A case study of co-production to support sustainable irrigation objectives in Victoria

Final Report

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GOULBURN BROKEN CATCHMENT MANAGEMENT AUTHORITY

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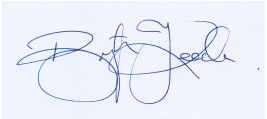

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Key terms used in the report

In this report we frame a new way of thinking about how government agencies work with farmers to achieve natural resource management (NRM) outcomes. With this comes new terminology that has meaning specific to this framing. A summary of the key terms is presented here to assist the reader.

Co-production Co-production (Whitaker 1980) simply denotes the functional relationship agencies have with their 'customer' or 'client' (typically the farmer) for natural resource management interventions. 'Production' denotes that they produce something, and 'co' suggests they work together to do this. The core insight embedded in the notion is that the effectiveness of an intervention depends on the effectiveness of the efforts of both agency and farmer and that their efforts are interlinked.

The co-production idea is basic to the way Ostrom (2010) reframed the way we think about working with farmers in NRM. She showed that farmers were capable of working with, and taking responsibility for, the co-management of natural resources. This is in contrast to the view often held which suggests that farmer self-interest will always erode the NRM base. Using co-production also brings focus directly onto the farmer, *their motivations* and *the relationship* required between them and agency to achieve co-production.

Farmers In Australia, there are many 'land managers', both public and private, of which farmers are one category. For example, governments manage public national parks and private land managers include farmers, urban property owners, manufacturers and foresters, to name a few. In our study of the SIP program our focus was entirely on farmers as land managers.

Institutional Design Institutional design refers to the way entities involved in pursuing some purpose are organised to cooperate. Depending on the purpose of interest it can refer to a single formal agency, such as DSE, or to a set of entities. Here, we use it to refer to the various formal agencies that have an interest in farm-related NRM, farmers and the structures that exist to facilitate integration amongst these components.

Interface The interface simply refers to the locations in the institutional system where farmers and agencies meet. This is everywhere interactions between the two parties occur, and is the main mechanism that integrates the roles of agencies and farmers as co-producers.

While there are various interface locations, each has one or other of two main roles for agencies: to engage with farmers for the purpose of identifying most appropriate NRM interventions; or to interact with farmers to promote individual adoption of interventions. These both contribute to intervention effectiveness, and are thus part of the overall interface, but they do not normally overlap.

We have defined these as *the adoption interface* and *the engagement interface.*

The adoption interface is typically one-to-one. The engagement interface is the domain, typically committees, where agencies work with farmer representatives, among others, to identify and promote local concerns and priorities, translate state and regional plans into the local context and identify optimal features of NRM programs. The distinct difference of focus of these two interfaces implies that salient farmer motivators and requirements for effective interaction may differ across them.

Linked to the interface notion is 'frontline staff'. These are the agency staff members that work directly with farmers at the interfaces. Different frontline staff may work at the two different interfaces.

Interventions Interventions is the term we are using to refer to deliberate modifications that agencies create for farm practices that affect NRM. These range from specific activities through to

programs and policies. The notion of co-production is not limited to any category of intervention: the skill of any intervention ultimately turns on judgments by farmers.

Motivators Motivators refers to specific factors that motivate farmer's interest in any practice change. These are identified from the farmer interviewee perspective. Motivators is not used to refer to farmer 'enthusiasm' or 'commitment', although these are likely to be influenced by the extent to which motivating factors are available or not.

Motivational Force Motivational force refers to the magnitude of the attractiveness of a practice change to a farmer. It is revealed in enthusiasm and commitment.

Psychological Contract Psychological contract refers to the mutual beliefs, perceptions and formal and informal obligations between two parties that enter a relationship (e.g. employer and employee). Each party possesses a set of expectations which they perceive the other should fulfil.

A psychological contract has two elements *transactional* and *relational*. Transactional elements are explicit, monetary-based expectations such as work for an agreed salary. Relational elements are implicit and dynamic like perceptions of interpersonal obligations, loyalty and commitment (Keeble et al. 2008). How well this contract is fulfilled impacts directly on motivation to perform and reciprocate agreeably (Rousseau 1990, 2004, Legge 2005, Keeble et al. 2008).

When two parties enter a relationship and form a psychological contract, each potentially has transactional and relational expectations that they aim to have fulfilled. Relational expectations are built up over time from interactions. The more we fulfil another's relational expectations, the more likely is it that they will *reciprocate* and meet our desired relational obligations. Conversely, not honouring these expectations can evoke a psychological contract breach.

For further detail see Appendix 1.

Psychological Contract Breach: Breaches occur when either party in a relationship perceives that their expectations are not met. Breaches, in either direction, impoverish the association between the parties. For example, breaches can result in a lower level of commitment or interest, reduced contribution or, in severe cases, outrage.

Strategic Courage Strategic courage refers to the preparedness of one party to penalise another to force compliance with long-term objectives. It is 'tough love' or the deliberate attachment of negative consequences to undesired behaviour even though consequences don't have to be delivered immediately.

The notion presumes that the party knows or assumes appropriate long-term objectives for the subject and that the subject will focus on short-term objectives unless sanctions are applied. Examples are compulsory education and routine bedtimes for children. Another is the compliant attitudes and behaviour that groups demand from their members, who wish to remain members, in the greater interest of the group (Wright et al. 2011b:22).

In the NRM context, strategic courage could be triggered by a farmer cherry picking NRM interventions, adopting only those with strong productivity benefits. The response of agencies to such a breach of a farmer's obligation to enhance NRM would be the withholding of access to future attractive interventions.

The disincentives for agencies to display strategic courage are numerous and strong (Wright et al. 2011b:18). An easier path to penalising breaches of NRM obligations in the psychological contract is through the negative judgments by farmers' peers.

1 Executive Summary

This project followed a two-part theoretical analysis of the implications of possible changes in the design of agencies involved in the implementation of the Sustainable Irrigation Program (SIP) in the Northern Irrigation Region of Victoria (Wright et al. 2011a; b). The purpose of the project was to test a series of propositions derived from the theoretical analysis about the design of Natural Resource Management (NRM) policy and farmers' motivation to contribute to NRM outcomes.

In 2011 we were commissioned to examine the importance of co-production for achieving Victoria's sustainable irrigation objectives for the Sustainable Irrigation Program (SIP). Our clients, the Department of Sustainability and Environment's Sustainable Irrigation Program (DSE SIP), the Goulburn Broken Catchment Management Authority's SIP (GB-CMA SIP), and the Department of Primary Industries' Service Design Research (DPI SDR) had a keen interest in ensuring irrigation policies and programs maximised farmer engagement.

The propositions were tested by personal interviews with farmers and current and former agency personnel involved in the SIP. In the interviews participants' perceptions of various critical components of the design and implementation of SIP interventions were explored. The survey was exploratory and focused on SIP rather than NRM generally.

Nevertheless, it was expected that implications for NRM in the broad could be substantial.

At the core of our reasoning was the seemingly non-controversial proposition that NRM interventions, including those of SIP, invariably involve joint effort by agencies and independent farmers: they 'co-produce' whatever is achieved, or not, by an intervention. A string of implications flow from this for the most effective cultivation of that co-production at the overall interface between farmers and agencies.

1.1 The importance of co-production for sustainable irrigation objectives in Victoria

The importance of co-production we established theoretically to rest on five key propositions:

1. **Dependency:** Agencies depend on farmers to achieve their objectives.
2. **Interface focus**: The relationship between agencies and farmers is fundamental to achieving co-production.
3. **Centrality of relational expectations:** Farmers relational expectations are critical.
4. **Salient farmer preferences:** Farmer preferences inform expectations.
5. **Interface Design:** The design of interfaces influences farmer motivation to co-produce.

Our survey of farmers and agency staff confirmed that each of these propositions was valid for the SIP case study (refer to section 3). Consequently, we established that the achievement of SIP interventions with farmers would be enhanced by consideration of these propositions in the design and management of SIP programs.

In brief, *our findings indicate clearly that agencies depend on farmers for knowledge, action and advocacy.* Knowledge is needed from farmers to lend interventions local appeal, relevance and appropriateness to maximise both the potential achievement of desired NRM results and the real achievement through adoption. Action is the adoption of interventions. Advocacy is either offering legitimacy to interventions by supporting them or providing recommendation of interventions to other farmers.

Knowledge and advocacy is acquired at *the engagement interface*. This is composed of the forums where agency staff and farmers consider actual and possible interventions; most prominently, committees.

Action is the result of interaction at *the adoption interface*; most often one-on-one interactions between agency staff and farmers.

Advocacy also occurs away from the interfaces but depends on farmer satisfaction with the outcomes of interactions at them. Advocacy can thus be by farmer representatives on committees or individual farmers to individual peers.

Our findings are that the likelihood of effective co-production depends heavily on the extent to which the operating characteristics of the two interfaces meet farmer expectations.

Expectations can be transactional or relational: broadly, monetary or socio-emotional. The typically low (and spasmodic) or absent transactional aspects of interventions mean that they do not characterise either interface routinely. This leaves *relational expectations* as the only category that farmers will always bring to either interface, and as such are an important consideration for agencies dealing with them. It also means that the psychological contract, the 'deal' that farmers perceive to be the basis of their interactions with agencies at either interface, is very vulnerable to any failure to meet farmers' relational expectations.

Our findings establish that both farmers and agency staff understand the critical role of farmer relational expectations at the engagement and adoption interfaces.

As would be expected, farmers' salient preferences determine the relational expectations that they bring to the interfaces and the factors they experience that breach them, corroding the psychological contract and, therefore, the potential for effective operation of the interfaces.

We found the *motivation factors* that attracted farmer to the adoption interface were *interest* in the issue, when a *threat or opportunity* was perceived or they required *access* to opportunities. The most common reason farmers were attracted to the engagement interface was to have *influence* over an issue or pending change. Typically, the issue was perceived as a threat, opportunity or was simply an issue of interest. For others there was a sense of *altruism* - they wanted to give back. *Our findings identify specific relational expectations, their motives and factors that have caused them not to be met.*

What is most apparent from our examination of farmer relational expectations is the value they placed on having interpersonal relationships with agency staff. Sections 3 and 4 of this paper offer insights into motivations, expectations and contributions each party makes.

Turning to the way interfaces should be designed, including decisions made about other aspects of agencies that influence what is possible at the interfaces, we have drawn on interviewees' insights into good and bad interface features from their experience. *We identify a variety of design implications for engagement and adoption interfaces.*

1.2 Recommendations to enhance co-production

The insights about institutional design and supporting farmer engagement are considerable and we encourage the reader to consider our detailed discussion of these insights presented in sections 4 and 5 of this paper.

In brief, co-production of SIP is encouraged by the following agency characteristics.

1. Agencies have a 'culture' that supports farmer and community engagement.
2. They work together to support this culture across agencies.
3. They involve farmer representatives early on and are honest about level of influence.
4. They provide farmer access to frontline staff for local intelligence.
5. They establish high-functioning relationships between agency staff.
6. Frontline staff have flexibility.

7. Complementary tools (e.g. planning and incentives) are used to link SIP and productivity outcomes on-farm and over time.

Co-production of SIP is encouraged by attention to the following to avoid breach of the relational expectations with farmers.

1. Clear and consistent farmer influence over intervention design and implementation.
2. Maintenance of frontline staff to maintain interrelationships with farmers.
3. If influence is to be reduced by centralisation, or frontline staff numbers reduced, the impact on relational expectations must be considered and managed to avoid breach of the psychological contract.
4. Respect farmers' values: do not lecture them about stewardship.
5. Respect farmers' contributions to co-production: do not politicise committees.

2 Introduction

2.1 Project background

Government agencies face perennial challenges of how best to engage farmers to work with them to achieve natural resource management (NRM) objectives. Farmers are critical to the achievement of these objectives because: they manage large tracts of land; they hold the local expertise needed for successful programs; and their farm practices can affect NRM. Because farmers' contributions are discretionary (they choose to accept or not the interventions agencies propose) agencies need to activate farmers' willingness to participate in the process (Wright et al. 2011b).

In 2011 the Department of Sustainability and Environment's Sustainable Irrigation Program (DSE SIP) and the Goulburn Broken Catchment Management Authority's SIP (GB-CMA SIP) commissioned Service Design Research to investigate the role of institutional design to support the achievement of sustainable irrigation objectives in Victoria. Our clients (DSE, GB CMA and DPI) had a keen interest in ensuring irrigation policies and programs maximised farmer engagement. Also, as a result of recent government reviews of delivery models for NRM, SIP agencies were keen to confirm the validity of the essential characteristics of their delivery model and identify areas for improvement.

In our review (Wright et al 2011a), we highlighted the essential institutional design factors being used nationally and internationally for NRM that would support SIP. Many warrant consideration but the most important proposed was the co-production approach. Ostrom (2010) reframed the way we think about working with farmers in NRM. She showed that farmers were capable of working with, and taking responsibility for, the co-management of natural resources. This is in contrast to the view often held which suggests that farmer self-interest will always erode the NRM base.

Co-production is a way of framing the relationship between agencies and farmers as one of interaction with farmers to produce preferred NRM. This approach brings directly into focus *farmer motivations* to 'produce' preferred NRM with agencies, and the *type of relationship* needed between agencies and farmers to achieve this. Typical characteristics of effective co-production include deep delegation in a multi-level system, establishing vertical trust, securing lower level rights and influence (Ostrom 2010, Whikater 1980, Marshall 2008), and building and maintaining 'interface' capacities to work with farmers and community (Wright et al .2011b).

We propose that the benefits of taking a co-production approach are that:

- it takes account, in institutional design, of farmer motivation and community interests;
- it achieves co-operation both in adoption and engagement by responding to farmer needs;
- it accesses unique local knowledge and cultivates a shared interest in success; and
- it achieves a wider reach into community involvement and self governance and potentially accesses strategic courage from citizens at this level.

2.1.1 Who is SIP?

The DSE SIP is a Victorian program designed to support sustainable irrigation objectives in Victoria's catchments. SIP is a State government program that is managed by the Water Division of the State agency DSE. The group that manages the program has a policy and investment role and aims to foster sustainable irrigation in Victoria and minimise the impacts of irrigation. The program spans six irrigation regions in Victoria and consists of catchment and farm programs focused on salinity, nutrient reduction, and water savings through on-farm efficiencies.

The GB CMA SIP and DSE SIP are partners in the delivery of irrigation programs in the Goulburn Broken Catchment. Both agencies partner with other agencies to implement SIP including water authorities, the regional Department of Primary Industries and research and industry groups.

Agencies involved in SIP have legislative responsibilities to co-ordinate the management of land, water and biodiversity resources in Victoria's catchments in various capacities. Specific detail about the SIP institutional design and relationships are presented in results.

2.1.2 Case study objectives

To test the appropriateness of the 'co-production model' proposed in our earlier papers (Wright et al. 2011a, 2011b), our first step was to undertake a qualitative investigation of how co-production fits with the way SIP currently operates. Being the backbone of the co-production approach we had a strong research focus on *farmer and agency motivations* and the *relationships* established between farmers and agencies implementing SIP. To do this we interviewed farmers and current and former agency staff to explore the presence of key determinants of co-production effectiveness and possible areas for improvement.

We hoped the case study would enable us to:

- identify the key institutional design features that support farmer engagement for irrigation policies and programs;
- explore the importance of the co-production approach for SIP;
- collect farmer and agency perceptions on motivations to co-produce; and
- establish the importance of specific dimensions of agency-farmer relationships for farmer engagement and adoption.

The key stages of this project were:

i. Design a qualitative case study of the state and regional (Goulburn Broken) SIP programs.
ii. Undertake interviews with farmers and agency staff involved in SIP or similar programs.
iii. Analyse data about co-production, farmer and staff motivations, and institutional design elements.
iv. Prepare a final report for consideration by DSE and GB SIP.

In this report we present the case study results and recommendations. This report is the final deliverable for the project and will be accompanied by briefings with DSE and GB CMA.

2.2 Research questions

To test the merits of co-production for sustainable irrigation in Victoria, we brought together organisational psychology, organisation theory and motivation theory to explore the co-production approach (Wright et al. 2011a, 2011b). This approach is summarised in five key propositions: dependency, interface focus, centrality of relational expectations, salient farmer preferences and interface design. The propositions form a causal chain of reasoning and formed the basis for our interview questions, data collection and analysis.

To explore the factors that motivated farmers to account for NRM in farm practices with agencies and the relationship between them we used psychological contract theory (Rousseau 1990, 2004, Legge 2005, Keeble et al. 2008). For a detailed analysis of the theoretical approach refer to Wright et al. (2011b) or Appendix 1. Psychological contract theory offered a meaningful investigation of the mutual beliefs, perceptions and expectations that arose between agencies and farmers.

2.2.1 Dependency: *Are SIP agencies dependent on farmers to achieve SIP objectives*?

Agencies depend on farmers collectively to contribute local intelligence to the process of conception, design and/or implementation of NRM interventions and, individually, to change behaviours to adopt an intervention. The greater the dependency, the more farmer involvement in co-production is linked to agency performance.

This dependence includes reliance on farmer *knowledge* (of their own farm and, as representatives, of local farms of peers), on farmer *action* (to adopt interventions) and, as representatives and individual adopters, on *advocacy* of interventions to peers.

2.2.2 Interface focus*: Is the relationship between agency staff and farmers fundamental to achieving co-production*?

Interaction with farmers is obviously required to deal with this dependency and the extent to which the dependency is satisfied will depend on the adequacy of the interactions.

The two major components of the overall interface are defined here as *the adoption interface* and the *engagement interface*. One is the interface, most often one-to-one, between agency representative and farmer to encourage adoption. The other is the interface between farmers and agency staff in forums designed to enable engagement by farmers in the intervention design and implementation process. These are most often committees formed by agencies but can extend to groups formed by agencies or by farmers.

In the case of the adoption interface, the effectiveness of the management of the interface is measured by the market penetration (the level of adoption) of an intervention and the satisfaction of farmers with pre- and post-adoption processes and outcomes.

In the case of the engagement interface, effectiveness is measured by the appropriateness of proposed interventions and the legitimacy that farmers attribute to the outcomes of the engagement process. Without that legitimacy, and individual satisfaction, farmers will not advocate for those outcomes.

2.2.3 Centrality of relational expectations: *Are farmers' relational expectations a critical factor*?

To identify how the effectiveness of interface management is maximised it is necessary to analyse the motives and expectations of the farmers on whom agencies are dependent. When agency staff establish a relationship with farmers, a psychological contract forms which includes mutual beliefs, perceptions, obligations and mutual expectations of each other. A psychological contract has both a transactional (monetary) and relational (socio-emotional) base which become obligations either party fulfils. Because for NRM activities the transactional obligations are slight, the need for agencies to meet relational obligations intensifies.

Theoretically, in the absence of transactional obligations of any substance, interactions at the interfaces are completely vulnerable to poor satisfaction of relational obligations: there is no redundancy, no fallback position of the kind that operates in conventional employment contexts. The health of the relational obligations within the psychological contract, between agencies pursuing NRM objectives and farmers, determines whether there is an NRM workforce at all, not merely how committed it is. Equally, not honouring relational expectations can create a psychological contract breach.

2.2.4 Salient farmer preferences: *How do farmers' preferences inform relational expectations*?

The motivations of the two parties to a psychological contract determine the expectations that are most important to them. The motivators will include the functional results they are seeking from the interactions with the other party. There will also be relational expectations derived from cultural and personal expectations as to acceptable interpersonal relations. Given NRM objectives, for agencies the relational expectations that they have of farmers include openness, at the least, to the prospect of enhancing the NRM outcomes of their farming practices.

For farmers, the basic importance of farm financial viability means that this will motivate an interest in productivity-enhancing results from interactions with agencies, together with satisfaction of some level of other objectives such as leisure, stewardship of the environment, and so on. The pursuit of

enhanced productivity competes to various degrees with satisfaction of other objectives, and sometimes it does not compete at all. The relationship between productivity objectives and stewardship objectives, especially, influences the framing of NRM interventions by farmers and the implications of this for interface design.

Farmers differ in their concern for stewardship of the environment. These differences are likely to be tenacious and, as a result, changing farmers' resource-use practices requires changes in relevant perceptions via interactions with agency staff (Wright et al. 2011b).

Farm performance will have physical farm productivity at its core, together with other preferences (for leisure, for stewardship, for social acceptability for example) that are sought to be satisfied once a minimal level of total physical productivity has been surpassed. Farmers under financial stress will be more concerned than otherwise with possible productivity gains; other preferences will not be considered if a change in practice reduces expected productivity. Above the tolerable level of farm performance, practice changes will involve a calculation of performance that adds stewardship benefits to productivity benefits. The weighting will reflect farmer preferences, informed by personal values related to stewardship in this case.

The motivational force that a farmer has for an intervention will depend on the appropriateness of the balance of productivity and stewardship benefits they perceive and the total level of benefits. There will be a level below which the benefits are not worth chasing. The implication of this is that the role of NRM agency staff in adoption processes for a farmer must include: explaining the relevant benefits and uncertainty surrounding stewardship activities, finding ways to incorporate NRM activities into productivity by working with the farmer's preferences and, over time, working with farmer perceptions to identify possibilities where productivity and stewardship outcomes are mutually beneficial.

2.2.5 Interface design: *Do interface design principles influence farmer motivation to co-produce?*

Theory suggests (Wright et al. 2011a, 2011b) that deep delegation of decision-making authority, also called subsidiarity in NRM literature, is needed to satisfy farmer's relational expectations and encourage them to reciprocate in ways agencies desire. Specifically, the ability clearly to influence NRM policy decisions, if not actually make them, is a necessary condition for farmer interest in engagement. At the adoption interface influence is unavoidable: the farmer is the decider. At the engagement interface it depends on the way structures are designed.

If we gauge the farmer interest in delegation of authority and the importance of farmer influence on outcomes at the interfaces are high, we expect institutional design of interfaces that serves these key characteristics to be important to maximising co-production for SIP.

The decisions that determine the nature of encounters at the interfaces include any and all that influence agency staff roles, farmer roles, interface forums and staff capabilities. Staff roles are influenced by the decisions made, by all agencies involved, about program integration, the nature of inputs desired from farmers to the encounters and the extent to which maintaining interaction with farmers is defined as an explicit staff role. Farmer roles are influenced by agency decisions as to locations of decision making authority, the timing of farmer input into program development systems, levels of agency support and development of farmer capabilities to interact, and forum design (particularly of engagement forums).

In this research we sought to identify active farmer motivations and expectations of interactions at both interfaces and the extent to which these are being satisfied.

2.3 Research method

We chose a case study approach to explore agency and farmer perceptions of co-production for sustainable irrigation objectives in Victoria. This method enables an intensive examination of the research problem within the richness of the research setting and so allows unique features of the case to be observed and fully explained (Bryman 2001).

The co-production propositions formed the basis for our interview questions, data collection and analysis. To explore the factors that motivated farmers to produce NRM activities with agencies and the relationship between them we drew on psychological contract theory (Rousseau 1990, 2004, Legge 2005, Keeble et al. 2008).

2.3.1 Interviews

First, we conducted a document analysis to understand each agency's role and objectives. Second, semi-structured interviews were then conducted with agency staff and farmers. Two interviewers conducted the interviews face-to-face with the exception of two phone interviews. Interview responses were transcribed by the interviewers and analysed using case-analysis (Patton 1990). The analyses involved identifying and describing the psychological contracts between agencies and farmers, mapping the interface, identifying the confirmation or not of the co-production propositions, and inferring ways co-production could be improved for SIP.

2.3.2 Sampling

As the study was exploratory in nature, sampling was purposive. The guiding criterion was the emergence of convergence in responses. The contact details for interviewees were obtained from project funders and interviewees. We interviewed 18 farmers from the Goulburn Broken catchment including Shepparton, Murray Valley, and Central Goulburn districts. The majority of interviewees were irrigators with dairy, horticulture, cropping and mixed farming enterprises.

We sought to include some dryland producers, and did, but enjoyed much less success in identifying willing interviewees. The few we could interview, coupled with relevant agency staff perspectives on dryland farmer contexts, provided insights into differences among farm types. Anecdotal evidence suggested that a characteristic of dryland farming appears to be much lower levels of participation in NRM interventions. Our dryland sample was too small to consider farm-type causes of this. However, dryland farmers did converge with irrigation farmers in the core areas related to expectations of agencies, motivation to engage and related aspects. That is, major differences in behaviour related to production systems rather than individuals. Data were too few to analyse the adoption interface related to dryland farmers. However, the data dryland farmers provided relating to the engagement interface did inform the results.

To explore a range of farmer perceptions on motivation to co-produce, we interviewed farmers that had had extensive experience with agencies, and others that had not.

Agency interviewees (12, past or present) were selected based on their involvement with farmers, the management of SIP programs, policies and NRM broadly. We selected interviewees from four different agencies (DPI, G-MW (Goulburn-Murray Water), DSE, CMAs) to understand the breadth of the SIP interface. To explore the spectrum of experience in co-production management, we interviewed staff in various roles including policy design and implementation, executive management, program implementation and frontline management.

2.3.3 Study limitations

The objective of this case study was exploratory and the results therefore provide insights into the notion of co-production for this case only. Further trials would be required to generalise the case study results. We recognise that the Goulburn Broken is one irrigation region in Victoria and, to ensure wider applicability, the co-production propositions would need to be evaluated in other irrigation regions. We did attempt to secure two regions in this study but timing proved difficult for all parties. Notwithstanding this, the results are relevant for other DSE SIP regions to consider.

3 Survey Results and Analysis

In this section we present the results and analysis of our case study of co-production for the SIP. First, we present the way co-production fits with the way SIP currently operates and the relative importance of the co-production propositions from section 2. Next, we present farmer and agency perceptions on motivations to co-produce for SIP and the relational expectations that arise at the interface. Results are divided into the adoption interface and the engagement interface because the motivations and relational expectations for each were quite different and warranted separate consideration.

3.1 Confirming the importance of co-production

This study was designed to identify how the prospects for co-production could be maximised, given unavoidable constraints. The first question to be addressed was the extent to which the claim (by Wright et al. 2011a, 2011b) that NRM necessarily involves co-production was valid.

In Table 1 are quotations by agency interviewees that go to the notion of farmers as co-producers. These statements provide clear evidence that the propositions are of value for SIP. We found SIP agencies were dependent on farmers to achieve their objectives by way of *knowledge, action* and *advocacy*. Farmers did have salient preferences that needed to be accounted for when agencies proposed NRM interventions. Quotations confirmed the importance of an *interpersonal relationship* with farmers to achieve agency objectives. Staff were alert to the consequences of managing farmers' relational expectations. The predominant view from experience was that a devolved institutional design benefited agency performance and, if farmers had influence, benefited them also.

Co-production has obvious and less obvious dimensions with respect to dependency. The obvious dimension is that farmers manage the bulk of land and any policy intended to modify resource-use practices inevitably implies modifying their behaviour. The less obvious dimension is that the substantially unidimensional psychological contract, with slight or no transactional obligations, makes relational obligations more important than in any workplace. Farmers can choose not to engage: they are a discretionary workforce for NRM.

What emerged with stark clarity from the data was that the core of the relational obligation is that farmers must perceive, individually or collectively, that an NRM program, or a broader-focus program embodying some NRM, is relevant and sensible in their context. Many agency interviewees emphasised the importance of establishing a high-functioning relationship with farmers as the key to achieving SIP objectives, particularly 'green' ones.

All interviewees with experience of engagement interface management described farmers and community members as an indispensible input to the success of SIP (both in central and regional design). Agency interviewees also emphasised the importance of involving farmer representatives early to help identify problems because they were often too complex for agencies to identify alone. Experience had shown interviewees that, as a consequence of early involvement, a more acceptable, enduring change was achieved with the farming community.

Table 1 Agency quotations that support co-production propositions for SIP

Co-production proposition	Interview statements that match co-production propositions
1) Dependency	
a) *Knowledge*	• 'farmers manage two thirds of the catchment so it is there that [agencies] make a difference' • 'farmers test the accuracy of what [agencies] think problems are and possible solutions' • 'community must have real input at the regional level; they must get to decide' • 'program objectives need to be designed with farmers' • 'you can't have an arrogant, hierarchical approach to NRM; the field is too complex and we never know fully what is going on until we consult'
b) Action	• 'policies and programs don't happen without farmers' • 'realise you are only part of a farmer forming a solution'
c) Advocacy	• 'you need community champions out front to win farmers over' • 'have farmer representatives whenever you can; only they know farming as well as we think we do'
2) **Interface focus**	• 'we must understand farmers' operating environments' • 'the relationship between frontline [agency] staff and the farmer is central to achieving enduring change' • 'agency staff have a 100% impact on farmer involvement' • 'the relationship between frontline [agency] staff and the farmer is central to achieving enduring change' • 'the purchaser-provider model has gone too far; it is not useful – it misstates the relationship'
3) Relational expectations	• farmers can be more powerful than [agencies] in pushing issues' • 'farmers are powerful; they will fire up the media if they are not happy' • 'link it to what they value, don't try to change their values' • 'it is hard to work with farmers when they don't value the outcome you are selling'
4) Salient farmer preferences	• 'it is hard to work with farmers when they don't value the outcome you are selling' • 'link it to what they value, don't try to change their values' • 'we need to start with productivity activities, then with a relationship we can introduce NRM activities, they are quite open to this'
5) **Interface design**	
a) *Deeply delegate*	• 'you need community champions out front to win farmers over' • 'the authority that a committee perceives it has influences its openness with agency staff' • 'program objectives need to be designed with farmers'
b) Influence	• 'be prepared to forego total [agency] control to get a good outcome' • 'community must have real input at the regional level; they must get to decide'

3.1.1 Agency perspectives: supporting co-production

We asked agency interviewees to draw on their experiences and suggest what needed to be in place institutionally and operationally to support co-production.

First, many interviewees stated there needed to be a 'culture' amongst agencies where they valued involving farmers and community and supported their influence. It was hard for one agency to achieve this alone. For this culture to be sustained executive leadership within and between agencies was raised. Other examples given were inter-agency representation on committees and at public forums, and regular interactions between agency executives.

Establishing well-functioning relationships with partner agencies rated highly with interviewees. This was described as building trusting relationships, regular communication, knowing the person behind the job, and involving each other in key decisions. There was a clear dependency between agencies for intelligence, access to farmers (especially a reliance on intelligence from frontline staff) and legitimacy of policies and programs.

Predominantly, interviewees believed offering local discretion and influence were cornerstones of this culture. Agency interviewees raised that adopting this culture meant that they had to forego agency control to get a good outcome, which could be challenging for some. 'Good' engagement was perceived as involving farmers early in policy and decision processes and being honest with them about their level of influence.

Interviewees conveyed the importance of frontline staff because they held the interpersonal relationship with farmers that could result in co-production. These staff conveyed that what helped to manage the interpersonal relationship was discretion to commit to farmers (incentives, planning, etc.) and flexibility to adapt activities to account for the local context. For programs, complementary tools (to the relationship) raised included the specific 'whole farm planning' intervention and grants as they gave staff the foot in the door. Once they had an interpersonal relationship with farmers they worked to earn respect and trust and could identify synergies for both government and the farmer for NRM. Other operating processes thought to support co-production were state and regional planning processes although, if too prescriptive, these could stifle representatives' discretion.

3.1.2 Potential co-production breaches

We asked interviewees to describe the types of challenges they faced in maintaining co-production with farmers and community members (see Table 2). We found a clear relationship between agency perceptions of potential breaches and the co-production propositions. For example, if programs were centralised and SIP was disconnected from farmers and community, their dependency meant expectations were breached.

Second, the contraction of frontline services to farmers was perceived to have potential to breach farmers' relational expectations with respect to service quality and interpersonal relationships. When breaches did occur, frontline staff tended to bear the brunt of farmer frustrations being the 'face' of agencies in farmers' eyes.

Inappropriate framing of SIP to farmers was thought to result in breaches with farmers; for example, lecturing farmers ignored their preferences and neglected the importance of establishing a personal relationship built on respect. So could uncertainty created by complex, high-cost programs where risks were transferred to farmers.

A breach of the 'engagement culture' raised was agencies that behaved in a paternalistic, hierarchical way and didn't trust regional partners or community representatives. This was thought to affect staff and farmers' morale and motivation.

Table 2 Agency staff perceptions related to co-production breaches

Co-production propositions	Agency perceptions
1. **Dependency**	• Disconnection from farmers/ community
2. **Interface focus**	• Lack of support to manage frontline contraction.
3. **Relational expectations**	• Contracting frontline; undermining capacity to deliver.
4. **Salient farmer preferences**	• Lecturing farmers or trying to change their values
5. **Interface design**	• Eroding local influence. • Paternalism rather than partnership.

3.2 The interface for SIP

To analyse the SIP interface we asked interviewees to describe how they interacted with farmers to promote adoption of SIP activities and describe their experiences dealing with farmers. To better understand the importance of relationships between agency staff and farmers we asked all interviewees to reflect on their program experiences. This included motivating factors and relational expectations that arose, barriers to involvement and potential breaches.

3.2.1 Analysis of the SIP adoption interface

The adoption interface for SIP was primarily managed by regional DPI staff who were the principal non-commercial contact for farmers and held the primary *ongoing* interrelationship with farmers. DPI were also the principal non-commercial contacts in the implementation of explicitly productivity-oriented programs and tended to sit outside the SIP (e.g. in dairy or horticulture). There were specific programs where other agencies led the interface, like groundwater (G-MW) and modernisation (NVIRP). Other SIP agencies like DSE and the CMA depended on DPI (and others) to manage the ongoing relationship with farmers to promote adoption.

Significantly, there was a single criterion that generally dictated the nature of the interface between farmers and any given agency. The interface was one-to-one and direct between farmer and staff member when the agency was managing program adoption at the *property level*. For DPI-managed NRM programs, processes like one-to-one extension and groups were used.

There were a number of agencies that interacted with farmers around NRM concerns at any given point in time. The significance or prominence of the NRM elements in the psychological contract between farmers and each agency differed from agency to agency. As well, the specific expectations each agency had of farmers differed. It is important to note that there are, potentially, a number of psychological contracts involving a single farmer and they are interrelated. Therefore, it is necessary to consider the set of contracts and prominent interconnections among them.

DPI staff working with farmers were often relied upon by investor agencies to provide intelligence from the field to assist policy development and advocacy; thus, dependencies on frontline staff spanned agencies. Generally, however, the 'upward' flow of information, which is a major part of agency (NRM) expectations of farmers, was via groups or committees interacting with CMAs, G-MW or DSE.

3.2.1.1 The motivation factors that attracted farmer interest to programs

We found that the farmer motivation factors for programs fell into three categories: interest in the *issue*, when there was a perceived *threat* or *opportunity* for their farm context, and when they required *access* to innovations, funds or opportunities. These categories are not mutually exclusive and a farmer could be motivated by one, some or many in the three categories. Table 3 includes examples of program motivation factors drawn from the whole variety of interviewees' perspectives.

For any change to farm practices, we found a farmer considered the overall increase it offered to their farm's performance. This was a risk-adjusted perception: the uncertainty that surrounds productivity outcomes caused discounting of the benefits in the farmer's mind. Performance had physical farm productivity at its core, together with other preferences (for leisure, for stewardship, for example) that were sought to be satisfied once a minimal level of total physical productivity was surpassed.

Farmers under financial stress appeared to be more concerned than otherwise with possible productivity gains; other preferences were not considered if a change in practice reduced expected productivity. Such a reduction may not result from an expected reduction in average output; the reduction may be caused by the change being judged to increase production risk or reduce future choice.

Predominantly, agency interviewee perceptions corresponded with farmer data. Farmers were thought to be motivated when they had a problem to solve on their farm, or they wished to resolve an issue for their community, group or area. One interviewee summarised the situation as:

> *Farmers are motivated to deal with change in their farming context, new technology, profitability and sustainable practice change.*

Frontline staff observed an increase in interest in programs or joining groups when dramatic changes like the drought and water reform occurred (corresponding with farmer statements about threats). In these instances farmers sought information and advice to manage change and remain viable. Staff stated that access to financial incentives did trigger interest for some.

NRM programs were designed to change the culture of resource use. Not surprisingly, they were perceived by farmers as being inseparable from the productive activities with which they intersect. Few were viewed as solely NRM interventions.

Table 3 Motivating factors that attracted farmers to programs

Motivation factors	Farmer perspectives	Staff perspectives
Issue interest	• interest in the issue • perceived need for specific, independent, time-relevant, expert advice to enhance farm operation	• when there is a problem that needs to be solved on farm • farm development opportunity
Threat	• external change has modified the farm context significantly • potential to make the wrong choice, unaided, on an unavoidable issue • determine how a change will impact on them	• seeking advice to remain viable in difficult times • seeking assistance in interpreting a policy change
Access	• funding for values-driven NRM innovations • whole farm planning • productivity and/or lifestyle enhancements • gains, financial grants, enhanced decision making quality	• processes like whole farm planning and incentives • information that translates programs into local context

3.2.1.2 Barriers to farmer involvement at the adoption interface

We asked both farmer and staff interviewees if there were reasons why farmers did not get involved in programs (Table 4). There were several types of barriers raised: inability to access programs because of no agency relationship, being overwhelmed by change or administration, they lacked capacity (e.g. financial, time), or lack of interest in the issue. Agency interviewees stated that some farmers were put off if they had bad prior experiences with agencies or the agency had staff who were not based locally. Also, an inability to link programs to an issue that farmers valued was thought to demotivate potential adopters. Staff and farmer interviewee responses largely converged.

Table 4 Barriers to farmer involvement at the adoption interface

Barrier type	Farmer perspectives	Staff perspectives
Access	• no relationship with an agency contact • a sense of being overwhelmed by the scale of change or program complexity • 'too many hoops to jump through'	• they got frustrated by red tape • staff weren't local
Capacity	• cash flow constraint when funding was refunded later • inability to contribute part-funding • lack of time	• they didn't have the capacity (financial) • less respect for staff that weren't local • programs or NRM issue and proposed solutions are confusing
Lack interest	• the issue doesn't interest me • administrative overload of some programs • few purely conservation programs	• not linking NRM programs to what farmers value • didn't value the outcome you were offering
Threat	• suspicion of agency motives in collecting farm data • approval delays can create financial risks • some programs create winners and losers	• past bad agency experiences created resistance

3.2.1.3 Farmer perspectives on their information sources

Farmer interviewees indicated that government programs and agencies were only part of the overall interface from which they sought information. The information sources raised by farmer interviewees are illustrated in Figure 1. Search behaviour provides the context into which agency programs have to be pitched. The information sources that farmers use included: neighbours (almost without exception amongst respondents); agencies for specific programs; private providers; groups or committees; and the world wide web. Who farmers used depended on their farm context and their perception of their role as farmer, personality, motivations and needs.

The advice sought was usually specific to an issue and its importance determined by farmer preferences. When entering farming, many farmers had embarked on standing courses offered by agricultural colleges or agencies. Thereafter, the information search was much more targeted. The web was widely regarded as too diffuse an information source, albeit satisfactory for people who prefer to undertake their own research on an issue initially or altogether. Some farmers used physical experimentation to refine their understanding of the relevance of problem solutions for their context.

The government programs that farmer interviewees recalled included whole farm planning and farm improvement programs, Farm Water, Modernisation, dairy and horticulture extension, support

groups for water reforms, pest management, Beefcheque and training courses like Farm$mart, artificial insemination, and business management.

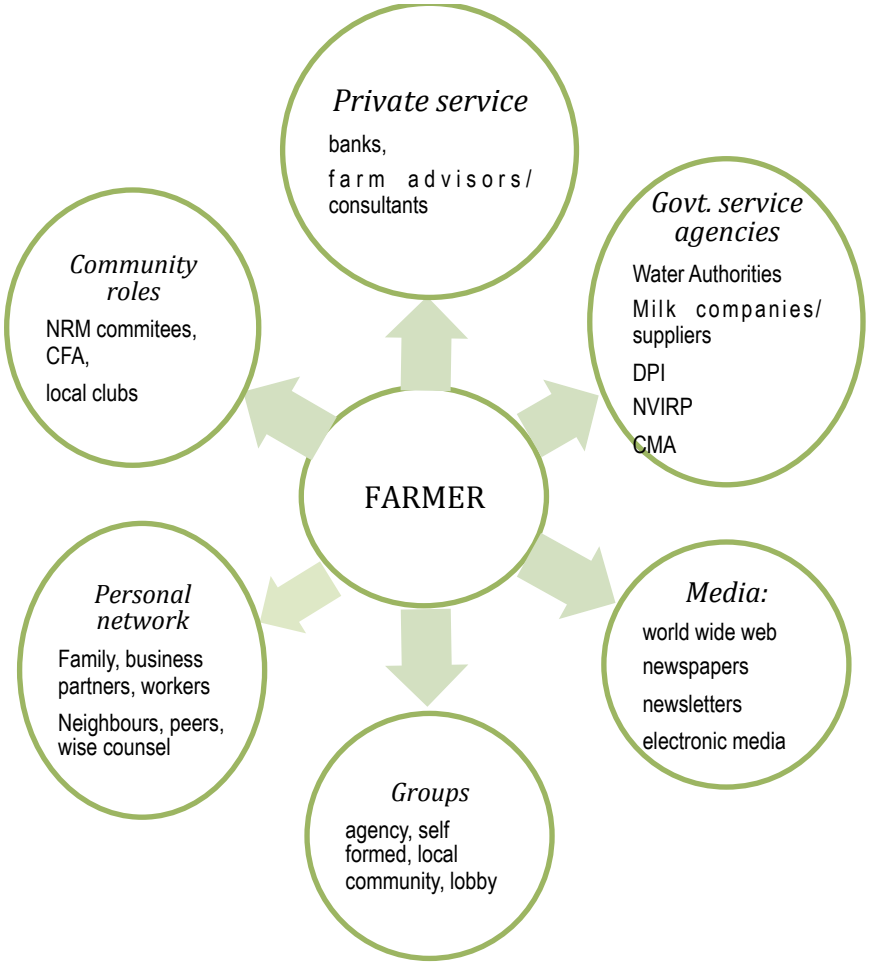

Figure 1 Information sources identified by farmers

3.2.1.4 Intervention factors that farmers valued

We asked farmer interviewees what they valued when working with government agencies on programs. Many farmers stated they were attracted to *tailored programs*, staff they could *trust* especially if they had continual access to a *'go to' person*. Agency interviewees confirmed this need as farmers would regularly call them for advice on issues where they thought government could help. Frontline staff believed it was important to meet this expectation so that farmers had a good agency experience. The value farmers placed on a good *interpersonal relationship* with staff was clear. Whilst they valued financial incentives, these were not the only driver of satisfaction.

In staff interviews (summarised in Table 5), staff emphasised the importance of *understanding farmers' interests* and being able to frame NRM activities in light of these interests. Staff impressed the importance of being able to *create synergies between farmer and government goals*, particularly when dealing with 'green' program elements. For farm programs, staff needed to make the private benefit of programs evident.

Staff interviewees believed farmers were attracted to working with agency staff if they got support to *deal* with the *administrative load* of programs, sort through confusing requirements and access desired programs. Farmers were observed to also desire *independent advice* and *access to relevant networks*. Staff living local was raised by both as a mark of credibility and accessibility.

Staff found it easier to access farmers when programs included *planning tools* and *incentives*. These tools were a conversation starter and, in listening to farmer motivations, it was in time possible for staff to introduce program components including environmental aspects once trust and a relationship were established.

Table 5 Factors attracting farmers to interventions

Motivating Factor	Staff perspectives on attracting farmers to interventions
Interest	• frame NRM activities in farmer interests • personal relationship to support practice change • create synergies between government and farmer goals
Threat	• identify threats and provide information to address them
Capacity	• establish trust and a continuous relationship • develop a local network to provide support • provide independent advice
Access	• process program and grant administration • complementary tools to support relationship (planning, grants) • port of call into agencies to manage issues • live local

3.2.1.5 Barriers to using agencies

When asked if there were any barriers to working with agencies, farmer interviewees mentioned the absence of a relationship with a staff member was a common reason. Farmers' identified barriers are presented in Table 6. This presents interesting considerations for the importance of establishing an interrelationship with farmers to promote adoption.

Farmer interviewees also raised barriers like a drop in local services due to functions being moved out of their region, which they believed made programs less relevant to them. Some interviewees had on occasion received inconsistent advice, particularly when different agencies were involved in the one program. In some instances this created challenges (or risks) for farm management. Other farmer interviewees simply believed their knowledge superseded that of government agencies and sought out specialists.

When asked the same question, agency interviewees commented it was harder to work with big farmers because they often had private industry contacts and sought specific knowledge or were highly skilled themselves. Agency interviewees also mentioned promoting NRM or green activities alone, without offering any benefits to the farmer, was a barrier. Another issue for staff was having less time to build relationships with farmers.

Table 6 Barriers to farmers using agencies

Barrier type	Farmer perspectives
Interest	• Staff only interested in productivity focus rather than pure sustainability [outlying response]
Threat	• Inconsistent advice from different agencies
Capacity	• My knowledge exceeds that of staff member • Lack of specialists for what I need
Access	• Absence of relationship with staff member • Contraction of local staff (centralising)

3.2.1.6 Relational expectations for the adoption interface

We proposed that, when two parties enter a relationship and form a psychological contract, each has relational expectations they wish to have fulfilled. Relational expectations are built up over time from interactions. The more we fulfil another's relational expectations the more likely they will *reciprocate* by meeting our desired relational obligations. Conversely, not honouring these expectations can evoke a psychological contract breach. In Table 7 we summarise what farmers and staff perceived were the 'relational expectations' they had at the adoption interface.

Above all, the *interpersonal* and *expertise* elements of the relationship were valued highly by farmer interviewees. Many recalled the person from the agency rather than the agency itself. This was confirmed by the extensive list they offered of people that had worked with them, particularly those they considered indispensible.

Farmer interviewees commented that they expected staff to be professional and respectful, good listeners, maintain confidentiality, be proactive and support them to cut through red tape. They also wanted staff to be honest about potential opportunities or threats.

Agency interviewee responses converged with those of farmers and stated often that having an authentic relationship with farmers was critical if they were to create opportunities for NRM activities. Beyond an authentic relationship, agency staff held one main expectation of farmers: farmers have the most reliable understanding of their immediate management context as it related to NRM.

It became very clear during our interviews that, as one would expect, farmer expectations of DPI staff applied to their overall role, not merely the NRM program aspect of it. It became clear, also, that DPI staff (among others) were firmly of the view that some degree of perceived private financial benefit was normally essential for NRM programs to attract farmers. Depending on the quality of the relationship they had with a farmer, that benefit may be very small but adoption was unlikely if it was instead a cost. That was not to deny a common concern with stewardship and amenity among farmers; it was the common presence of this that enabled 'acceptable benefits' to sometimes be very small. Relatedly, programs designed to reduce negative, distant spillover effects were regarded as adoption impossibilities: stewardship concerns, in the absence of non-trivial financial benefits, did not stretch to distant places and anonymous farmers.

Table 7 Relational expectations at the adoption interface

Relational Expectations Type	Farmer Expectations	Agency Expectations
Interpersonal	• familiarity with my farm • the same staff member continuously • trustworthiness • clearly map programs into the my context and goals • Open and listens to my side	• duty of care to their farm and the physical environment • authentic relationship
Professionalism	• reliability and timeliness in follow-up of commitments made • being proactive and make things happen • be straight and respond in a timely manner	• interested in productivity enhancing change
Expertise	• broad knowledge • informed by practices of other farmers in the area • cut through the red tape	
Respect	• receptivity and empathy • punctuality [a respect signal] • maintaining confidentiality • live local	• respect and trust staff

3.2.1.7 Breaches of relational expectations: farmers

Breaches occur when either party in a relationship perceives their relational expectations are not met. Breaches, in either direction, impoverish the association between the parties. For example, breaches can result in a lower level of commitment or interest, reduced contribution or, in severe cases, outrage. We asked farmer interviewees what potential breaches could occur one-to-one. Their responses are summarised in Table 8.

We found farmer perspectives on breaches mirrored their relational expectations. So, if there was no interpersonal relationship, a lack of professionalism, expertise or respect, breaches were likely to occur. Farmer interviewees who valued a personal relationship were frustrated when they encountered a recorded message rather than a person. Being lectured, sloppy preparation and staff not turning up were common frustrations raised by interviewees. Respect breaches included breaches of confidence, and arrogant and overpowering staff that 'sold' without listening were unappealing.

Table 8 Farmer perspectives on breaches that arise

Breach type	Farmer perspective on breach
Interpersonal	• recorded message not a person • reduced level of person-to-person contact
Professionalism	• less productive group encounters • discontinuous agency staffing (I have to keep training new staff) • sloppy preparation for meetings • lecturing me
Expertise	• lack of humility when new staff • inconsistent advice
Respect	• arrogant overpowering staff • breach of confidence • selling something rather than listening

3.2.1.8 Frontline staff characteristics that support co-production

The study of farmers and agency staff revealed the specific components of the psychological contracts that operate to determine the willingness of farmers to consider adopting agency programs and engage in information collection and decision processes. This indicates the interface characteristics that agency managers with farmers should seek (Table 9).

The specific effective approaches by agency staff, and agency support of them, that experience has revealed to staff and farmers were sought in the study. These are the specific behaviours that, as a relationship develops, fashion the fundamental quality of that relationship. We were seeking to identify the factors that determined the strength of psychological contracts, and therefore agency influence, over and above the basic level of merely ensuring that relationships were not corrupted by breach of the psychological contract. It should be borne in mind that the one-on-one context is typically a relationship between a DPI representative and the farmer. Also, it is not specific to NRM issues.

Staff characteristics that interviewees indicated could help or hinder relationship quality are here grouped under *personality, attitudes, behavioural style* and *expertise*. Each matters in both one-to-one and committee contexts.

Table 9 Frontline staff characteristics that support co-production

Key Characteristics	Example
Personality	• the ability to attract high respect and trust and exhibit conviction • being outgoing and likeable • able to listen and display empathy • able to self-monitor - be aware of your impact on others • open and confident in exchanges • able to influence people
Attitudes	• respect farmers and their knowledge • recognise that many farmers have been let down by agencies in the past • be receptive to the farmer's perspective before offering advice • recognise the risks farmer's face • realise they are only one input to a farmer forming a solution • understand the extreme difficulty of putting yourself in a farmer's shoes • link programs to what they value - don't try to change their values • dedication to the relationship with farmers and partner agencies • clearly accept contrary views of farmers to their own • do not signal the attribution of guilt
Behavioural style	• are accessible - have an open door policy • work at establishing good relationships • look for intersections of government and farmer interests on issues • be honest about government programs • maintain continual communication with community members so that you understand, • can represent their situation - interact with them socially • do not lecture farmers • develop analytical and leadership abilities in community members • encourage frank and open discussion • are open to the committee refashioning a solution you have brought to them • are professional and friendly, encouraging goodwill, honesty and generosity • adroitly playing to contrarian positions on issues to stimulate debate and creativity • actively manage farmer expectations within a given committee and over the lifecycle of a problem resolution • support farmers on committees given the chance of attacks from constituents
Expertise	• staff with specialist knowledge about state policy priorities and processes • staff with specialist skills to facilitate effective community engagement relationships and processes • staff with specialist knowledge about regional, industry and farm and program context for irrigation • skills in negotiation, relationship building, conflict management, capacity building program management, strategic planning and implementation.

3.2.2 Analysis of the SIP engagement interface

At the engagement interface, agencies have a different purpose to the adoption interface. They seek inputs such as *knowledge (*e.g. *local context, preferences)* for their decision making and *advocacy* of their NRM objectives by participants with the broader farming community. As we established earlier, the degree to which the engagement interface sponsors co-production depends on how much influence these participants have and how deeply decision making occurs in the system.

To make suggestions of how co-production could be improved for SIP, we first established how the SIP engagement interface operated. We now present these results. Following, we present farmer and staff perspectives about this interface including motivations, barriers and relational expectations that arise.

We found the majority of SIP's engagement interface was coordinated by CMAs with support from their partners G-MW, DPI and others. The DSE water group oversaw SIP at a state level. DSE SIP staff members and others in the water group did intermittently engage with farmers to test policies and develop strategies but *regional agencies* managed the *ongoing interrelationship* with farmers and community participants.

We classified the SIP engagement interface as decentralised because the central agency (DSE) devolved decision making and implementation to regional agencies, then devolved these decisions to sub-regional levels. Interface structures used by agencies included boards, committees, groups and public forums. Farmer and community representatives participated in these structures and had both *knowledge* and *advocacy* roles.

Statutory obligations and strategies decreed who should engage community and agencies often designed the engagement interface together. Whilst agencies implemented SIP, it was integrated into each agency's organisational context and structures. Regional and state interfaces were interconnected through agency partnerships and agencies tapped into each other's inter-relationships with farmers to achieve their own objectives.

Interviewees advised that the inception of this institutional design occurred in the 1980s. The original aim was to ensure community people were taken seriously. At this time representatives had a lot of discretion about regional implementation. Regional implementation committees in CMAs and water authorities were designed to ensure community had access to influence and power.

The degree to which representatives influenced decision making at the engagement interface (i.e. made decisions versus informed them) varied. The inception of the engagement interface 30 years ago was deeply devolved, but many commented that, with the pressure for greater accountability, discretion at the deeper level had been difficult to maintain over time. Also, significant funding cuts had made it difficult to resource the deeply-devolved model.

A defining feature of the DSE SIP and the Goulburn Broken engagement interface was the formation of committees with significant farmer representation. When the agency is engaging with farmers to collect or disseminate knowledge related to program priorities, conception or design, the interface is most likely to be one-to-many between agency staff member(s) and farmers. To some extent, DPI staff were requested by investor agencies, such as CMAs or DSE, to collect intelligence from the field to assist policy development. Generally, however, the 'upward' flow of information, which is a major part of agency (NRM) expectations of farmers, is via groups or committees interacting with partner agencies.

Because committees were formed by agencies the psychological contract of greatest interest was that between farmer/community committee members and the founding agency. That contract was composed of elements related to the agency itself (associated with policies, staffing levels, and so

on) and elements present in the conduct of agency representatives on committees. There are a number of agencies that may be interacting with farmers around NRM concerns at any given point in time. The significance or prominence of the NRM elements in the psychological contract between farmers and each agency differs from agency to agency. As well, the specific expectations each agency has of farmers differ.

Farmer interviewees had a range of experiences volunteering both for SIP and other NRM structures. Some interviewees were highly experienced and had held leadership positions in NRM agencies and others had become involved to support specific issues intermittently. Some interviewees who had no involvement helped us understand why they did not.

The predominant committees mentioned by interviewees were state and regional committees: water service committees, CMA implementation committees and boards, industry boards, policy taskforces like the Northern SWSS, Landcare and pest management committees. Farmer interviewees also raised other community committees they got involved in like CFA, Red Cross, parent and teacher associations and local sporting clubs.

3.2.2.1 Motivating factors attracting farmers to the engagement interface

We asked farmer interviewees what attracted them to roles in NRM agencies and their responses are grouped in Table 10. The most common reason raised was to have *influence* over an issue or pending change. Typically, the change presented a *threat* or an *opportunity* to them or their local area. For example, if they perceived they needed access to people in power to influence a change outcome, or if they did not trust the agency to represent them, they would join committees. Others were asked by their peers to represent them.

Farmer interviewees conveyed that they were also motivated to participate if they were *interested in the issue*. To quote one interviewee, 'water is my hobby!' For others it was a way to fulfil their NRM values. The third motivating factor was there was a sense of 'civic virtue' or *altruism*: people who wanted to give back.

These roles were not considered easy because, once farmers took positions, if controversial they could well be abused and challenged. When involved at the engagement interface, many made significant time contributions. For example, some in leadership roles received several calls a day from other farmers for advice. One interviewee provided evidence that they had contributed 40 hours in the week preceding the interview to volunteer activities.

3.2.2.2 Barriers for farmers being involved in the engagement interface

The most common reason provided by farmer interviewees for not getting involved was *lack of time*. Some did not have the family support to devote the time to committees, particularly if they ran large properties or had small families. Another drawback of being involved raised was the considerable personal cost involved:

> *'You have to be happy that your farm will be less profitable and you will have fewer holidays.'*

Others believed there were simply fewer farmers available now able to get involved (e.g. the reduction in numbers of dairy farmers alone in northern Victoria was said to be a third since the drought commenced).

Another interesting observation was that farmers devoted volunteer effort to other groups like the CFA, local sporting groups and school committees to support their local communities. In this sense *NRM is competing* with other organisations for volunteers' time.

Table 10 Factors that attracted farmers to the engagement interface

Motivation factor	Farmer responses
Influence (threat/opportunity)	• 'we think the (said) change is risky and need to influence it' • 'I need to keep the company honest, we don't trust them' • 'no one would and so I had to' • 'I get access to the people in power' • 'I can manage the consequences of change on my farm better' • 'the agency asked me because they valued my approach'
Issue	• 'water (issue) is my hobby!' • 'I really believe in this issue' • 'I can build my skills and have a robust discussion'
Altruism	• 'to fulfil the NRM values I was brought up with' • 'I need to help others to understand what is going on (e.g. water reform)' • 'I should give back - you know, it boosts your self-esteem, health and happiness' • 'my peers asked me to'

3.2.2.3 Relative contributions of farmers and agencies

At the engagement interface, each party makes a contribution to the relationship, termed 'relative contribution'. We asked both farmers and staff what they thought they contributed to the relationship at the engagement interface (Table 11).

When asked what they contributed, farmers stated that they provided knowledge, leadership, and access to networks. This contribution was considered helpful for agencies as they had the ability to bring others along. Farmer interviewees believed that, as committee members, their role was to challenge thinking and be frank about the value of solutions to issues and programs proposed by agencies. They also believed that they were representatives of their local group or peers. In this regard they stated that they had a responsibility to peers to explain the implications of issues of which they were aware.

The relative contribution of agencies to farmer representatives at the engagement interface was described by agency interviewees. They mentioned that representatives had the opportunity to influence both on issues and access to people in power, that agencies gave committees credibility in the community and provided support for committee function.

Table 11 Perceptions of contributions to the engagement interface

Agency interviewee responses	Farmer interviewee responses
Relevant contribution (what I offer)	
• Local discretion and influence • Access to people in power • Support for members to work together and achieve objectives • Credibility and respect • Commitment to community engagement	• Knowledge and expertise • Civic virtue • Leadership, direction: reality check • Access to networks • Influence and credibility with community and farmers • Help others understand changes

3.2.2.4 The relational expectations at the engagement interface

We asked farmer interviewees that had been involved in committees what they expected from the relationship when they were involved (Table 12). Again, for farmers the ability to influence and access influential people was an important factor. Committees that enabled them to access power and decisions, and agency staff that supported them to lead and partner with them, were rated highly. The importance of farmer representatives on committees publicly declaring support for programs and policies was noted to be very high as advocacy.

Farmer interviewees commented on the support they expected and needed from agency staff. Staff who had an interpersonal approach and fostered good relationships between committee members, and between members and agency staff, were considered invaluable. There was a need for professionalism and expertise. For example, timely responses, straight answers, good briefings and taking local perspectives to a higher level in the agency were valued. Some interviewees raised the need for good science to support the message they took to community, important in NRM given the diffuse nature of cause and effect.

We asked staff interviewees who had worked at the engagement interface what they expected from, and offered, farmers in this capacity. Many responses converged with farmer responses. Staff were aware of farmers' expectations to influence and that this was a primary motivator and something they tried best to achieve within committees.

Agency interviewees commented that the consequences of having farmers involved were many: public scrutiny of programs, they could truly represent community preferences, access knowledge and, with participants' advocacy, achieve an enduring change that would not occur without them. Access to members' local knowledge was considered indispensible for programs and policies and they expected this of members.

Agency interviewees stated that they put considerable effort into encouraging effective committee relationships and emphasised the importance of trust, a balance between task focus and maintaining good member relationships and diffusing any tendencies to an in-group mentality. Staff who worked on these committees needed to be approachable, to have an ‘open door’ policy. To maintain trust there was a firm belief that agency staff had to be as direct as possible with representatives and convey what could be achieved together realistically. Frontline staff also placed importance on building committee members' skills and fostering engagement. There were examples where more senior farmer representatives were encouraged to mentor new recruits.

Table 12 The relational expectations of being involved at the engagement interface

Motivating Factor	Farmer perspectives	Agency perspectives
Access/ Influence	• support us to take message local • support us to lead from the front • trust lower levels (us) with decisions • stand side by side in public on issues • take local perspectives to the higher levels for us • provide us access to the Minister	• presence of leading farmers • representatives have good informal networks and feed back to peers • members have access to information and decisions
Interpersonal	• foster good relationships • face to face relationship • encourage good relationships between volunteers and all agency levels • create good relationships between different agencies	• mutual respect • balance of task and relationship emphasis for member dealings • small committee size • open door policy for members
Professionalism	• provide a consistent quality service • timely responses • independence from agency agendas • liaise to present coherent set of ideas	• new members welcomed, no "in group" mentality • support group to trust and good dynamics • meet members costs • offer quality input and good briefings
Expertise	• brief volunteers well • provide good science for issues	• mix of representatives • good contextual knowledge

3.2.2.5 Committee breaches

Breaches of psychological contracts between farmers and groups and committees can trigger departure by the farmer. Of somewhat greater concern, perhaps, is the fact that they can simply reduce input and commitment, without triggering departure. The most prominent breach, by mention and vigour, was the failure of agencies to meet committee member expectations of influence, even decision making, with respect to issues and programs.

The consequences of breaches of farmer expectations could be serious. Beyond simply failing to attend committee meetings, and communicating why to networks of peers, disaffected members can mobilise media and political concern about committee decisions. Less obviously, committees

that become fractious and adversarial to agency staff, as a result of breaches (or any other reason), have triggered staff resignations in the past.

Both farmer and agency interviewees described the breaches that could arise at the engagement interface (Table 13). There was convergence for both groups around diminishing influence, and being expected to take responsibility without any formal sense of authority for members.

Farmer interviewees said they found it hard to operate effectively if they did not have a 'real' say. From a farmer's perspective, being expected to take knives in the back for agencies, or represent Ministerial and agency interests without consideration of their peers, is a serious breach. They are wary of committees that become 'politicised'. Committees that are self-interested or perform only an administrative function were of little interest. Not being given straight answers by agencies made things difficult.

Agency interviewees gave examples of breaches which they or their agency could cause such as fobbing members off, exhibiting low morale (due to staff cuts) and failing to represent committee members' perspectives.

Table 13 Perspectives on committee breaches that can arise

Breach type	Farmer responses	Agency responses
Access/influence	• being expected to manage funds and programs without any authority • self interested committees • being excluded from agency reviews • tokenism	• not involving them or letting them have a say. • reducing their influence on committees or standing by their decisions. • eroding local influence • overstating the committees level of influence
Interpersonal	• being expected to take 'knives in the back' for the responding organisation;	• exhibiting low morale • not dealing with their concerns directly • erratic support
Professionalism	• agency staff taking a superior attitude to community • being bogged down in administrative accountability • politicisation of committee roles	• not following up on their issues fobbing them off. • not supporting committee decisions • not supporting staff
Expertise	• inability to attract sufficient farmer representatives • challenge of convincing farmers of spill over effects of non-farm actions	• appointing members they don't respect • failing to identify with the committee or their issues

3.2.2.6 Groups

Groups were another structure that occurred at the engagement interface in this study. Groups took two forms: *agency led groups* and *farmer self-organised groups.* Groups are of interest because in deeply delegated models they are a tool to encourage implementation and access strategic courage external to the agency (Wright et al. 2011b); that is, groups can extract compliant behaviour from members much more easily, and willingly, than can agencies.

Groups have been used by agencies implementing SIP and beyond and most farmers had had experiences in one or two in the last 30 years. Farmer interviewees were asked to reflect on their group experiences and raised several groups including DPI dairy groups, water reform groups and Beefcheque. Others mentioned included Landcare and pest management groups.

3.2.2.7 Factors that attracted famers to groups

Farmer interviewees were asked to describe why they joined both agency led groups and self-organised groups (Table 14). The motivating factors for the two group types differed. For agency groups farmer motivations closely matched adoption motivations like productivity and lifestyle benefits. Also of interest were: access to networks, resources or information. Continuing agency representation tended to be more characteristic of groups that agencies form. They are essentially a device for reaching for more local levels of distribution or collection of information and advice than is available at committee level; for example, farm working groups. Groups may also be the most appropriate vehicle for locally focused action; for example, rabbit elimination and dairy groups.

The formation of self-organised groups was typically spontaneous. Most often, groups of farmers form naturally with the intention of enhancing farm productivity, have influence or access to a program, deal with an issue like Modernisation or influence an issue that is a threat or opportunity. Self-organised groups tend to be less about social interactions because they are designed to serve a functional purpose and often involve farmers already interacting socially to some extent; they grow from existing networks to a greater extent than do agency led groups.

If a self-organised group had a tight focus, such as the Northern Victorian Irrigators, Inc., periodic involvement by agency staff to provide expert information may be welcomed. Agency secretarial support is sometimes provided. The agency most often involved where productivity is the focus is DPI.

Table 14 Factors attracting farmers to groups

Motivation factors	Agency organised groups	Self organised groups
Access/ Influence	• access a network I want to be a part of • efficient way to access data, funding or information	• to champion a cause of interest to a number of farmers • coordinate collective effort to deal with an issue, e.g. rabbit plague • achieve collective agreement for a cross-property program
Personal	• issues of interest to me • productivity or lifestyle benefits • social interaction	• to 'sort out' a problem causing discontent amongst farmers
Expertise	• meet leading farmers	• confirm understandings of complex changes (e.g. water reform)

3.2.2.8 The relational expectations for groups

We asked farmer interviewees what they expected from groups when they joined them (Table 15). Broadly, groups were valued as a medium to meet peers, work through issues of interest and receive support. There was a preference for smaller groups with technical and staff support from agencies. Again, trust and respect, both among farmers and between farmers and agency staff, played an important role. Farmer interviewees expected influence, access to information and support from agencies in both group types. We did not collect agency expectations of groups as those that they form are relatively few and are formed for quite specific, idiosyncratic reasons.

Groups had highly variable longevity and modus operandi. Some had persisted for decades, others not. Some have been demanding of close identification from members, sharing financial information and plant and equipment. Others are much more loose.

Table 15 Relational expectations of groups by farmers

Relational expectations type	Farmer Expectations
Access/ Influence	• local ownership • can assert rights • access funding, information, power to resolve issue
Interpersonal	• Work through shared experiences • small • respect • I trust staff in involved
Professionalism	• support: technical, admin and group presence • lifespan • group objectives are clear
Expertise	• variety of topics • good technical support • group is resourced and has expertise

3.2.2.9 Group breaches

Interviewees identified the following as breaches of farmer expectations experienced from groups: not getting much back, the group lingered on without purpose and there were too few members to create a critical mass. Agency breaches centred around not providing support or not being present at meetings when they had been promised.

For self-organised groups, breaches were similar to committee breaches but being unable to have influence or politicising groups was considered a breach by farmer interviewees.

Table 16 Perspectives on group breaches that can arise

Breach type	Farmer responses
Access/influence	• I was giving much more than I was getting back • lack of influence
Interpersonal	• below critical mass as farmers leave farming
Professionalism	• the group lingered on when it should disappear • group being used as weapons by different sides of politics • staff not turning up to meetings or providing support
Expertise	• topics covered are not well rounded;

4 Managing to Enhance Co-production

The purpose of this exploratory case study of SIP was to:

- Explore the importance of the co-production approach for SIP,
- collect farmer and agency perceptions on motivations to co-produce and the importance of agency-farmer relationships for co-production and,
- identify the institutional design features that support farmer engagement for irrigation policies and programs.

We did this by testing propositions in regard to:

1. Dependency
2. Interface focus
3. Centrality of relational expectations
4. Salient farmer preferences and
5. Interface design.

The results confirmed the validity of these propositions. Whilst this case study was exploratory, the consistency of the results lends considerable force to the implications for natural resource management. Perhaps most importantly, the results confirm the paramount importance of co-production for SIP and the centrality of relational expectations in co-production in this case.

4.1 Co-production is central

The existence of, and reliance on, co-production by government in achieving NRM outcomes is apparent from the results. They clearly show that the quality, acceptance and impact of NRM programs rely utterly on the engagement of farmers in the designing of programs and on subsequent adoption by farmers. Engagement and adoption are separate, but related, processes with their own interfaces with farmers. Jointly, the engagement and adoption interfaces comprise the overall interface between agencies and farmers.

The central role of co-production in SIP management by agencies raises a number of questions as to how co-production should be enhanced. The answers depend on the motives and expectations that farmers bring to the adoption and engagement interfaces. Fundamentally important, however, is the dominance of the relational expectations of farmers, and the subsequent obligations these create for agencies, at these interfaces. This leaves either interface vulnerable to collapse if expectations go unmet. There are no transactional underpinnings to fall back on. The results highlight the dangers of pursuing approaches to agency design in NRM that undermine farmers' motivations to contribute to NRM outcomes.

4.2 Transactional and relational expectations

The results clearly show that transactional expectations play only a limited role in motivating farmers to co-produce NRM outcomes. This makes sense for two reasons. The first is that very few NRM programs offer substantial productivity benefits. This study confirmed that productivity concerns are active when farmers are contemplating changes to, or matters affecting, production systems. When NRM outcomes are embedded in policy interventions that have substantial productivity benefits, such as irrigation modernisation, attracting farmer adoption is easy. The higher the productivity benefits of any program containing NRM, the greater the attractiveness to farmers. This is undeniable. Few NRM programs offer productivity benefits as substantial as irrigation modernisation.

The second reason that transactional expectations have limited relevance in motivating farmers to co-produce in NRM is that productivity benefits are ephemeral across transactions: they are attached to individual interventions uniquely. There can be no justified expectation on the part of farmers that NRM-related interactions with agencies will routinely yield significant productivity

benefits. Hence, transactional expectations cannot be any continuous part of the ongoing psychological contract between agency and farmer.

Furthermore, farmers are likely to believe, often justifiably (Wright et al. 2011b), that agencies would not dare withhold access to significant productivity enhancing programs as an act of strategic courage to punish farmers for being eclectic users of the adoption interface.

The limited importance of transactional expectations to farmers means that it is relational expectations that motivate farmers to co-produce NRM with government. This means that meeting the following farmers' expectations is vital in achieving NRM outcomes:

- Having influence on policy design at the local level.
- Having access to agency staff.
- Having an interpersonal relationship with agency staff.
- Being treated with respect.
- Being supported in promoting messages to local community.
- Consistency in service quality.
- Supplied with good science.

Given the importance of meeting these expectations to achieve NRM outcomes, skilled frontline staff in agencies is essential to managing the adoption and engagement interfaces with farmers.

The importance of the relational obligations in the psychological contract is not driven by farmers' needs. It is driven by agency needs. The study has confirmed that farmers who would otherwise respond to satisfaction of their expectations of agency staff will simply disengage, from both adoption and engagement interfaces, if their expectations are breached. When expectations are breached farmers lose nothing by disengaging.

The importance of the psychological contract to farmers' motivation to adopt NRM interventions is the key insight this study offers NRM agencies. In short:

- Programs that link NRM outcomes and significant productivity benefits are attractive as stand-alone transactions – irrigation modernisation is a clear example;
- NRM programs that offer limited productivity benefits, or even reduce productivity somewhat, will not be adopted in the absence of a continuing, positive adoption interface.

4.3 Improving the adoption interface

Our results show that the quality of the psychological contract at the adoption interface determines farmer willingness to contemplate adoption. As the quality of the psychological contract at the adoption interface increases, the minimum productivity benefits, relative to NRM benefits, that will motivate a farmer to co-produce NRM outcomes should decrease.

One way the quality of the psychological contract can be improved is by using the interface to change farmer perceptions of the benefits or costs of NRM. For example, the establishment of a continuing relationship with a farmer may lead to a shift away from evaluation of costs and benefits of programs an on individual, case-by-case basis in favour of evaluation over a longer-term and multi-program context. Such behaviour results from continuing access to programs and assistance with consideration of them, the development of linkages between plans for farm development and sequences of interventions; indeed, any benefits that the farmer attributes to maintaining the adoption interface with the agency staff member.

Assuming that meaningful engagement interfaces apply to the intervention domain (e.g., SIP), there may also be peer pressure to look more favourably on adoption than otherwise. Advocacy of interventions by farmer leaders and representatives on committees can be a powerful, motivating mixture of demonstration effect, credible information source and peer pressure. It has to be

recalled that peer pressure, despite its pejorative image, is essentially information from a valued source as to the appropriateness of behaviour.

Another pertinent change in perception could relate to the perceived risk associated with interventions. The trade-off between productivity and NRM results usually involves NRM costs that can be calculated with considerable certainty, and rather less certainty about any productivity benefits. The greater these perceived risks, the higher the productivity benefits that will be required relative to NRM benefits. A reduction in perceived risks to productivity benefits would be beneficial for NRM programs. An increase, of course, would be unhelpful.

Differences in production risk, especially, may help account for the lower penetration of NRM programs reported to us in dryland areas than in irrigation areas. This difference warrants further study. When NRM costs are lowered, and productivity benefits very clear, dryland farmer participation in NRM programs is strong. The subsidised 1080 rabbit elimination program is a clear example. The removal of the subsidy may have pushed the program beyond the minimal acceptable net productivity benefit.

If the proposition can be maintained that dryland farming is intrinsically more uncertain than irrigated farming, due to both higher production and price risk, which we believe is generally the case, a given level of NRM benefit (with known direct cost) will need to be associated with a higher level of productivity benefit to attract similar motivational force. Farmer values, professional identity and personality have nothing to do with this; it is simply a matter of productivity risk being taken into account by prudent farmers.

In the absence of a sufficient sequence of programs of interest to a farmer, it will be difficult for agency staff to create and maintain effective adoption interface relationships. This indicates that a starting point to address poor levels of NRM intervention adoption, predictably given our reasoning, is not by focusing on specific programs, nor even the adoption interface, but on the engagement interface.

The implications of this are that the role of NRM agency staff in adoption processes for a farmer spans the following tasks.

- The clarification of all relevant benefits and of the uncertainty surrounding them.
- The exploration of maximal NRM benefits for a given level of productivity change and vice versa.
- Over time, the creation of a predisposition in the farmer to include contemplation of NRM outcomes in all change decisions.
- Over time, the movement of the farmer's perception of programs from one of spot possibilities to one of components of an evolving suite moving the farm to higher levels of productivity and stewardship.

4.4 Improving the engagement interface

Agency staff are the conduit for information and advice to and from the engagement interface. The performance of this interface depends on their ability to guide and listen, assuming that the design of the forums involved is consistent with justified farmer expectations.

Assuming appropriately designed programs, adoption depends on the perception by farmers of the fit of interventions, within sequences of programs, to their situation. The agency staff member working with farmers at the adoption interface plays the key, third-party role in assisting that judgement, provided the farmer is listening. Whether farmers are listening depends on the motivational force being generated by the psychological contract at the engagement interface, the committee, and the contributions to intervention quality this leads to.

Engagement in relevant NRM forums has no productivity benefits, beyond the possibility of avoiding higher losses of productivity, or smaller gains, from current or future NRM programs due to poor design, or of attracting productivity gains on the back of new NRM programs. Motivators otherwise are mainly likely to be altruistic.

In either case, motivational intensity is going to depend strongly on farmer perceptions of influence over program design and/or implementation. This is known to be a key motivator of collective action (Mazzoni and Cicognani 2012). Such perceptions will be strongly influenced by the degree to which decision about policy design and implementation are centralised.

The relentless findings in our results of the importance for agencies to have farmers involved at the engagement interface, to draw on their knowledge and achieve their advocacy of policies and programs, and of continuity in the conduct of the adoption interface, provide grounded confirmation of our expectations derived from theory: strongly centralised models of the institutional architecture that creates the NRM production system are incompatible with adequate levels of co-production.

It is commonplace for organisations to swing between high and low centralisation of decision-making authority (Mintzberg 1993). High centralisation enhances overall efficiency, coordination and consistency of purpose; low centralisation enhances staff motivation, sensitivity to client/customer preferences and overall effectiveness.

The unique implication of relying on discretionary contributors, or 'co-producers', is that centralisation has to be minimised for organisational performance to be acceptable. The psychological contract, the 'human-to-human' understanding, in the typical agency workplace has a mix of 'buying worker effort' and 'attracting commitment'. Focusing persistently on attracting worker commitment is not normally essential because a floor in effort is ensured by their contractual obligations as paid employees. No such floor exists when the workforce is discretionary, as is the case with farmers producing NRM outcomes.

This has the arresting implication that centralisation of decision-making authority in agencies risks destroying co-producer support. Decentralisation does not come easy for government but engagement of co-producers is impoverished without it.

Strong centralisation will lead to interventions that are less suitable for the contexts in which they will be deployed. It will also lead to lower motivation to undertake them. In the context of co-production, centralisation implies the disappearance of the workforce.

The relevant question, then, is 'how decentralised should the institutional design be?'

The NRM literature (surveyed in Wright et al. 2011a, 2011b) argues strongly for the merit of subsidiarity, of deep delegation of decision-making authority. The drivers of this argument are those that pervade this study: the need for knowledge, advocacy (and therefore program legitimacy) and action from farmers.

While this may seem a very farmer-friendly approach, the drivers actually relate to maximising agency effectiveness. The reasoning is utterly pragmatic. To optimise decentralisation, account has to be taken of farmers' motivation and expectations. The relative success of the SIP program provides sustained program-level confirmation of this point.

This study reveals that farmers are alive to the opportunity cost of getting involved at the engagement interface. That cost can have time, stress (including the risk of condemnation from peers) and productivity-foregone components. Altruism and a concern for community are manifest among the motives for engaging. So is a wish to influence program design.

While farmers were happy as committee members to provide agencies with 'frank and fearless advice and a reality check', there was no evidence they had an abiding wish to actually administer

interventions. Although the funding allocation process of some programs concerned farmers to whom they seemed ad hoc, it was the lack of clarity or consistency they thought was unfortunate, not the administrator. Except for programs where final design obviously best occurred at the local level (such as managing channel spurs), managing implementation is most likely to be viewed by farmers as a burden with no benefit but some social risk.

This contradicts, to a degree, the arguments for polycentric governance and very deep delegation in the NRM literature. The confounding factor here is the absence of a true common property resource compared, say, to a fishery. In our findings, only when there is clear competition for a resource does the motivation emerge for farmers to jointly manage it.

There was a clear wish among farmer interviewees to influence the portfolio of NRM interventions in terms both of composition, priority and the local relevance of intervention design features. Real influence is participation in decision-making and indicates very deep delegation. The detailed issue remaining is the degree of influence, which means the extent of control of decisions. Our sample of farmers who had joined NRM committees had all supported the purposes of the committees. None had joined to impede progress towards NRM improvement (although some didn't trust agencies to represent them so joined to 'keep them honest'). Fundamental dissatisfaction with NRM proposals was expressed in other, more public or political forums.

There would seem to be scope for various degrees of influence available to farmers through committees to be equally satisfactory provided that it is real, non-trivial and perceived to be rational by the farmers. The same could be said of different influence from program to program within a committee. Interviewee responses in this study indicate that a defining input to satisfaction with available influence was the extent to which programs were seen to appear as *faits accompli*. This occurred when programs were seen to have features that were locally inept but decided prior to committee input.

Ultimately, there can be no valid detailed answer to the question 'how decentralised?' when it is posed abstractly, away from any specific NRM context. The abstract answer is 'as decentralised as stakeholders jointly determine', which is to say that farmers should have as much influence as is consistent, in the collective stakeholder view, with their knowledge, abilities and wishes, subject to binding constraints operating over the context. Developing the knowledge and abilities of committee members is therefore an aspect of committee support that agencies need to consider providing to improve committee performance.

It is salient to note that a decision, made by an agency alone, that farmers will administer a program is indicative of quite centralised authority.

This study confirms the tenor of the NRM literature: the instinct in designing engagement processes and forums must be to favour decentralisation. Unless farmers perceive the ability to influence interventions through engagement, they will not bother engaging. And, if the extent of perceived influence is trivial, a notionally positive incentive will not generate motivational force. It may even engender negative motivational force as farmers avoid the risk of being subjected to 'promotion dressed up as consultation' or being seen as 'part of the problem' in the eyes of their peers.

Pushing decentralisation to its feasible maximum impacts agencies as well as farmers. In a co-production context frontline staff have to be seen as knowledge workers and managed by their agency as such. This has strong requirements for delegation and autonomy in the psychological contracts between them and their agency (O'Donohue et al. 2007). Agency staff at both interfaces must have the discretion to interact as comprehensively as possible with farmers. The study has clearly revealed the importance of interpersonal expectations to the psychological contract. Individual agency staff, much more than the agency they represent, are the other party to farmers'

psychological contracts related to NRM. This is the case even though farmers commonly have encounters with staff from a variety of agencies.

The power of decentralisation as a driver of co-production therefore transmutes into a force for careful consideration by agencies as to how, individually and collectively, they design engagement and adoption interfaces.

4.5 Interface construction

The incentive that agencies have to manage the interface with farmers well is apparent. Also apparent is that, as with the one-on-one adoption interface between agency staff and farmers, the engagement interface with groups and committees has to be an ongoing relationship.

There are a number of design requirements that this survey has revealed to be essential for effective adoption interface operation. One is the need to achieve continuity in staffing sufficient to maintain psychological contracts. This has implications for both the quantity and capabilities of frontline staff.

Another is the artificiality, from the farmer's perspective, of splitting programs into 'productivity-oriented' and 'NRM-oriented'. The farmer's context, usually, does not support such a decomposition of reality and, intended or not, such splitting can signal lack of respect to farmers. They risk being confronted with a veritable blizzard of somewhat incoherent programs or contradictory advice. Therefore, every effort should be devoted to co-coordinating the portfolio of agency interventions.

A split approach also tends to emphasise the separation of productivity and NRM benefits. This is not helpful to the continuous relationship strategy required to enhance NRM outcomes nor to the need to make mindfulness of NRM issues a more prominent, routine feature of farmer decision making.

Another design implication is that the centrality of the relationship between agency staff and farmer to effective adoption suggests that agencies may usefully consider the possibility of a focus on a single interface with individual farmers. That is, should there be one principal relationship involved with the conversation between farmer and government about farm-related programs? When should this not be the case?

At the engagement interface the distinction between groups and committees is that, even though an agency may encourage the formation of a group, farmers govern them. All an agency can reasonably do, without destroying the essence of a true group (Wright et al. 2011b), is service the group with information and administrative assistance.

A committee, in the sense used in this research, is formed by an agency and has some formal status, involving reporting and some decision making, within the agency's organisational design. A committee is a part of the formal organisation of the entity creating it. It has a charter basically oriented to achieving particular outcomes for the agency. The management of the membership and modus operandi of the committee will determine how effectively, and how sustainably, this is achieved.

The plurality of agencies needing to collect information from farmers to inform policy means that the tight focus on a single agency staff member interfacing with individual farmers will not be mirrored in committee structures: there will be multiple committees serving individual agencies as they develop programs developed in pursuit of distinct agency charters.

However, there are some strong arguments to suggest that one principal relationship might suit the adoption interface. This is considered below.

4.6 Innovation in institutional design

Our focus has been on the motivation of co-producer adoption and engagement. The design components of most prominent interest here are those that are the most fragile: the adoption and engagement interfaces. These are where the adequacy of institutional design is proved. Their fragility makes the achievement of NRM outcomes vulnerable to weak interface performance. This is the major consequence of the reliance on co-production.

For both the adoption and engagement interfaces, the strength of the psychological contract relies on farmers' experiences of encounters compared to their expectations. A substantial number of these encounters rely, in turn, on continuity of individual staff at the interface. While important at both interfaces, this is arguably more important at the adoption interface. It is important to bear in mind the unique set of skills required of agency staff at the interface. These include:

- The ability to attract high respect and trust and exhibit conviction;
- able to listen and display empathy;
- self –confident and able to influence people;
- respect for farmers and their knowledge and recognise the risks farmers face;
- honesty about government programs and linking them to what farmers value;
- dedication to the relationship with farmers and partner agencies;
- being accessible;
- developing analytical and leadership abilities in community members;
- actively managing farmer expectations and supporting farmers on committees;
- specialist knowledge about state policy priorities and processes;
- staff with specialist knowledge about regional, industry and farm and program context for irrigation;
- specialist skills to facilitate effective community engagement relationships and processes;
- skills in negotiation, relationship building, conflict management, capacity building, program management, strategic planning and implementation.

The critical role of frontline staff in managing interfaces demands that trust must permeate their psychological contract with their agency. Interestingly, some interviewees reported that agency managers were concerned that agency staff can be 'captured' by farmers. Yet ‘capture' is what the faithful representation to an agency of farmers' views and preferences appears as. So-called 'capture' may well be an indication that farmers do have influence. Concerns over capture are a clear signal of a lack of trust in frontline staff and are an intrinsic impediment to decentralisation and to continuity in agency representation as a means of establishing respect and trust.

Continuity of staffing is permanently under threat for all of the large range of reasons that can change the levels and composition of staff. Knowing this, an implication is that it is most important to minimise avoidable damage to continuity.

In the study area there are currently three agencies at both the interfaces: GBCMA, G-MW and DSE at the engagement interface; and GBCMA, G-MW and DPI at the adoption interface. DPI has been relied on, as has GBCMA, to use its adoption interface to promote SIP programs. DSE does not often present at the adoption interface. Historically, various external shocks to these agencies have disrupted the capacity to maintain continuity at adoption interfaces. This also applies to productivity-oriented programs of agencies. The threat to continuity, as we write, is both to the availability of individual staff and, more concerning still, the total capacity of an agency to interact with farmers one-on-one. There is nothing to suggest that such shocks will cease. This should be assumed to be a fact of life with which one should plan to cope.

We have argued in this report that the plurality of engagement interfaces is sensible, given the distinct focus of the different agencies that use each. These interfaces, being less numerous than the farm population and one-to-many for agencies, are less impacted by external shocks to staffing.

However, an obvious question arises: is there potential for a single agency to be formed to operate at the adoption interface? Having a single agency responsible for integrating the variety of programs agencies offer to a massively overlapping client base seems to have merit. That is, shared purpose and shared clientele across NRM agencies seems to fit with the notion of a single delivery arm for the adoption interface. The results of our analysis make it apparent that such an entity could not be commercial and should not have a charter and formal relationships that encourages it to prefer 'more saleable' programs to less.

The possibilities for higher continuity and program integration that a single agency might offer could be expected to lead to greater understanding of each farm and farmer than is true of the current situation where different staff interact with a farmer. This, and potentially higher levels of trust and of other measures of the health of the psychological contract, should be available.

To a degree this has been seen already in the role of DPI in SIP program adoption. Continuity at the DPI adoption interface has given DPI frontline staff the long history of interactions with farmers that breeds good psychological contracts and good integration of interventions. SIP has benefitted from this. The organisational support appears, however, to be softening and putting this continuity at risk.

The possibility that a new agency could also conduct the presentation at the adoption interface of productivity programs as well as NRM programs seems obvious. This links to the point made earlier in this report that the disciplinary distinction made between NRM and productivity means much less to farmers than to agency staff. Does the design of the NRM institution independently of the farm productivity institution make much sense at the level of the adoption interface? This is all the more salient a question given the significant role of DPI currently in the delivery of both productivity and NRM programs.

Such an agency would also free the adoption interface from vulnerability to policy changes in agencies that render frontline interactions with farmers variously important over time: managing the adoption interface well would be core business persistently. Relatedly, the management of interfaces would more easily be shielded from the predisposition of bureaucracies to favour centralisation because interface success will be core.

It may be possible for such an agency to contract to other entities, such as agricultural R&D corporations, with an interest in adoption.

5 Recommendations to Enhance Co-production

This study, while exploratory, has found compelling, consistent confirmation that the effectiveness of co-production turns on the quality of the management of the engagement and adoption interfaces. What 'quality' means is informed in detail by the expectations of farmers at the interfaces. These we have considered in considerable detail.

There is probably little here that will surprise most farmers or agency staff with extensive frontline experience. We have striven to structure this information, however, to indicate how farmer motivational force is created and what this implies for institutional design.

Generally, the results in this study indicate that co-production in sustainable irrigation objectives and, we expect, in NRM broadly requires that agencies:

- Have a 'culture' that supports farmer and community engagement.
- Work together to support this culture.
- Involve farmer representatives early in policy design and be honest about farmers' level of influence.
- Maximise farmers' access to frontline staff for local intelligence.
- Establish high functioning relationships between agency staff.
- Provide frontline staff with autonomy and flexibility.
- Seek out interventions that link productivity and NRM outcomes (e.g. whole farm planning and incentives).

5.1 Preserving the SIP interface to support co-production:

- SIP is dependent on farmers in three ways: for knowledge, action and advocacy. Given this, institutional design must encourage farmers to co-produce to be successful. The decentralised model combined with interfaces that engage community and farmers at the regional and sub-regional levels are important structures to maintain.

- SIP programs currently account well for farmer motivations by combining productivity and NRM activities delivered by DPI.

- Preserve the interface structures which farmers value and have come to expect (relational expectations): access to frontline staff (preferably based locally) for programs and local influence in community engagement processes.

- Develop tools that aid adoption by enabling the ongoing linking of NRM to productivity. Whole farm planning has been an outstanding example, giving agency staff 'a foot in the door' to introduce NRM activities.

- When designing programs consider the factors that motivate farmers: is the issue of interest? Does it present a threat or an opportunity for them? Do they need to access the program to achieve benefits?

- Agency support for farmers at the interface needs to include: providing straightforward advice, cutting through bureaucratic red tape for them, integrating different agency services, briefing them, and standing side by side with them in public forums.

- All agencies need to support a co-production culture and have strong inter-agency co-ordination that is underpinned by partnerships. Because of the multi-faceted interface,

and agencies each having different psychological contracts with farmers, need to be alert to aligning and streamlining relationship management where possible.

- Where possible, ensure programs account for farm timing and, if there is a large financial commitment on the farmer's part, be aware of delays that create financial risks for them.

- Provide adequate support for the frontline in capacity development and qualities that evoke farmers to reciprocate (listed in Table 9).

5.2 Avoiding psychological contract breaches

- Farmers get involved in the engagement interface for influence primarily. Given this, be careful to preserve local influence and discretion. Be clear about the level of influence and, where possible, offer decisional rights and trust them by offering autonomy in their input.

- Any change that shifts influence away from the local level will need to be managed carefully so as not to evoke a breach. Agencies that choose to centralise will need to understand that some farmers may simply walk away. An assessment of agency dependency (on farmer knowledge, advocacy and action) will help understand the impact a breach will have on agency performance.

- Farmers that interact with frontline staff value their relationship with staff and it contributes to their motivation to co-produce and reciprocate in a way the agency seeks. Be aware that a retraction of this relationship could result in a breach of relational obligations and thus negatively affect their potential to co-produce. Any contraction of the frontline without managing relational expectations and obligations is fraught with danger for co-production. Frontline staff need support to manage frontline contractions and associated drops in service quality.

- Avoid centralising decision-making.

- Avoid lecturing farmers about environmental stewardship or trying to change their values.

- Avoid politicising groups or committees and think carefully about using farmer representatives to take a 'hit' for the agency with their local constituents. It is a breach of their relational expectations and can undermine their credibility locally.

5.3 Further work

Our findings about farmer differences, and interviewee observations about the kinds of farmers who do not engage or adopt NRM programs, suggest that progress in this area is going to have to include segmentation studies of farmers along pertinent dimensions. Our study, while it is focused on a substantial proportion of farmers for SIP activities, only offers a glimpse into the motivational world of farmers who are seriously disinterested in joining existing interfaces. Greater NRM intervention effectiveness will require further study of this substantial group.

In the course of the interviewing we discovered differences among farmers that influenced their predisposition to co-produce. These included factors such as type of farm enterprise, attitude towards farming as a business, locus of control and self-efficacy. Further research to classify farmers into segments based on these differences would be useful in identifying where agency efforts should be focussed to improve the adoption and engagement interface.

In the course of the interviewing we trialled some scales to test the existence and extent of different importance weightings interviewees attached to components of expectations, breaches of psychological contract, and so on. These assisted interpretation of results somewhat and would clearly be powerful tools for a larger, more comprehensive study covering multiple farmer segments.

Beyond the need to ensure that design decisions of the existing NRM institution work to the advantage of the effectiveness of interfaces, it is clear that the existing institution is poorly placed to provide significantly higher levels of continuity of frontline delivery against farmer expectations. This does not auger well because there is ample evidence in our results that farmers perceive that their influence at the engagement interface is significantly less than it was previously, and that accessibility to staff at the adoption interface is declining markedly.

This threatens a reduction in NRM performance.

This report has insights that can enable a lessening of the vulnerability of NRM performance for sustainable irrigation objectives in Victoria that currently results from the combined effects of the existing institutional design and the fragility of the psychological contract with farmers as co-producers. The latter cannot be changed but the design can.

6 Appendix

6.1 Appendix 1 The Psychological Contract

'Psychological contract' refers to perceptions each party to an exchange has about entitlements and obligations. Simple transactions, such as buying a new tyre for a vehicle, usually attract minimalist psychological contracts. More complex transactions, such as an ongoing employment relationship, lead to multi-faceted psychological contracts.

Legal obligations and entitlements often form a base to exchanges but the expectations people bring to exchanges can range well beyond these. Exchanges are most satisfactory to both parties when expectations are shared. When expectations are not shared, exchanges will be diminished in their satisfaction potential for one party or another: too much will be sought or not enough provided compared to expectations. Such *breaching* of expectations causes the affected party to redefine their expectations by lowering them and adjusting downwards their commitment to the relationship.

The detailed components of relevant psychological contracts are presented later in this report but the broad kinds of elements that contribute to them are formal task and financial expectations, interpersonal expectations about respect, trust and honesty and functional expectations such as competence and reliability.

Psychological contracts, and the relationships between interacting parties that they describe, explain the exchanges between the parties better the more persistent the relationships are. They are unlikely to be helpful when an exchange is a single, discontinuous event: an occasional transaction such as a tyre purchase.

They will generate more important insights when individual transactions are part of a continuous relationship that spans mutual interests to which different transactions contribute. The relationship a driver might form with a mechanic to oversee the safety and performance of their vehicle would be an example. Other examples include continuous relationships when they are formed with dentists, doctors, teachers and yoga masters.

An important feature of continuous relationships when they form is that both parties frame specific transaction possibilities the same way, as part of an ongoing series of interactions. To the extent that the psychological contract is mutually agreed, or 'reciprocated', individual transaction possibilities are viewed as contributions to shared, agreed outcomes. They are not seen as standalone choices to be optimised in their own terms.

The heavy reliance on farmer compliance with NRM agency aspirations that suggests that agencies and farmer are in co-production of NRM outcomes indicates that agencies should prefer entry into continuous relationships with farmers. There are two principal reasons for this. The first is that assisting farmers to judge the implications of a program for their business, and contributing to program design relevance in the first place, requires a solid understanding of the farmer's business.

The second is that farmers inevitably view modifications to their production processes as serial interventions rather than standalone 'adoptions'. Approaching them with NRM programs presented as single inputs to this persistent, continuous improvement process will conflict with their frame of reference for novel action.

While continuous relationships and healthy psychological contracts are desirable, the fragility of both, since NRM programs tend to offer limited production benefits, is a concern.

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