Research to practice – a case study in relationship building for successful extension

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Abstract. This paper argues for more explicit reference to relationship building as the foundation for successful extension. We tell the story of one scientist's ongoing journey with extension. Retrospective reflections of scientific endeavour in the cherry industry and efforts to work with, learn from and communicate results to growers demonstrated the fundamental need for relationship building in order to achieve successful extension. Relationships take time and investments in agriculture need to properly acknowledge and support longer-term project timeframes and careers if the vital collaboration between scientists and growers is to continue to build Australia's agricultural industries.

Key words: relationships, extension, participation, funding, narrative, reflection

Introduction

The gap between research and practice has long been a problem confronting researchers and practitioners. Agricultural extension is an example of the approach of one research discipline working to bridge this gap, and it has evolved significantly over time to develop a relatively comprehensive theory and a diverse array of methods (SELN 2006). As agriculture incorporates knowledge from an increasingly wide range of fields (for example plant physiology, climate science, geology, animal health, biosecurity, business management and so on) into a complex range of practices on the ground, the role of extension as 'knowledge brokers' between researchers and practitioners has become increasingly complex and important. As Cash et al. (2003) argue, managing boundaries between expertise and decision making improves the transfer of knowledge to action. Despite recognition of the essential role of extension and knowledge brokering in theoretical and academic circles, it is still under-recognised and undervalued, and many government funded extension programs and departments have suffered continual, even terminal, funding cuts (Hunt et al. 2012). In the Australian context, extension services in many parts of the country are being continuously withdrawn in both production and conservation areas. Most extension projects are now funded for a maximum of 3 years. Even with declines in extension funding, there is still a need for information to flow between researchers and practitioners. One, albeit uncommon, way that this can occur is directly from the scientist source (Bateson 2007). Although scientists have long conducted research on farms and therefore consulted directly with growers in respect to gathering data, many problems still exist in terms of the relationship between scientists and growers. Issues of trust have been discussed, in terms of legitimacy, local knowledge versus scientific knowledge and have even produced whole fields of academic study, such as understandings of risk, organisational trust, science communication and adaptive management (a few examples: Wynne 1992; Cash et al. 2002; 2003; Moser & Dilling 2010).

Indeed, understanding the farmer/scientist dynamic has been a central part of the development of extension best practices (Vanclay 1992; SELN 2006). While important outcomes of this work include the need to build equal partnerships, support social learning and build trust (Jakku & Thorburn 2009 provide a useful summary), a key aspect is still neglected in the discussions, namely, the importance of personal relationships and the time taken to build up these relationships. Thus, while social learning objectives and the increasing popularity of participatory approaches are one step forward in supporting partnerships between scientists and farmers/growers, it still needs to be acknowledged that longer term development of personal relationships are vital in successful extension processes. Therefore, funding cuts and a lack of investment in long term and continuous research programs damages the capacity of science to provide important and useful improvements to farmer practices (Hunt et al. 2012). The notion that it takes too long to build relationships (if it takes longer than a 3 year funding round), or that relationships can only be worked on during the time-span of a funded project, need to be challenged. This paper argues that it is not possible to transfer knowledge through participatory methods without an established relationship. The time taken to build relationships is an essential part of successful extension and no short term method, no matter how much participation it involves, can be an equivalent replacement. Without knowledge of the people on both sides that a longer term relationship creates, methods almost always revert to traditional knowledge transfer approaches, critiqued time and time again (see Potter & Oster 2008 for a review of the deficit model). These critiques include but are not limited to: the failure of knowledge transfer approaches to create a successful, mutually beneficial relationship between

the parties involved because it sets up an unequal power relationship and ignores the essential two-way flow of information and learning required for successful collaboration. Theories of participatory research, in particular, have made great strides in valuing different knowledge, building communication and trust, and collaborating for research end goals (across varied research disciplines of extension, education, risk management and organisational analysis), but still the processes of building personal relationships is not sufficiently acknowledged as an essential baseline in this theory. This means that as cuts to agricultural extension and short term project allocations continue, workers (both extension and research) are forced to do more in less time and, as a result, there is a risk that uptake of successful research will be slow, incomplete or lost.

This paper tells a story about how personal relationships, built up over years of research, have laid the foundation for successful extension of science to growers, without the need for specialised programs (and therefore specific funding arrangements). Through a retrospective, reflective narrative, we aim to encourage other scientists working with growers to reflect on whether their research practices have, or could, involve extension. We also hope to open up more collaboration between extension workers and scientists to break down traditional boundaries (particularly at the scientist end) and start building longer-term relationships, and challenge modern constraints of limited funding of discrete or short-term projects. In particular we seek to draw attention to the need for funding bodies and research and extension providers to recognise and fund ongoing relationship building.

Context: Scientific discovery

The cherry industry in Tasmania is expanding (Fruit Growers Tasmania 2012). Part of this expansion is supported by improvements in knowledge about the physiology of cherries and how they are best managed. Cherry cracking is an economically significant problem (Hanson & Proebsting 1996) for growers, with few, inconsistent management options (Simon 2006). Cherries crack when exposed to rain during the latter stages of fruit ripening (Measham et al. 2012); rain events anytime in the last 3-4 weeks before ripening are regarded as dangerous. The conventional view, based on decades of applied research in Australia and overseas, was that the disorder is caused by fruit expansion as rain falling on the surface of individual fruit is absorbed through the skin. Expansion of the flesh of the fruit puts pressure on the skin, which splits if too much expansion takes place (Sekse 1998). Attempts to control or manage the disorder have ranged from sprays that toughen the fruit or seal the skin, through to large expensive plastic covers covering whole orchards. The most commercially effective management approach has been growing cherry orchards in a location that has minimum likelihood of summer rain and then managing cracking as a financial rather than physical risk (Simon 2006).

The communication journey of a scientist doing extension described here started with an undergraduate research project aimed at better understanding the underlying plant physiology that leads to cherry cracking. A major change in thinking was not anticipated and practical management options were initially seen as longer-term objectives. This initial study led to an industry funded postgraduate program, which showed conclusively that the conventional view of the physiology of cherry cracking was too simplistic and that there were in fact two largely separate pathways for water entry into the fruit (Measham et al. 2010). Rain falling directly on the fruit caused small, often insignificant, cracks at the top and bottom of the fruit but the large side cracks that make fruit unsaleable are caused by water moving through the tree from the soil. In addition, each pathway is more prevalent in some varieties (Measham et al. 2009), and management needs to consider not only rainfall and variety, but also the influencing factors such as crop load, preceding climate and soil condition, and skin development (Measham et al. 2014). These factors can be managed to some extent prior to rainfall, and can therefore allow growers to use a number of strategies to manage the risk of cracking, rather than just trying to harvest before a rainfall event when fruit is not at optimum quality.

Context: Theoretical understandings of extension

Extension programs in the cherry industry, like many other agricultural industries, tend to occur along a continuum of rates of grower participation in (Table 1). With industry funded directives, farmers generally suggest areas they would like research to focus on and money from levies are put toward the appropriate research. Such research (for example integrated pest management, monitoring and modelling, export requirements) values farmers' knowledge and needs, but may miss out on key areas of scientific innovation and scientist expertise. Alternatively, technology transfer extension can occur when researchers communicate their results (which may or may not have included funding from growers and experiments on growers' properties) at conferences, workshops and field days. Technology transfer approaches promote scientific

interest, but may miss collaboration with farmers. Both approaches are 'problem driven', with either the farmer or the scientist defining what 'problem' needs attention.

Rather than a practical or scientific problem driving a search for information and change, successful extension can also be driven by relationships, with more participatory approaches. That is, scientists and growers work together and start to define areas of interest to work on collaboratively, through action research projects, citizen science projects and (often as a result of these through an iterative process, broader participatory projects) (Cooper et al. 2007). This involves a different style of interaction between the participants. It takes longer (often years) but it can also lead to longer lasting impacts, in terms of a lasting relationship with strong trust, empathy and shared knowledge.

Table 1. A summary of some examples of types of extension approaches.

Increasing stakeholder participation →				
Industry funded directives	Technology transfer	Action Research	Citizen science	Participatory approaches
Practitioner advisory boards, targeted calls for funding.	Field days, farmer groups, on-farm trials.	Farmer groups, on-farm trials.	Public groups involved in collection of data.	Multiple stakeholder engagement.
Industry defined research problem.	Scientist defined research problem.	Scientist defined research problem may be refined through process (iterative).	Scientist defined research problem.	Research problem developed in collaboration.
"Fix this problem"	"Look what I've found"	"Look what you can do"	"Help me answer this question"	"Help us fix this problem"

More comprehensive versions of Table 1 are already prevalent in the literature and our snapshot is intended as an overview. For further details there are a number of typologies of participatory research from Arnstein's (1969) 'participation ladder', to scales, numbered approaches and frameworks (see Reed 2008 and Neef & Neubert 2011 for a critique and review). Even though these typologies are usually presented in a linear way from least to most participation rates, more participation is not always better, rather it requires tailoring the approach for the particular context and the particular stakeholders (Neef & Neubert 2011). In particular, there is a need to move away from thinking about participatory approaches as methods or 'tools' to thinking about the process (Reed 2008) and this means tailoring approaches to suit the people involved, the research problems and the logistics of running the research.

The view of extension being based on relationship building is in line with developments in extension theory as extension as facilitation of group learning (Beilin & Andreata 2001; Black 2000; Fulton et al. 2003, Jakku & Thorburn 2009). Yet a key aspect that is often left out of work on extension as group learning, or in the well established theory of participatory approaches, is the essential component (and the time taken) to build up successful relationships. Without proper recognition of the role of relationships in achieving the goals of research with farmers, even celebrated participatory methods can be applied with unsuccessful outcomes. If miscommunication occurs it can result in potentially damaging consequences to reputations, networks and partnerships (organisational and personal, financial and private). Therefore, we support research that calls for all extension to:

- facilitate an environment where stakeholders' expectations are clearly aired and understood;
- develop learning processes that are interactive and iterative and where needed challenge current practices and perceptions;
- and embed extension in the project from the outset (McEntee, 2014, p.144).

Yet we would further add explicit recognition of the need to build relationships. This necessitates going beyond the time-frames of one specific project - and include personal reflection and therefore learning on both sides. Reflective practices and acknowledgement of the personal role of relationships in extension are essential, and might include explicit decisions on which methods suit which situation and the personality, style and capability of key stakeholders

involved. It is only through reflecting on the relationship process that the essential points of trust, credibility and legitimacy (see Cash et al. 2002 for definitions and discussion) can be monitored and improved. Therefore, we argue that relationships need to be more explicitly included in the theory of participatory approaches for extension, as well as in their practical application, and this may highlight the need for skill development in the areas of communication, leadership, ethics, facilitation and/or adult learning. Furthermore, it requires looking beyond the scope of individual projects and timeframes, situating research within a personal or organisational longer term strategy and agenda, and actively campaigning for research with longer time frames and continuity of programs within organisations and government directives. We would like to point out that many extension workers and scientists do this type of work already, as part of trying to continue and develop their career. However, explicitly addressing the essential component of relationships in both theory and practice in this way has the potential to challenge the current status quo of justifications for reducing funding and project timeframes.

Method

Our method is to retrospectively detail the experiences of an 'early career' research scientist communicating their research approach and their results. We use a narrative technique to detail the process of a scientist building a relationship with industry in order to stimulate similar personal reflections for our readers. We are writing from the perspective of the researcher – using a reflective account, not analysing grower responses. This is one method among many to achieve a focus on relationships. Other methods might include other perspectives through interviewing growers or other participants, data analysis of relevant documents, and journal keeping. The approach is adapted from ethnographic and feminist research, which promotes the power of reflection in creating understanding and stimulating change (Pini 2003). Our data includes personal reflections from the scientist (Penny) notes from an industry observer, fellow researcher, mentor to Penny and collaborator on many of her projects (Steve) and a social scientist familiar with extension techniques and education theories (Aysha). Through group discussions and observations gathered from conference presentations and field days, the crucial personal relationship that Penny shared with her grower cohort became apparent. Relating this to the theory of participatory methods, we found a lack of explicit acknowledgement of the personal side that was so important to Penny's story. In order to emphasise this personal element and the context that aided successful information exchanges and behaviour change, we decided to tell Penny's story. We include a timeline to demonstrate how the process of building credibility and legitimacy takes years to establish.

Timeline of research

2004 – Scientist first identified problem of cracking through grower/manager interviews during undergraduate study.
2005 – Scientist started an honours project to explore the issue of cherry cracking.
2005 – Scientist presented results indicating two reasons for cracking at a conference.
2006 – Interest builds and further conference invitations and a PhD project are offered to the scientist.
2010 – PhD project completed.
2009-2012 – Industry funding to assess management techniques

Reflections on the communication journey: Penny

As a final year undergraduate student, I was just starting to think about how the theory of my studies could be applied to commercial operations. I was undertaking an intensive industry project on the stone-fruit industry in Tasmania. I had chosen this industry for a few reasons; I liked fruit trees, I didn't feel there was enough perennial horticulture in the undergraduate degree and the challenges of tree crops, water dynamics and perennial systems intrigued me.

At first I was unsure how to approach growers. After encouragement from mentors at the University I rang some local growers and asked if they would help with my project and described what I was trying to do. I arranged times to meet and the growers when and where it was convenient for them.

In the beginning I felt inadequate in my knowledge of perennial systems. I felt confronted by the growers many years of experience and practical knowledge. I felt extremely grateful for the time that both the growers and my supervisors had given me for a project.

Growers were helpful, happy, enthusiastic and willing to share everything. They were very supportive of building capacity in research in perennial horticulture and could see that I was keen to help.

I sent growers a copy of my industry report as a way of thanking them for their input. I then asked some of the growers if they would be happy for me to investigate on their properties and quantify the cracking problem in an honours project. In meetings I explained to the growers what I had found in the literature about cherry cracking, and why I thought results were inconsistent. I asked for their feedback on my thoughts and on the project plan. They told me they would be happy to have me investigate as they had not seen much advance in this area despite international research – they were perplexed but interested in my theories. When I further explained that I was just starting in research they helped a lot with explaining their theories, and sharing the knowledge gained from visiting other orchards. It helped that I returned to the same growers I had initially interviewed; they had told me cracking was their number one concern so they knew I was serious and keen, and could work hard. I was also fortunate to be following in the footsteps of another trusted researcher – my supervisor Steve Wilson.

At this time I felt nervous, but I had started to gain confidence as I knew that this was a real problem and it was a problem that science could help to solve. I knew I was on the right track and that it could make a difference. Growers were overwhelmingly supportive and positive. They were happy that there was a student interested in cherries and the cherry industry because this was rare at the time; there is much more research activity now. They were interested in my approach to cracking but I still think at that point they didn't hold out much hope for advancement in knowledge in cherry cracking. Rather they thought it was a positive way to train a horticultural researcher.

I was still an honours student, when I first presented my scientific results at an industry conference. The participants were mostly growers.

For my presentation, although scientific in nature, I made sure that I put the problem in context, quantified it, then pointed out how the results were relevant to addressing that problem. I also showed that there was a potentially new way of thinking about this problem and that I was willing to explore it.

I felt very nervous – presenting to people who worked in the field. I felt confident in my work, but unsure how it would be received, given that I hadn't actually found a practical solution!

Growers (those involved in the research and many others) were very interested and asked lots questions. Most of them talked to me afterwards about their experiences of cracking, and posed many questions about how cracking develops.

After this (and to this day) I realised how important it was to talk/discuss with growers personally in order to guide research. All their experiences and ways of thinking were different. When I started my PhD, I involved more growers, considered their experiences and consequently tried to encompass more elements that could potentially impact on cracking. Discussions became a two way flow of information. During the PhD I made sure to take every opportunity to talk personally with growers about my work, present results at industry forums and in industry media. During presentations I kept specific orchard names out of it where possible so that there was a level of anonymity for the collaborating growers. I also discussed plans and results from individual orchards with respective owners to keep them informed, for example, of how their trees were responding to treatments. In this way, they always knew what I was doing, why I was doing it, where I would be and what the aims were. In response, I received interest, support and trust and aimed to reciprocate that as much as possible

In 2006 I had started a PhD, and was a casual teaching assistant at the University. As I had learnt, I was extremely aware of the need to keep collaborating growers informed and updated of trials. Also- to keep all growers informed of progress. The project became increasingly difficult to discuss due to increasingly complex science, but I always tried to highlight relevance and link back to the orchard level; we all persevered. When I presented my results at a national conference for the first time in 2009, I was excited and proud to be talking to an even wider grower audience. I was initially met with disinterest, as the prevailing attitude was this had been researched for a long time, and there was nothing else to know, it was just something about which not much could be done. I can be quietly very stubborn, and hence was determined to show how far cracking research had come and I succeeded. I had really made a lot of headway into the science behind the problem and explained how previous research had been inconsistent. The results helped explain many of the grower experiences, so it felt really good to be able to apply science in a way that meant something to someone.

All of the growers I worked with applied the knowledge to their operations. For example – considering varieties separately with regards to cracking, not letting trees become water stressed prior to a rainfall, and thinking about the preceding climate before a rainfall event

when making decisions. A big one for them to get their heads around was that by increasing fruit number per tree they could reduce cracking. High fruit numbers are well known to reduce fruit size (and therefore profit), but I was able to show the range in which they could retain size and reduce cracking through several years of results. Other growers in Tasmania asked questions at conferences and other industry gatherings and applied the knowledge as well. Some found the science a bit overwhelming, and sought me out individually to ask the 'stupid' questions. They also talked about it all amongst themselves. At the national conference they were first awed at the approach I had taken, surprised at how much work I (a student who didn't know anything about growing cherries) had done, and then overwhelmingly positive. When I presented the work overseas, the growers realised how scientifically valid the work was, and referred to me as 'our little Pen' doing world class research – they were very proud.

When the project advanced and started looking at how best to apply the newly gained knowledge through practical techniques, growers were happy and volunteering to help with trial sites. They realised that it was not a quick fix approach, and that I wasn't 'selling' one, because they had seen all the previous work. I received phone calls and emails and had many discussions with growers in which they described to me, using the knowledge and terminology I had provided earlier, how they were managing cracking, how they could see different responses to rainfall with management styles, irrigation regimes, crop loads and soils, even within their properties. One grower's comment's summed it up nicely; "Penny- I wasn't sure where you were going with all that science – but now it makes sense for me and I can use it – thank you."

Even now the project continues on. Growers are now more responsive because the science (which they have seen and followed all the way) has turned into practical application and provided tools that they can incorporate into their situations. The project continues – 2009-2012 funding from HAL to assess practical management techniques to improve marketable yield of premium quality cherries by reducing cracking while maintaining quality. This has been successful with regard to objectives – cracking was reduced by up to 50% using some techniques, and quality wasn't compromised. And now – 2012 to 2015 I have been granted additional funding to resolve a remaining piece of the puzzle – preventing water uptake to the fruit following rainfall and to produce a manual for management of cherry cracking to go to all levy paying growers. The work is internationally recognised, I am collaborating with researchers, with the additional benefit for growers in that I can keep them updated with international research. I am also now leading a national cherry industry development program which involves the state industry associations, and is driven by regional needs. Also – I am involved in a European cherry research network. Growers are supportive of these things as access to research outcomes is usually slow and diluted.

Analysis

Successful communication and extension develops an ongoing relationship, which allows for information to flow in both directions. Instead of growers just receiving information through either a one-off presentation or fact sheet, a relationship developed over time, through multiple presentations and individual farm visits for trials, so that growers were able to interact and ask questions, suggest aspects to look at and discuss results in different contexts applicable to them. This relationship builds credibility of the research through transparency of the objectives and the methods and it increases trust in the values and intentions of the scientist. This leads to acceptance of the research as valuable and important and ownership of the research results where growers participate in the research through trials on their properties. Seeing results in context and in practical terms means that the research is able to be judged and if successful, uptake and dissemination to the broader industry is likely.

Another key part of the success of the communication of this research is that there was always only a focus on the scientific understanding of water pathways in cherries, without prescriptive management implications of how to alter management as a result. In fact, if anything, the research confirmed that cracking is never likely to respond consistently to a single treatment or action. This allowed growers to make their interpretations about which management options would work best at their farm level and in their contexts. The diversity of farming systems and styles, motivations and goals (Vanclay 1992) mean that farmers will respond differently to information and think different things are important to implement on their farms. Therefore, allowing people to have flexibility to make their interpretations about how scientific results apply to them is an important characteristic of successful science communication.

One aspect that Penny noted was difficult was in her lack of confidence about how to 'do' extension properly, and in not feeling properly qualified to talk to growers. However the rewards for Penny in undertaking this task have been great, including an on-going research portfolio, a growing reputation nationally and internationally, potential to collaborate and learn from others,

as well as personal skill development. This was all built on a foundation of relationships with growers. While Penny's story is overall one of success, access to an extension 'mentor' or some skill development in extension methods might have helped Penny feel more confident earlier in her career.

Table 2. Summary of characteristics of successful research and communication demonstrated in the case study.

Research	Communication
Industry involvement in relevant focus of research	Multiple, personal interactions over time (face to face, phone and email) with growers, over substantial time frames (years).
Successful research recognised and funded	Open to growers' ideas and suggestions
International relevance demonstrated from a local base	Trialling the research on different individual sites increasing transparency and relevance and discussing the results from these sites on a personal level generating ownership because growers are included and involved.
On-going involvement and investment building up the research base and the networks	Focus on scientific understandings without prescriptive management implications.

Clearly the approach taken by Penny has been a key to a successful outcome for industry and enabled her to attract sufficient funding to build a significant international profile over a relatively short time in a crop that allows only one experimental cycle per calendar year. Her involvement with growers from the outset produced a two-way relationship critical in turning a complex scientific issue into an understandable and useful concept for growers to use in everyday orchard management.

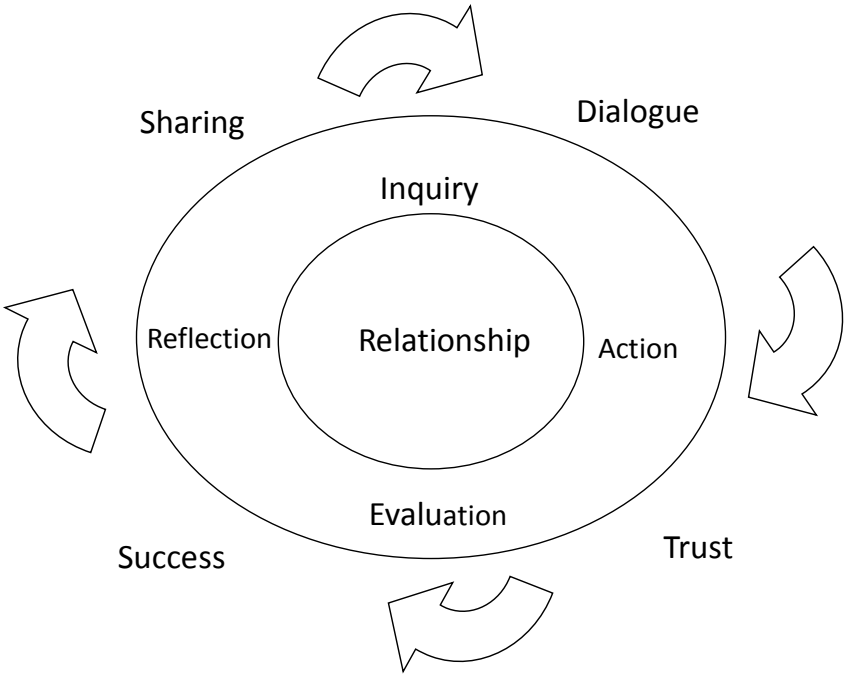
Our case study demonstrates that relationship building is the key foundation to successful extension. Yet even the most pervasive and basic models of social and adult learning do not include relationships, from the original action learning cycle (Kolb 1984), to the latest social learning frameworks (Jakku & Thorburn 2009). Neef and Neubert's (2011) very comprehensive framework for participation which talks about researcher and stakeholder characteristics and interactions still does not refer to relationships. While it is obviously implicit, we feel it is important that it be made explicit. Otherwise the significant investment needed to build relationships, as well as participants simply being aware of the importance of monitoring and managing the whole relationship process, is easily overlooked. Reflection is at least noted as a key methodology for improving extension practices (Neef & Neubert 2011), but our view is it is also a key route to understanding the relationships, which are at the foundation of every extension process and therefore should be recognised as such.

We advocate explicit reference to relationship building in all participatory models, frameworks and figures, where relationships are able to be defined according to the participant and therefore related to the most appropriate theory (of which there are many available in sociology, psychology, social learning etc). To this end, we have developed a simple schematic to highlight the key aspects of relationships in extension and help direct the practitioner to thinking about how relationships operate in their situation. From honest and open dialogue which builds trust, to trialling the change together, learning from the results and when successful, sharing these with others as prompts: we propose that these stages in relationship building can be thought of as operating alongside the stages of the action learning cycle (see Figure 1), and could equally be applied to many other figures and frameworks in various different ways. If relationships are more seriously considered as a foundation part of the participatory research process, more successful interactions and outcomes are able to be achieved. In addition, if relationships are a serious 'metric' of performace it is harder to escape the need for longer-term timeframes, respect, care and empathy on both sides, and potential skill development opportunities in areas such as communication or adult learning.

In practice, an explicit focus on relationships from the outset means identifying where relationships are important to research and extension, using a simple flow chart for example. This allows existing grower relationship networks to be identified, fostered and potentially built upon. It includes identifying the types of personalities involved, the styles and frequency of interactions that are preferred, how relationships are best maintained: whether formally or

informally, face to face, or by telephone/email, with frequent calls, or fewer more meaningful meetings, one on one time, or in specific contexts such as stage of crop growth. Then, it requires commitment to maintaining the relationship through the preferred methods identified and building personal skills to achieve these aims. Participation in groups, conferences, field days and networking activities are all part of relationship building, but are rarely explicitly acknowledged and even less frequently budgeted for. It is the researchers who are active and familiar in particular who are more likely to get funding, or get asked to work on projects, or receive positive responses to requests to collaborate, therefore it makes sense to invest in these aspects and explicitly devote attention to making and maintaining relationships. Some industries are successfully doing this, building relationships between growers and in turn with researchers, for example the well known Birchip Cropping Group among others (GRDC 2014). To guide this explicit focus, a more complete model, such as Figure 1, modified from the action learning cycle, can aid reflection on whether processes are working well. Figure 1 is an illustration of how relationships can be overlaid on existing models. It is a guide only, as the exact configuration or use of the model is not as important as the processes of reflection and acknowledgement of relationships which may equally be achieved through other means, for example discussions with critical friends, keeping a journal or advice from an external observer, as suits particular individuals.

Figure 1. Relationship processes overlaid on the traditional action learning cycle model



Source: Adapted from Kolb 1984

Conclusion

In this story, it is not possible to differentiate research, development and extension. Even when the science moved beyond what was practically useful in the short term, the relationship between growers and researcher was maintained and continued to build. Overall, the outcome of the research was an explanation, not a product or even a specific management recommendation. An irregular but economically disastrous and intractable problem became something growers could start to understand and work out their ways of combatting or managing. With a relatively inexperienced researcher, taking on the responsibility of her own extension work it would have been easy for growers to dismiss the results as 'academic' and of no practical use. Instead a presence in the industry and a mutual trust has built a relationship, which already shows signs of continued longer-term value.

To an extent, serendipity has played a part. Scientific discovery is never assured in research, and examining cherry cracking from a different perspective was never expected to give such a profound change in thinking. Nevertheless the story highlights the challenges of maintaining

such valuable relationships once established and how to develop relationships when research does not deliver such fortuitous outcomes.

How funding bodies and research providers should deal with these challenges raises questions of funding and incentives for researchers particularly where there is no obvious extension link between research and practice. Research providers emphasise scientific papers and research output, while funding bodies are increasingly answerable to growers. This story shows that growers do not necessarily demand instantly applicable answers with an immediate benefit to profitability and that researchers do not necessarily measure success in scientific publication. Perhaps then the challenges are simpler than they would first seem. For research providers (e.g. CSIRO and universities) to develop a research value metric that values relationships with industry as an equal component along with publications and impact factors would seem an obvious and essential step. For research and development corporations the path seems less certain. To value research outcomes at the proposal stage assumes success and uptake, but the critical issues of unexpected outcomes and strengthening links between providers and growers are difficult, if not impossible, to evaluate. With extension becoming increasingly incorporated into the commercial outcomes of research (product sales and service delivery) the resources available to advise and innovate to improve production without adding a saleable input are becoming increasingly limited and the opportunities for practitioners to take time out to reflect on the extension processes themselves, and the benefits derived, are rare.

Our approach has been to provide such a reflection on almost a decade of one scientist's interactions with industry. We found that relationships with growers were at the heart of successful communication and behaviour change. Relationship building is under-recognised as a fundamental part of participatory theories, and extension theories should include more explicit reference to ways that scientists, researchers and extension practitioners build relationships as part of 'doing' extension. Longer term research partnerships and active relationship building between scientists, extension practitioners and researchers, as well as between growers and grower groups at all levels and from across all institutions should be recognised as best practice, advocated by theory, fought for politically and therefore actively fostered as essential to the innovation that carries agriculture forward in Australia. It is only with a commitment to an ongoing presence that lasting extension successes occur, with deep relationships built over time. Without this type of commitment and understanding, we are accepting second best extension outcomes and the political decisions driving these arrangements are failing community needs for sustainability, productivity and environmental conservation.

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