Farmer risk perceptions and practice: Utilising notions of risk for extension in Project 3030

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Abstract. Farmers make decisions concerning their farm systems in an environment full of complexities and factors beyond their control. Consequently, within Project 3030 - a forage focussed research effort in South Eastern Australia - risk perception is emerging as a critical factor in planning the project's extension strategy. In order to understand issues of risk on the level of practice, the project's social research team have engaged with key concepts of Ulrich Beck's 'risk society' theory. At its heart, Beck's notion of 'risk society' is predicated on the assumption that society is preoccupied with a perceived level of risk created by human activity. As farmers expend a vast amount of their time and energy assessing risk and attempting to create contingency plans for a host of possible events that may be thrust upon them at any moment, we have found Beck's notion of risk insightful. This paper explores how farmer risk perceptions regarding Project 3030 findings have become a potential barrier to adoption. Discussion focuses on a set of advisory tools emerging from the social research aspect of the project and the ways in which they are intended to assist extension providers in understanding the variation of risk perceptions of farms and develop strategies to support farm management practices.

Keywords: Risk, Individualisation, Advisory Relationship, Management, Practice.

Introduction

Project 3030 is a multidisciplinary research and development project concerning innovative forage technologies and practices for the Australian dairy industry and in collaboration with The University of Melbourne. This research spans several locations in the South-Eastern portion of Australia and includes social researchers, a scientific research team, trial farmlets, farmers, agronomists, modellers, government agricultural advisors, industry service providers and farm consultants. It was originally inspired by experimental modelling results which suggest that a 30% increase in home grown forage (forage grown within the farm system as opposed to forage sourced from the market) can lead to a 30% return on capital assets on-farm.

In order to explore this, successful commercial farmers and their farm systems have been incorporated into the research project as partners in order to fast track the research process by supplementing traditional scientific method with 'real time' learning opportunities (Crawford et al. 2007). Consequently, Project 3030 has developed a new technology around the practice of growing different types of forage plants to complement more traditional perennial and annual rye grass feed bases for dry land dairy farms. The project has taken a 'principles' based approach which seeks to identify for farmers the fundamentals of successful practice change in different contexts as opposed to an inflexible list of actions in which success is assured.

However, Project 3030 lacks a formal extension brief and, as such, has been intended from its inception as strictly an R&D project. In order to ensure industry impact after the project's end, a social research team from the Rural Innovation Research Group at the University of Melbourne has been engaged to develop an effective strategy for advisors seeking to discuss Project 3030 principles and practices with their clients. In the course of achieving these aims, we have identified risk and risk perception as a key motivator both for those who seek to engage with Project 3030 principles and those who are reluctant to do so.

In this paper, we will first present the key concepts of *reflexive modernisation* and *individualisation* and discuss their utility in understanding farmer risk perceptions. We will then discuss the ways in which farmer risk perceptions have impacted on decision making concerning feed-base options. Finally, we will focus on the two key strategies (the 'Germinator method' and 'risk mapping') that have been employed to address barriers to adoption posed by farmer risk perception regarding Project 3030 findings.

Beck: Key concepts

We have found the conceptual framework provided by Ulrich Beck's Risk theory (1992, 1994, 1998) allows an understanding of how farmers perceive risk in general and how they assess new technologies in relation to risk in particular. At its heart, Beck's notion of 'risk society' is predicated on the assumption that society is preoccupied with a perceived level of risk created by human activity. These risks, in turn, are the cause of such anxiety because their origins are

understood as being beyond the control of the human populations whose collective actions brought them into being and, as such, can only ever be managed, not eradicated. Consequently, Beck (1998, p. 12)believes that:

> We no longer choose to take risks, we have them thrust upon us. We are living on a ledge – in a random risk society, from which nobody can escape. Our society has become riddled with random risks. Calculating and managing risks which nobody really knows has become one of our main preoccupations.

Anyone familiar with any form of agriculture will immediately see the pertinence of the above passage for those studying farmer risk perception and on-farm decision making. Indeed, farmers expend a vast amount of their time and energy assessing risk and attempting to create contingency plans for a host of possible events that, while completely out of their control, may be thrust upon them at any moment. Consequently, while not written with the farming community in mind, Beck's words ring true in this context. Holling and Meffe (1996) lend support to this position in their article concerning the pathology of the 'command and control' ethos in all forms of natural resource management. They submit that the 'command and control' approach attempts to either prevent negative outcomes by controlling the processes that lead to these outcomes or by 'the amelioration of the problem after it occurs' (1996, p. 329). Furthermore, they see this as a generic default position (hence, pathological in nature) in which managers of natural resources seek first to command their environment in the face of risk. This perspective has much in common with Beck's. However, while Holling and Meffe (1996) are concerned with the way in which a narrow focus on 'command and control' can obscure whole system perspectives, Beck simply acknowledges the behaviour as a compelling reality and argues that modern social actors cannot be understood without recognition of the way in which risk impacts upon their everyday lived experience.

Beck paints his notion of a 'risk society' on a very broad canvas and suggests that risk has taken precedence over traditional ideas of class and status as a defining aspect of human society. Our engagement with Beck's thinking on risk has, necessarily, not been at this level but, rather, at the level of individual farmers and their understanding of the risks they face, while striving to achieve successful farming outcomes in an increasingly complex farming environment. This increasing level of complexity, brought about by factors such as the introduction of new technologies and greater levels of exposure to the global market, has caused what Beck has called 'risk anxiety'. Put simply, risk anxiety acts to separate individuals from their perceptual safety net and recasts them in isolation from their fellows. Beck has labelled this process 'individualisation' (1998, p. 7).

Concerning this process, Beck posits that people in modern western societies increasingly perceive themselves as isolated and believe that the traditional collective belief systems of the past are losing relevance. This state of awareness, called 'reflexive modernity', implies that people (who are in the position of being able to) are moving toward a consciousness centred around risk management. Beck says the implications of this "reflexive modernisation means that scepticism is extended to the foundations and hazards of scientific work and science is thus both generalised and demystified" (1992: 163). Thus, regardless of the greater complexities and complications of Beck's meta-view of 'society', his conceptualisations of the process of individualisation within the greater context of reflexive modernity is useful for our purposes. It provides us with a model flexible enough to record and analyse aspects of the different beliefs and viewpoints operating within the project.

Risk perception and decision making

Let us consider then, how these overarching processes described by Beck play out on farms across Australia from season to season. If we consider farms as sites where decisions are made, we begin to see evidence of Beck's premises more clearly. As mentioned above, Project 3030 has three commercial farm partners, known as partner farms, operating in collaboration with the research effort. During the 2006/2007 season we monitored the decisions made on these three partner farms in an effort to understand how they made decisions concerning their risk environment. In each case, the partner farms were the site of decision making processes within which the aim was to gain as much profit as possible through the use of appropriate farming practices while maintaining their farm systems in a robust state. However, issues stemming from differences in current and projected local climatic conditions, regional environment, farm size and level of engagement led to a divergence in the on-farm management practices used to run these systems. This is commonly called 'farming for the season' (which, in the context of South-Eastern Australia, refers to Autumn to Winter and Spring to Summer).

When using this approach, farmers are constantly engaged in assessing and re-assessing factors that impact upon the state and profitability of their farm systems. Over the course of twelve months, the major decisions made on the partner farms were monitored in order to better understand the way participants viewed and reacted to their risk environment and how management practices influenced the capacity of the farm to cope with these risks. This was an important aim as our ultimate objective was the creation of a set of tools to enable extensionists and advisors achieve on-farm practice change through the use of advances in complementary forage technology resulting from Project 3030 research. In order to do this, we first needed to understand what decisions were being made in relation to the feedbase of each partner farm and then investigate how and why they were being made.

The principle strategy used here was the anthropological methodology of participant observation. However, this was not the traditional long term anthropological engagement typical of ethnographic study. It was, rather, a kind of engagement the author refers to as 'intermittent' field work – where relationships are built firstly through physical proximity and then maintained and strengthened through regular (yet not frequent) participant observation, shared involvement in the project and frequent contact via phone and email. This type of engagement was found by the authors to be the most effective given that the project spanned south eastern Australia and involved three partner farms (in the South West, North East and Gippsland regions of Victoria) the DPI in both Victoria and South Australia, trial farms at Demo Dairy in Terang (Victoria), several private consultants and research teams from the University of Melbourne. Indeed, the physical realities of this multidisciplinary research made full scale ethnographic engagement impossible under the circumstances. However, this kind of anthropological relationship building was complemented by data collected through a series of eight in-depth semi-structured interviews, two project open days, eleven forage insight group meetings, twelve partner farm meetings, one annual project workshop, three program management meetings and a whole of project review between 2006 - 2007.

The Gippsland partner farm

As indicated in Table 1, decision making in the Gippsland and North-East partner farms are good examples of the kinds of decisions produced by the 'farming for the season' strategy employed by dry-land dairy farmers in Victoria. At a surface level, the decisions recorded in Table 1 are nothing more than routine decisions taken as opportunistic and *ad-hoc* reactions to current and short-term circumstances. However, when seen as part of a dynamic risk management strategy, they gain a continuity that is not at first apparent.

The Gippsland partner farm is located in a district adjacent to the coast near the south-eastern tip of the state of Victoria. The farm has a total area of 91.1 Ha but, at the time research data was collected, the milkers were grazing 86.4 Ha (with 14.5 Ha in crops currently). The farm ran on a rye grass feeding platform complemented currently by Oats and Triticale Lucerne. It originally included another 100 hectares but that land, owned still by the partner farmer's father, had been given over to another son to manage.

For the Gippsland partner farmer, decision 1 (Table 1) was consistent with his reputation as an innovative farmer and his belief that keeping up with technological change is a key to staying competitive within the industry. Decision 2 was made partially through his involvement with the Project 3030 but was mostly informed by the experience of the partner farmer's father and his intimate knowledge of the paddocks and soil types within the farm. Decisions 3 – 7 were ultimately the result of the partner farmer's interaction with Project 3030 and are the result of the Project 3030 decision support network to better understand and manage his risk environment. These decisions, (some concerning practice and others concerning attitude) do not represent a conservative default position but, rather, can be seen as evidence that greater support regarding decision making processes can lead progressive farmers to re-assess long held notions of risk on a case by case and seasonal basis.

The Gippsland partner farmer's attitude towards farming and the management of his farm system is born out of his own personal experiences both on and off the farm. Having grown up working on his father's farm, he was well acquainted with the rhythms of dairy farming and, coming from a family deeply involved in the industry, received a solid education in the fundamentals of farming life. However, at 17 he left the farm for an apprenticeship in Melbourne as a diesel mechanic. He completed a four year apprenticeship and stayed another four years in that trade before returning home to begin share farming with his brother on the family's original property (now including the 640 acre allotment of the farm next door). At that time, he also attended a centre for applied adult education where he studied farm management practices in order to assist his re-introduction to farm life in a managerial role.

Table 1. Gippsland and North-East partner farmer decisions, 2007.

Gippsland Partner Farm - Key Decisions:	North-East Partner Farm - Key Decisions:
1. Farmer participating in short course leading to the implementation of longer grazing rotations and leaving higher grazing residuals.	1. Buying the mixer to improve utilisation of the bought-in feed and to drive production higher by improving digestibility, increasing intake.
2. Deciding to keep one paddock with Lucerne still growing when it looked a disaster earlier in year.	2. Sowing the cereals in late February/early March despite the risk of failure in the event of a false break.
3. Deciding to sow cereal crops and to use the triticale for silage only, whereas the oat crop was to be grazed and made into silage.	3. Setting the production target at 40 litres to keep the cows efficient.
4. Doing all the sowing of crops and oversowing of pastures earlier than last year, which mostly paid off.	4. Deciding on the quantity & quality of fodder necessary to produce a 40 ltr production average from the herd, and then fixing a desirable price range.
5. Being aggressive with silage making and using the skip paddock method for determining which paddocks to cut.	5. Increasing the workload on farmer labour while looking for a suitable replacement for employees who had left.
6. Cutting back on concentrate use through spring because of cost but using more of the pasture base that had been generated by better forage management principles.	6. Deciding what proportion of the farm to sow to which species (annual ryes, Italians, perennials, cereals).
7. Deciding to wait until the triticale crop reached a later growth stage, which resulted in a doubling of the dry matter yield as silage.	7. Deciding to use the dam water for irrigating the perennial rye grass in the irrigation bays instead of saving the water for the milking shed.

Source: O'Kane et al. 2007

His time in the city reinvigorated his enthusiasm for farming and gave him a new perspective on what it meant to him to own and work land as opposed to work for a wage. For instance, when asked if he saw the farm as simply a business or something more, he replied:

> Yeah. Like, it means more to me than just 'I'll get up in the morning and I'll milk the cows'. Its not, you know…it's a family farm; especially this one, it's been in the family since day one: we've always owned it. And it means more to me than, just, I get up and start work at this time … It's where I live, it's my work: it's my life … It's everything, and if I was to lose the farm – for whatever reason – I'd be lost!

Hence, the Gippsland partner farmer saw the farm as an integral part of his family's identity and as something that he held in trust, with his father and brother, for the future generations of his family in the area. This had a significant impact on his perception of the risk environment in which he farmed as, unlike many of his colleagues who have been forced, though economic necessity, to regard their properties as assets which facilitate their business enterprises, he still very much viewed his farm as an expression of the family's shared history. As such, while no farmer relishes the idea of losing assets, this added dimension dictates that the Gippsland partner farmer's management practices must be, first and foremost, strategic and long sighted. In this respect, he was prepared to accept, to some extent, a reduction in lifestyle options in order to ensure the security of the farm.

The North-East partner farm

For the North-East partner farmer, decision 1 was the result of a long-term planning approach that precedes Project 3030. The partner farmer had planned to buy this new machinery for some time and this plan had come to fruition early in the year under study. Decisions 2 and 6 were the result of the partner farmer's interaction with Project 3030 as, in both cases, these decisions constitute a break from his regular sowing practices. As it turned out, the decision to sow earlier than usual was so successful that the partner farmer reported that he will incorporate this into his management system. However, he also reported that he would not replicate the percentage of the farm sown to the specific species and cultivars used in that year due to doubts about the benefits of intensive complementary forage cultivation and the opportunity costs involved when using valuable paddocks for anything other than rye grass. Finally, decisions 3, 4, 5 and 7 reflect clearly the partner farmer's depth of experience on his own property and his familiarity with both his herd and his farm system in its entirety. While the North-East partner farmer did seek decision support through his involvement with the project, it would be incorrect to assume that these comments were persuasive in his decision making. It would be more correct to state that his decisions, already reached before discussion, were

weighed against any informed comments in order to estimate their potential impact upon the system.

Indeed, the North-East partner farmer saw his farm very much as a business and exhibited a profit-driven approach to farming in general. For example, when asked to identify the most pressing problem for farmers, he replied that he felt it was that the costs of production were fast outstripping the price returned on the product. According to him, this was, in part, due to the deregulation of many sections of Australian agribusiness such as the Wheat Board and, more obviously, the dairy industry. This had led to an increase in costs by allowing a more profit driven attitude to prevail over the last 20 years or so. For the North-East partner farmer, this has meant that more aggressive economic conditions have enabled agents in the market to increase the prices of commodities such as fertiliser, grain and supplemental feed in general when the market perceives them as scarce. As he stated, this is particularly noticeable in times of exceptional weather conditions:

> When conditions turned unfavourable, suddenly, it impacted … See, in previous droughts we've been able to buy feed from the wheat board or whatever at reasonable market prices, that went up…But this time – last two droughts – they've just…taken every cent they can get out of the marketplace.

Thus, with the relaxation of the traditional national checks and balances on market forces (in the Australian context), his perception of the risk environment has changed and he must now spend more time, energy and money sourcing inputs such as supplemental feed than he used to do. Hence, his businesslike approach to farming appears to be an effective strategy for imposing some level of control over what he sees as a highly fluid risk environment. However, this is not to say that the North-East partner farmer had no attachment to his family farm. Even though his first instinct, when asked was to define his farm as a business, he went on to qualify that by stating:

> It's more than a business in that aspect … Because you've worked on it all your life and you've looked after it, so that means something to you.

Hence, although the North-East partner farmer acknowledged an emotional attachment to the farm, he considered this aspect of his relationship with the farm as secondary to the farm's commercial viability. In this he reflects the realities of modern farming in a highly competitive and complex environment and this can be seen in the way he approached both his farm system management and his involvement in Project 3030. He has geared his farm system towards high production, with the aim to keep his cows fully fed (or as the local Department of Primary Industries Officer described it "on the verge of being overfed") for as much of the lactation cycle as he can in order to reach his production goals.

The South-West partner farm

The South-West partner farm is managed by a husband and wife team (the partner farmers) and owned by a parent of one of the partner farmers. The partner farmers have been working the farm for 23 years and it has been in the family for 26 years. The area was originally opened up as part of the soldier settler scheme but, as with the majority of land under dairy in the modern era, the original farms of the 1950s have been bought up over the years by successful farmers to make economically viable configurations. However, there has been a dramatic decrease of dairy farming in the area – there are only five commercial dairy farms left from 14 on the road running past the South-West partner farm – due to the increasing pressures placed on dairy farmers by an ever modernising industry.

The farm covers an area of 155 Ha but only 115 Ha was used for the dairy herd which, at the time of data collection, was 170 head, down from the usual 185. The dairy ran on a rye grass based feed platform with approximately 60% being sown to Italian annual rye grass in 2006 to compensate for the poor performance of perennial rye grasses in the previous dry year. Of the 115 Ha milking platform, there were 4 Ha of chicory, 9.3 Ha of Lucerne, 6 Ha of fescue, 69 Ha of Sonik-megabyte, 4 Ha experimental paddock (annual rye grass trial plots), 2 Ha triticale and 20.7 Ha perennial rye (Banquet). In 2007, the farm produced a total of approximately 900 rolls of silage and 500 rolls of hay.

As Table 2 shows, the South-West partner farmers exhibited a different decision making style than that apparent in the other two partner farms. Clearly, the most striking difference is the fact that all of the important strategic decisions for 2007 were made from mid to late 2006 rather than as the season progressed. When asked about these decisions, the local DPI officer explained:

> The really crucial ones were actually made last year, not this year. And those decisions were, then, just being implemented this year. So, that this year there hasn't been a lot of really significant ones – they were more last year.

Table 2. South-West partner farmer decisions, 2006.

1. South-West Partner Farm - *Key Decisions:*
2. August 2006
3. Identified lack of feed as a real problem for next year.
4. September 2006
5. Decision made to cut silage early because of wilting due to lack of moisture.
6. October 2006
7. Committed to definite amount of supplemental feed to be brought in from off-farm sources.
8. Calculated how to stretch that out until home grown feed was available again.
9. November 2006
10. Decision made to set the farm up on a platform of annual rye grass for the first time in order to take fullest advantage of Autumn break
11. Decision made to sow in early to mid-March, cross-drilled with high sowing rate and quantities of nitrogen where necessary.

Source: O'Kane et al. 2007

She further explained that because of the extremely dry conditions for a number of years, the partner farmers decided in the previous August (2006) that another drought was imminent and that there would not be enough feed produced on farm to keep the system at a profitable level of operation. Furthermore, in that September, as the moisture levels in the soil were so low, they decided that they would have to cut silage early to gain whatever benefit they could from a perennial rye grass platform that was only shin deep and wilting. The dry soil conditions also prompted the partner farmers to sow only one of the usual 4 paddocks to Brassica (turnips in this case) and this, in turn, meant that major decisions had to be made concerning the quality and quantities of supplemental feed to be sourced for the rest of the lactation through to after the next Autumn break. Consequently, it was decided that the best strategy they could employ to alleviate the situation as quickly as possible was to take the fullest possible advantage of the Autumn break in order to produce as much feed as possible as quickly as possible.

Thus, as a consequence of the drought and the need to set definite mid-range goals concerning feed base and animal health, initially to the detriment of production, the South-West partner farmers responded decisively to their perceived risk environment. Accordingly, a risk responsive forage plan was developed as a reaction to the extreme conditions experienced because of the drought and the need to ensure sustainable production as soon as possible after the autumn break.

In this case, all six decisions were part of a strategic plan which was formulated well before the autumn break (the coming of the first autumn rains). The above decisions were made after careful consideration and represent the application of the participants' combined expertise to a problem clearly defined by present and future risk perception. It is also an example of how good farmers naturally draw upon their professional and social relationships in order to make the best decisions possible when faced with extraordinary conditions.

Individualisation

In each of these three cases, Beck's articulation of reflexive modernity and individualisation comes to the fore. Clearly, the decisions made by each farmer were dictated, to a large extent, by how they viewed their own individual risk environments. This perception imposed boundaries around decision-making parameters and reduced possible directions from a multitude to a few. Additionally, while not the focus of this analysis, the personal priorities of the partner farmers and the ways in which they each engaged with the land and the animals that they farmed also heavily influenced the range of possible choices they considered. If we return to the key area of inquiry - *how did the participants view and react to their risk environment and how do management practices influence the capacity of the farm to cope with these risks* - we can see a correlation between feedbase management practices and the way in which each farmer perceived their risk environment in relation to their farming priorities.

For example, the Gippsland partner farmer's first priority was to maintain the farm as a viable financial proposition for future generations. This made him hesitant to over extend his farm, either financially or in terms of production, so he was willing to forgo high levels of profit for a more robust farm system. However, lacking an opportunity to expand the farm, he was willing to engage with the Project 3030 research team and seek new ways to secure feed through innovative forage practices and feedbase management. While it is not within the scope of this article to present a broader picture of the research findings from Project 3030 social research (see *Project 3030 Module 8 Milestone Reports 1 to 5*), the Gippsland partner farmer indicated many times that the risk for him lay in not engaging with innovation and research, rather than engaging with it too heavily.

The North-East partner farmer was also cautious but, as he was more focussed on profitability, sought to gain higher production levels by feeding his herd at, what he considered, the optimum level. This led to a more aggressive approach to the forage management practices which were at the heart of the research. Indeed, the North-East partner farmer's most noted contribution to the research as a whole was to combine rye and rape seed when sowing (at a 10 to 1 ratio) in order to see if he might successfully grow and graze the rape yet still achieve canopy closure with the later maturing rye (see *Project 3030 Milestone Report 8* and *Project 3030 Module 8 Milestone Report 3*). While it was not done at the direction of the project research team, it was done at a time when the partner farmer and his advisors thought the formal research was moving too slowly to address the perceived risks to the farm thrown up by a late autumn which threatened to finish early. Thus, if we consider the individualisation of risk through reflexive modernity discussion presented earlier, we can see that, in order to secure home grown feed in an environment where bought in feed was expensive, North-East partner farmer assessed where his risk was greatest and moved to address through a change in feedbase practice. Importantly, this was done without the assistance of the research team and indicates that, despite his engagement with the research project, he felt he faced this risk alone, and so, acted alone.

For the South-West partner farmers, the reality of drought in the Australian farming context made their perception of risk immediate and constraining. They thought the situation so perilous that they instituted a long term plan at the onset of autumn in which most consequent decisions were prescribed for a twelve month period. Interestingly, in this case the pressures brought about by individualisation (seeing themselves as 'apart' from their neighbours in a sea of risk) caused them to briefly trade reflexivity in order to cope with their perceived risk environment. Thus, their management plan was established early on a long term basis with feed security at its heart. This left them with little scope for pursuing the project's objectives as any use of the feed platform for project purposes (forage crops to complement the rye grass base) brought about an opportunity cost in relation to the drought plan.

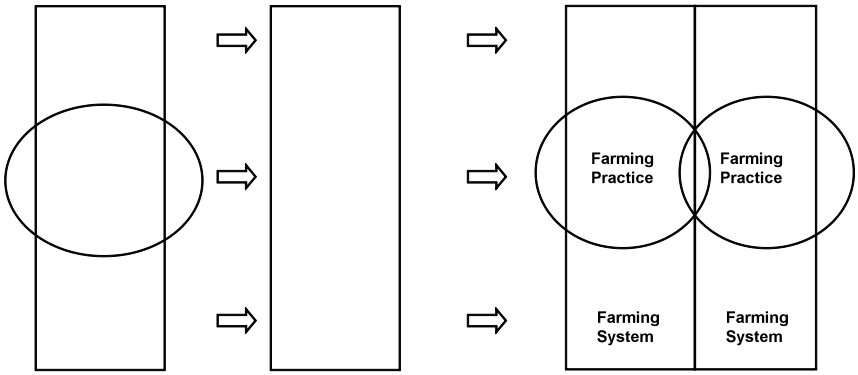
The Germinator method

One of the key synergies of Beck's theory with our experience of risk perception in Project 3030 is his claim that people may best respond to risk, and the demands of risk management, through the creation of "consensus-building cooperation" (1998: 29). In order to come to grips with the act of consensus making with regard to risk perceptions concerning Project 3030 complementary forage principles and practices, we needed a way to understand how farmers perceived their own farm systems and the particular challenges they felt most pressing. It was to this end that we employed an extension tool, called the 'Germinator method' (Figure 1), which provided a way for extensionists and advisors to ground their understanding of farmer management capacities in the world view of the farmers they were engaged with.

The Germinator is an advisory tool developed by Kenny and Paine (Kenny 2002). It, in turn, is based on the 'interplay' model used by Gremen (1993) and Paine (1999) in which group participation in learning activities concerning specific practices are mediated by someone performing a 'mediating practice' to become 'joint performances' in which knowledge concerning the practice at hand is increased. The mediating practice is usually performed by the advisor (or group convenor) and involves the task of making the information presented to the group by a range of different fields of expertise accessible to all involved. This requires the creation of a shared language in which the group begins to create its own history and identity. It is this mediating practice which then enables the joint performance of all of the different areas of expertise represented within the group as they share their experiences and bring a combined focus on the same problem from different angles. All of this is based on a notion of 'competent performance' (Kenny 2002, p.106) in which farming practice is seen as involving a combination of different competent performances being utilised to achieve a desired goal. Here, the role of the advisor becomes much more than that of a deliverer of technology. In Kenny's words "By

seeing farming practice as a range of competent performances, the challenge [for extensionists] shifts from 'how can I convince this person that technology 'X' is good for them' to 'what technology would be appropriate in supporting this individual to improve their competence' (Kenny 2002, p.106).

Figure 1. Germinator method



Source: Kenny 2002

As such, the germinator method models farming practice as a combination of the goals a farmer has for his/her farm system and his/her perceptions of the barriers he/she needs to overcome to achieve those goals. Under this logic, the appropriateness of 3030 principles of complementary forage and rye grass management are assessed on two levels. On one level, the goals of the farmer are assessed by the advisor for their feasibility given the farm system and level of farmer competence in each situation. On another level, the advisor must make a call on the ability of the 3030 complementary forage and rye grass management principles to achieve these goals. This is an important process as the complexity of 3030 complementary forage principles means that they bring with them a certain amount of risk which must be offset by appropriate levels of farmer competence.

The point here is that Project 3030 management principles are not for every farm or every farmer so a process is needed to enable advisors and extensionists to make an informed decision as to who might benefit most from this approach. The germinator method provides us with this process as it was originally designed as a 'needs based' approach to extension. In this approach advisors, when responding to a request for assistance from a farmer, gauge farmer world view and farm system in an attempt to understand the need/s behind the request and ascertain whether or not this can be met through a technical solution or an increase in management capacity. The advisor also, after scrutinising the farm system, makes a judgement as to whether or not the challenge can be met within the current system by a more competent performance of current management practices (i.e. Feeding Pastures for Profit).

With regard to Project 3030, the Germinator method is applied in a situation where the issue is clearly defined (making a practice-based approach possible) and where, in addition to responding to requests from farmers, advisors and extensionists may be in the position of approaching farmers on behalf of the industry with this new technology. As such, their role as disseminators of information must be tempered by an understanding of the potential risks of 'selling' a new technology to farmers that is beyond their current ability to manage.

In its original form, the Germinator model works by looking at how the advisor constructs an opinion of the farmer, the farm system and the farm practice. This constitutes the advisor "picture of how they believe the farmer sees the problem situation with which they are faced" (Kenny 2002, p. 159). This picture evolves from an understanding of "three main elements – *the farmer as a person* – who they are – *the farm system* – what they do, and *the farming practice* – the interrelationship of who they, what they do and why they do it" (ibid: 160).

In this model (see Figure 1), or *Mind Map* (2002, p. 159-161), the first panel represents the farmer's understanding of the farm system and farmer practice. The third panel represents the advisor's understanding of appropriate practice given the potential and condition of the farm system. The second panel represents the process of farmer engagement by which the advisor can build a realistic opinion of how the farmer is positioned in relation to his/her goals,

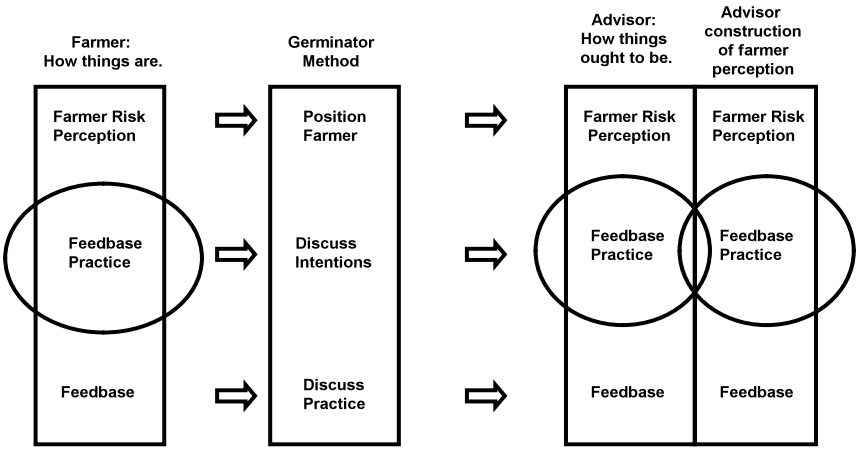
understanding of the farm system and levels of competence. Finally, the fourth panel represents this new, grounded, understanding.

3030 risk mapping

With regard to Project 3030, the Germinator method has been reworked to take into account the relevance of risk perception to Project 3030 complementary forage technology. As is alluded to above, the great majority of farmers and advisors participating in the project (within the various partner farms, regional development groups and forage insight activities) understand Project 3030 complementary forage practices in relation to the level of risk their use would introduce to a farm system. Through many conversations and interviews about risk, it became clear that farmers were looking at these practices as either a way to achieve greater production (in which case the risks/challenges caused by the introduction of greater complexity would have to be met through competent performance), or as a way to navigate risks caused by poor seasonal rainfall and market variability (in which case Project 3030 management practices are seen as a necessary risk undertaken in order to navigate an even greater risk).

Hence, Figure 2 focuses specifically upon aspects of risks related to the feed base rather than the more general approach contained in the original model. In this approach, the first panel represents the farmer's understanding of the farm system in relation to the feed base, feed base management practices and the risk environment (e.g. feed budgeting, identifying and meeting the feed gap). The third panel represents the advisor's understanding of appropriate practice given the potential, condition of the farm system, feed base and risk environment. The second panel represents the process of farmer engagement by which the advisor can build a realistic opinion of how the farmer is positioned in relation to his/her goals, risk perception and understanding of the farm system with particular emphasis on feed base issues. The fourth panel represents this new, grounded, understanding.

Figure 2. Germinator risk process



Source: O'Kane et al., 2009 adapted from Kenny 2002, p. 159-161

In order to follow the process outlined in Figure 2, we need to be able to engage with farmers around risk and the feed base effectively and efficiently. Here to, the germinator method provides us with a way to do this by using a four step process designed to clarify farmer positioning and provide the advisor/extensionists with a realistic understanding of farming practice. Again, this approach has been adapted for the purposes of understanding how risk perception affects farming practice in relation to matters concerning the feed base.

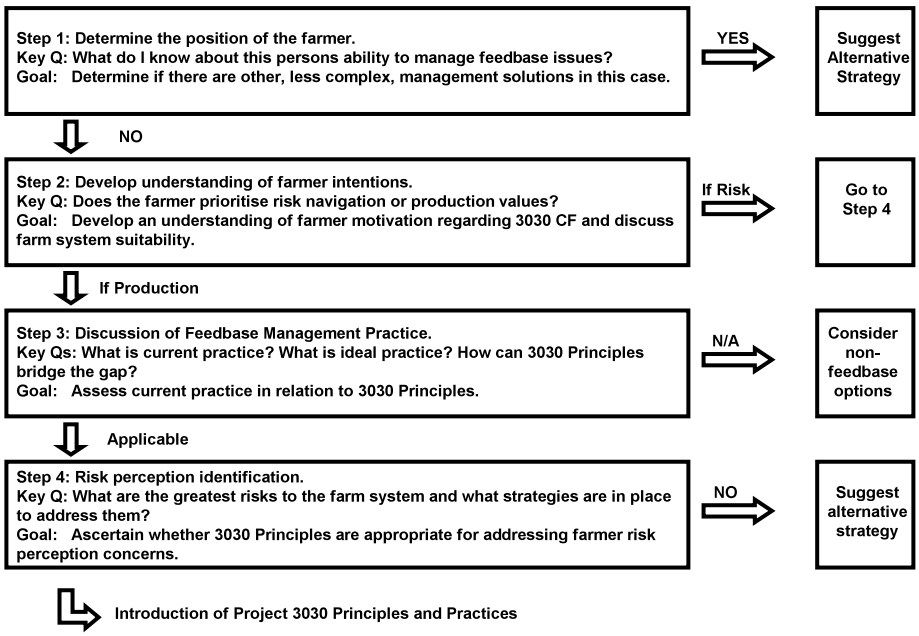
In Figure 3, each of the four steps is designed to ascertain whether or not the complementary forage practices of Project 3030 are appropriate for the farmer's needs, farm system and level of competence. In addition, attention has been payed to whether or not the farm wishes to use Project 3030 principles to achieve greater production or to navigate perceived risks (mainly by chasing early green feed to take the pressure of pasture rotation cycles). This has been highlighted as it is a determining factor with regard to how the farmer will utilise 3030 technology and what kinds of support that farmer will need to make informed decisions.

Behind each of these four steps is a series of questions designed to respectively:

- Determine the position of the farmer in relation to the farm system feed base.
- Develop an understanding of the farmer's intentions with respect to the feed base.
- Engage with the farmer around feed base practice.

- Identify where the farmer perceives the greatest risk to the farm system lies in relation to the feed base.

Figure 3. Germinator Risk Method



Source: O'Kane et al. 2009

The major focus here is to determine whether or not Project 3030 complementary forage management principles are appropriate in each case. If they are not, our advice is to direct the farmer to a more appropriate alternative. In many cases major increases in production can be made by simply managing forage and fodder resources better within existing farm systems. Programs such as *Feeding Pasture for Profit* and *Target 10* are designed to give farmers the opportunity to pick up these gains without disrupting their current farm systems to any great extent. As Project 3030 has been historically aimed at highly competent farmers, the project has presumed a highly productive rye grass milking platform as a prerequisite for engaging with its complementary forage practices. Thus, it is expected that the above exercise concerning risk perception will result in many farmers being recommended other, less complex strategies.

Conclusion

In conclusion, Project 3030 is a major multidisciplinary research initiative within the dairy industry which is focussed on the discovery and identification of new technology and management practices concerning the use of complementary forages to fill seasonal feed gaps for dry land dairy herds. The principles and practices, while effective, involve a greater level of complexity regarding management practices and this, in turn, makes them a risky proposition for those farmers who might seek to use them while lacking the necessary management capabilities. Furthermore, both the farmers and advisors involved in the project are aware of this and have sought to understand this new technology through the prism of risk. This, in concert with our emerging understanding or farmer decision-making processes in relation to risk perception, has led to our focus on risk as a way to draw these issues into a context where they can be addressed within the advisory relationship.

While this may limit the industry's exposure to the benefits of Project 3030 research, it is designed to ensure that the project's impact upon the industry is positive rather than negative. This lies at the heart of our approach, as the utilisation of Project 3030 complementary forage principles and practices involves the introduction of a significant level of new management complexity into existing farm systems, and with complexity comes risk. Therefore, we have been careful to balance the industry's desire to provide a significant population of dry-land dairy farmers with the benefits of Project 3030 research with the need to ensure that these 'benefits' are used appropriately and competently.

Finally, if we recall Beck's emphasis on a consensus-based approach to addressing individualisation, we can see that the above model achieves this by grounding the advisors understanding of the farmer's position regarding his/her feed base issues, farm system and farming practice in a structured conversation concerning risk perception. The logic here is to

bring both advisor perceptions of farmer capabilities and farmer risk perception to the fore in a context within which consensus concerning a course of action becomes the next logical step. This, we think is the power behind the model. However, we note here that the above approach to risk is but a part of our overall integrated approach to the Project 3030 advisory strategy, which is also significantly informed by the methodology of *Social Network Analysis* (Granovetter 2002, Hanneman 2005), the *Interplay* model (Gremmen 1993; Kenny 2002; Paine 1997) and the concept of *Communities of Practice* (Crawford et al. 2007; O'Kane et al. 2008; Wenger 1998; Wenger et al., 2002). Again, without scope to enter into a discussion of the strategy in its entirety, we wish to point out that the notion of risk is central to our approach and provides a common language with which to engage both farmers and advisors around Project 3030 principles and practices.

Three Key Lessons:

4. Farmer risk perceptions have far reaching impacts on their forward planning and management practices.
5. Practice change can be greatly facilitated by helping farmers address perceived risks through supported decision making.
6. Beck's notion of 'risk society' allows us to understand how advisors can use consensus building tools to facilitate risk navigation through better supported decision making.

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