

**Open to Ideas:  
Information flows from Dairy Directions to Dairy Farmers**

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## **1. Introduction**

The ‘openness’ of farming systems that is the focus of this paper is ‘open to information’, in particular the way that new information from the farming systems research project, Dairy Directions, flows from research outputs to dairy farmers.

Dairy Directions is a multidisciplinary research activity centred on a steering group of interested parties, mostly farmers, scientists and economists, but also drawing on extension agents, natural resource managers, water service providers, community service providers and public policy participants.

The core general research question of Dairy Directions is ‘What options do farmers running different dairy farming systems have to achieve their goals in an uncertain future?’

The goals analysed by the project are predominantly economic and financial – maintaining or increasing profit and cash flow, growing wealth, managing risk, preparing for succession and balancing the dairy work-life balance. Their uncertain future encompasses variability in prices, as well as the natural environment and the policy setting.

## **2. Farm Management and Decision-making**

Timely, considered decision-making is one essential element for success in managing farm business – a business best described as gambling against nature and markets where the odds of many potential events and outcomes are unknown and unknowable.

### *2.1. Management and decision-making, processes and fields*

The meaning of the terms management and decision-making are closely entwined. Farmers are all the time seeing, hearing, pondering and acting. The process of making decisions about what, when and how to do things on farms can be defined to encompass everything but the actual ‘doing’.

In thinking about information from a research project flowing into and washing around and over a farmer’s decision process; it is useful to break the decision process into some broad different ‘decision areas’. Boehlje and Eidman (1984) break down management, and thus areas of decision process or sub-process, into the functions of planning, implementation and control in the farm management fields of production, finance, human resources and marketing

A refinement is to introduce time and differentiate decisions by the time dimension of the matter the decision is about. Decisions made by farmers can be categorised into three main groups, according to the nature, impact, frequency, consequence and ease of reversing the decision. Operational decisions are those made on a daily basis, and their impact primarily is direct and short term. The effect of these decisions on the

medium-term performance of the enterprise is indirect, though cumulative. Most operational decisions are changeable in a short time; examples include feed allocations to lactating animals, grazing decisions, identifying/treating diseases, or selecting animals for market.

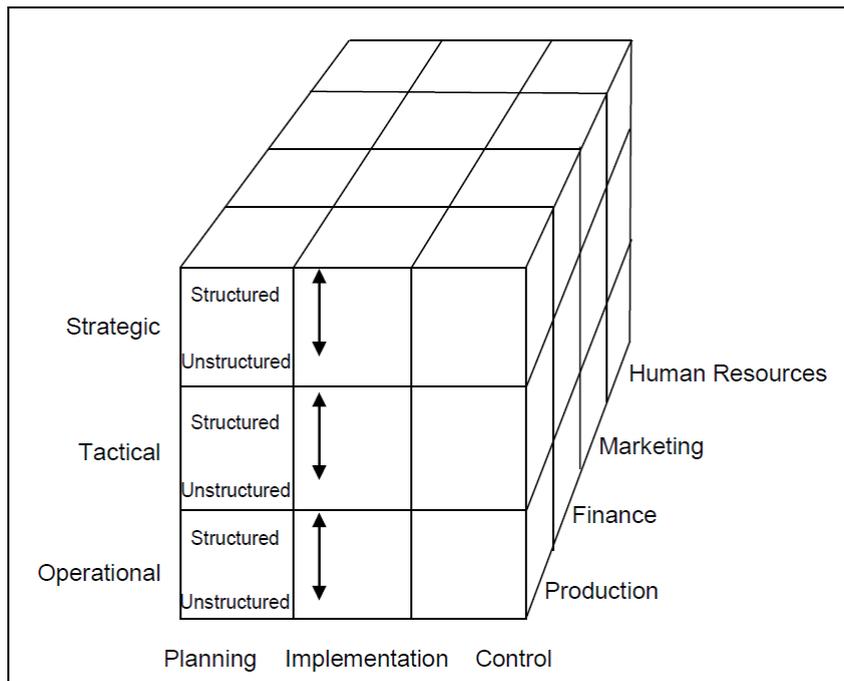
The next level of complexity and consequence are tactical decisions, which are made for the short to medium term, say within a production cycle. When considering a farming enterprise, these are decisions within-season and within whole production cycle, such as setting production targets, and the choice of purchasing water, nitrogen fertiliser or fodder to achieve the set production targets. These decisions have substantial consequences within the season, however shouldn't have too many impacts in the medium-long term.

Decisions that have a substantial impact and consequence beyond a single production period are considered strategic. These are decisions that result in major changes to systems, and require the highest levels of information and analysis. Examples of a strategic decision include changing an enterprise; expanding farm area, changing calving date or a substantial infrastructure investment. Farm business performance for many future production years will be influenced by these strategic decisions.

It is the nature of the decision that informs the above classification of decisions. It was Gray (2009) who suggested that the experience of the manager will also influence the way a farmer approaches a decision, i.e. the notion of 'structuredness' of decision making.

The extent of "structuredness" of situations and choices, about which decisions are being made, depends on the farmer's knowledge and the number of new situations s/he has come across in their farming career. Structured decisions are familiar: the farm manager has experience with them. A relatively inexperienced farmer may be faced with many unstructured decisions, which require the sourcing and processing of external information before determining a course of action. With time, however, the manager will be able to make some of these decisions based largely on the information derived from experience, with little need to gather further information. Other decisions, arising from a constantly changing environment, both natural and economic, will be semi-structured relating to situations that are entirely the same as past experience and not entirely new either; somewhere between 'nothing is new in farming (read the Ancients)' and 'its' a whole new game'.

The decision process discussed above is represented as a modification of Boehlje and Eidman (1984) cube, as shown in figure x. The point of the above discussion is to help define what area of the decision process the information flows from the output of the dairy research project Dairy Directions best fits.



**Figure 1. A classification diagram of farmer decisions (derived from Boehlje and Eidman (1984) and Dryden (1997) - Source Gray (2009))**

The research output of the Dairy Directions research aims to fit mostly into the strategic ‘sub-cubes’ of the Gray-Boehlje-Eidman representation of management activities and fields shown above.

## 2.2. Sources of information and circles of influence for farm decisions

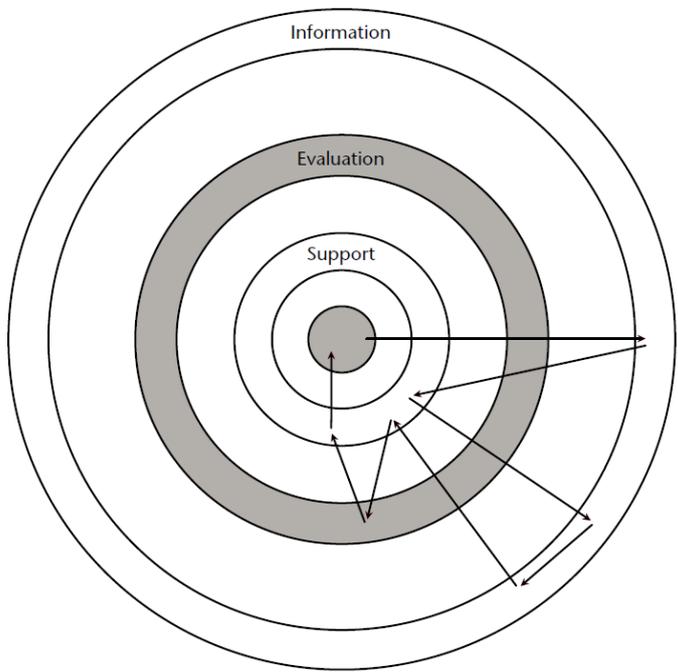
The diagram above explains the type of decisions made by farmers. It provides little insight into how the information used in decisions is gathered and filtered by farm managers. Phillips (1985, as quoted in Barr, 2011) conducted a longitudinal study of dairy farmers, interviewing a number who were considering significant changes to their farming systems. Each person and organisation they contacted about the decision, and the nature of the interaction, was recorded.

People with whom the decision was discussed fitted into one of three categories: information, evaluation and support. The information group is solely a source of data. This may include research projects, other farmers that have made similar decisions and extension personnel or sales staff with whom the farmers do not have an established relationship. The evaluation group is used to help the decision-makers sift through the vast quantities of information available. This group may include consultants, dairy factory field officers or stock and station agents, government extension officers, neighbours and discussion groups. The support group is the most immediate and trusted circle, including the people who will be affected directly by the decision. This group may also include consultants, or extension officers with whom the farmer has an established relationship.

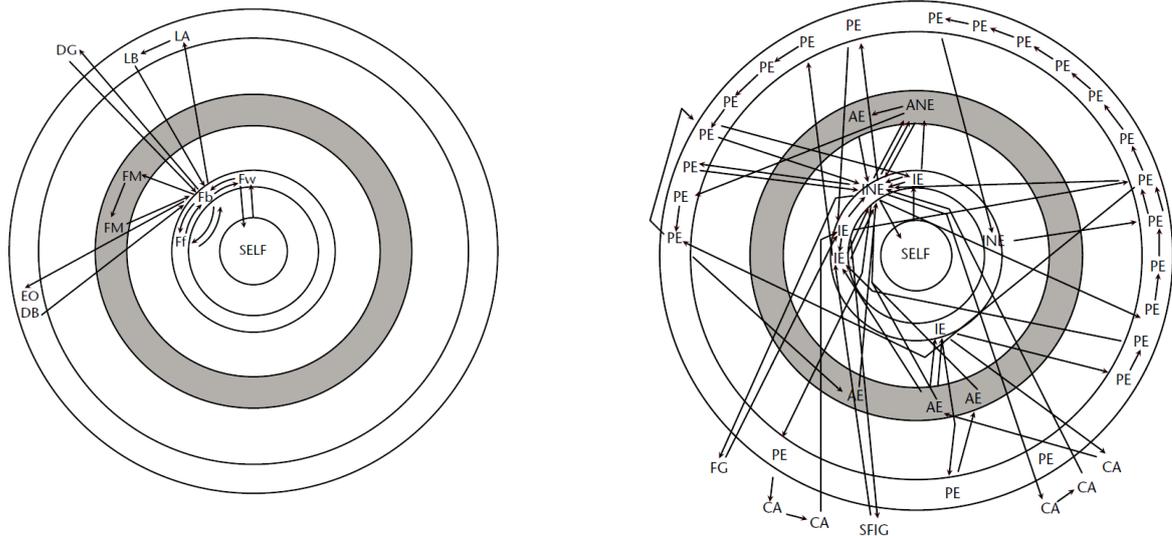
The patterns of behaviour Phillips (1985, as quoted in Barr, 2011) found in the decision process was generalized and represented as a series of concentric circles, with each group listed as a band around the centre which represents the farm manager making the decision (see Figure 3). After each visit to the information band to collect

data, the farmer returns first to the evaluation band to sift and cull the information collected, and then either informs the support circle of his progress, or returns to the information band to clarify issues. Tactical or operational decisions may be relatively straight-forward, requiring only a few sorties to collect some information. The categorization and channels of information and efforts differs depending on nature and type of the decision at hand

A farmer may evaluate some information without help, or may require discussion with the evaluation and support networks on the way. As the complexity of the question posed increases, the amount of information seeking, information evaluating and information confirmation (from the support group) increases markedly. The interaction between different decision processes and skills and the abilities and knowledge held by different farmers is integral. The Dairy Directions process aims to allow participants to build skills and abilities and knowledge of how more experienced, better decision makers/managers go about the process.



**Figure 2. Phillip's conceptual model of farmer decision making**



**Figure 3. Phillip's decision making diagram with a relatively simple decision (moving fence - left) to the relatively complex decision (build new dairy - right)**

The Dairy Directions research focus on strategic questions puts it into the complex decision information flows such as shown in figure 3. In terms of Phillips' depiction of sources of information farmers draw on, the output from the Dairy Directions research fits into the information and evaluation 'bands', working principally through the filter of intermediaries providing and evaluating information with dairy farmers. It is these intermediaries who are defined as the first-users of Dairy Directions research outputs.

### 2.3. Summary so far

The focus on types of decisions processes with an emphasis on the strategic decisions, with the notions about the open flows of information between farms and the community, encapsulates the focus of flows of information from the Dairy Directions research. The output from the Dairy Directions research project aims primarily at the part of decision processes defined as strategic, often unstructured, though some critical tactical sub-processes of strategic come into the focus too. And, we have depicted the 'target audience' of the Dairy Directions research project in terms of Phillips' circles of influence with the target circle of influence of the Dairy Directions information being the providers of services to farmers, consultants and leading farmer (first user) providers of information to farmers.

## 3. Dairy Directions: developing and disseminating information about strategic changes to farm systems

Enter the Dairy Directions – analysing farm systems for the future project. Established almost a decade ago, this program uses the whole farm approach, incorporating time, dynamics and risk into farm budgets to process and produce some of the information required in making strategic, largely unstructured, decisions about future directions for dairy farms operating under changing and uncertain conditions. A case study approach is used. The project establishes a 'base' farm using current and

recent-past biophysical and financial data about how a farm system operates. The project team asks, given the aim is for this business to maintain and improve profitability and net cash flows, and meet owner goals for growth of equity 'how might this farm change to achieve these aims over a planning period of 7-10 years, given the resources and the choices available?'

### *3.1. Using Case Studies*

To analyse future options for a farm business much needs to be known about it. In this regard, the role of whole farm case studies in farm economics is well-established (Crosthwaite et al. 1997, Malcolm 2004). Whole farm case studies can be both real and unreal (Malcolm 2004), current and potential. Farm models only partially represent reality, but case study farms simulated for economic analyses have a good chance of encapsulating the important features if they start life as an actual farm. Real case studies of 'what is' and particularly 'what could be', analysed using the whole farm approach and incorporating time, dynamics and risk, have been the basic analytical tool of Dairy Directions. The key is to bring to bear the appropriate degrees and balance of depth and simplicity (simple but not simplistic) to the elements of the system in question to enable rigorous and sound analysis and sensible conclusions to be drawn.

Traditionally case studies of farm businesses were done by farm business management problem-solvers such as agricultural consultants, but they were not regarded as a useful, or respectable, approach in agricultural economics and science research. The view was that, unlike the standard agricultural economics and science empiricism, designed to generalize from samples to populations, it was considered that few general principles could be derived from individual case studies. For some purposes, case studies of real and representative farm businesses, as they currently operate and as they could operate, provide information about real world phenomena that facilitates deep understanding. Such understanding can be used to check against current theoretical understandings about how parts of the real world work. Thus, case study research is used to generalize to theory, and the analysis can inform other farmers running similar systems on their future options. The results of a real case study analysis are either consistent with theory, and add support to the explanations of current theory, or they are not consistent with theory and challenge accepted wisdom.

The attributes and goals of farm families and the systems they run are unique. Emphasis on the uniqueness of farm businesses that justifies the use of case study approaches has a corollary: how can the findings about the state of affairs on one farm be useful and used to help farmers running other different farms? There are inherent differences in the feedbase systems implemented on farms in the temperate, Mediterranean and subtropical regions, and on rain fed or irrigated farms. Further, farms that have similar systems operate on different response functions, or at different points on a common response function. However, emphasis on the uniqueness of farmers and farms clouds the extent to which there are many commonalities between farms too. Farms in a climatic region face generally similar weather, albeit with random occurrences, such as storms. Farmers producing similar products sell on similar markets: the law of one price is a powerful phenomenon, where price differences in markets for products of the same quality and quantity sell for the same price after adjustment for differences in transport costs. The same biophysical

principles, for example in pasture production or dairy cow nutrition, apply to all farms. In summary, all of these different farms are subject to the same laws of nature affecting the internal workings of the farm business, and the same laws of economics and finance, and effects of risk and uncertainty that operate in the external environment.

Some confusion about using results from case study research and development comes from the notion that an aim of extension is to say 'You should do this'. The more useful extension approach is to say to a potential farm innovator: 'This is the information generated about future options from examining the detailed situation of this case study farm; these are the methods used; this is the way to think about whether a change like the one in question is a good thing to do or not in your own case, and this is the way to use the information generated. If you want to test out the advantages and disadvantages of this innovation on paper, here is how we do farm budgets – put your own thinking and numbers behind them'.

### 3.2. *The analysis*

Information from scientists and economists is used in conjunction with the experience of a group of leading farmers from the local district to analyse the main options that are identified in terms of efficiency (profit), liquidity (cash flows) and wealth (growth). The whole farm analysis includes risk analysis using @Risk probability distributions for key input variables and commodity price (Armstrong *et al*, 2009). Some of the questions analysed include:

- Is buying more land a sound option?
- How do intensification (increasing stocking rate) options look in terms of return and risk?
- What choices for feeding systems are there in a future of reduced water availability and reliability?
- What are the main substitution options for feed sources and how do they affect performance of the system?
- Is leasing land a good option?

The outputs of the whole farm analyses are not prescriptive. Although farms are open in many ways, and exposed to similar risks and problems, no two systems are the same – a reasonable suggestion for one enterprise may not be sensible for another business. Instead, the results used for extension are general, with a focus on sources and impacts of risk, skills, and 'things to think about'. Such messages may include:

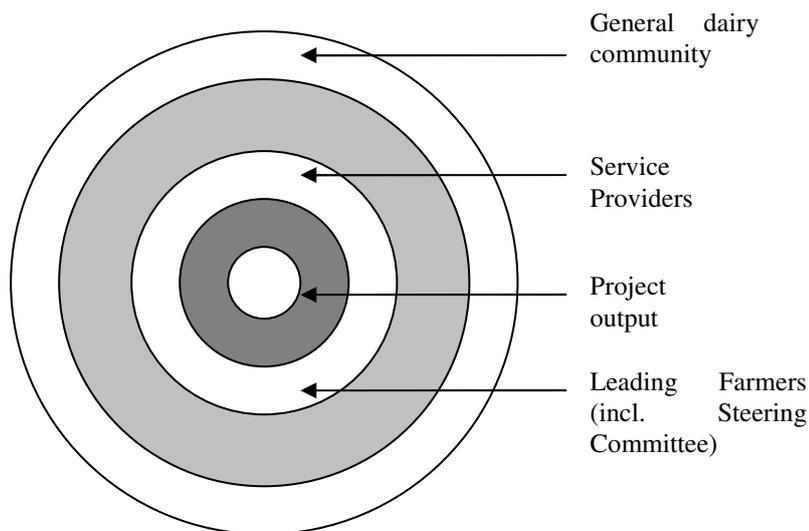
- If you intensify the farm, a main determinant of profit may change from pasture consumption (which you control) to grain and hay price (which you don't). Can you manage that shift? And, don't forget: intensifying will increase both the mean and variance of profits.
- If you increase land area and herd size, your focus will shift from being a farmer to a people manager. Are you ready for that?
- If you reduce your lease area, your focus will be more concentrated, may be able to improve the performance of the remaining area enough to offset the reduction in home grown feed.
- When you undertake a strategic farm development, it will take a number of years before you will have it performing at the anticipated levels, those that justify the change.

- Financing detail about the implementation of the decision is critical.

### 3.3. Dissemination

While an ideal might be for the participants in a research project to be able to communicate all findings with all farmers considering strategic decisions of the type that are investigated, constraints on resources in what is essentially a research project limit the dissemination of information. Further, the information is complex and specific, but with relevance to many farmers in the region running similar systems and facing similar external and internal phenomena. Practicalities dictate that the project aims to provide information to two groups: service providers and leading farmers.

One way of representing the dissemination of the results is through a diagram similar to Phillip's (1985). Three concentric circles centred on the Dairy Directions outputs highlights the priorities of the different target audiences (Figure 4). The aim is that many of the service providers and leading farmers reached by the project will be in the evaluation, if not support, population. By improving the understanding of these influential groups of people, the project is better able to instil an understanding of farm management economics, systems thinking, and risk, in the minds of those actually making the decisions.



**Figure 4. Target audiences for Dairy Directions outputs..**

The main method of dissemination is tightly focussed workshops, usually for relatively small groups of participants, e.g. 20-30 bankers. A variant is to operate through existing dairy discussion groups or service provider networks. Importantly considerable time and effort in the workshops is spent on elucidating the key, relevant and critical elements of the underlying science and response functions and the associated farm management economic theory (though not called such) as these determine the analytical approach and help shape results and implications. Agricultural science and economics by stealth is the method.

The workshops are held usually for four hours. Their aim is to increase the understanding of the principles of farm management economics – the importance of wealth, profit, and risk/variability as apparent in the analysis and conclusions about

the future options analysed for the case study farms. Participants are given the details of the base farm and some of the possible system changes, and asked to ponder the options, in their own terms, individually and collectively, based on their background and experience – be it accounting, extension, banking or farming. After discussion about the different options, using the various approaches favoured by the participants, the Dairy Directions farm management economics (whole farm, risk, dynamics, time) approach to analysing the various options is explained, with details of how the project researchers analyse the changes. The proceedings of the workshops are ‘summed up’ with some of the key messages defined. Regularly farmer participants express surprise at the extent to which the setting up of the analysis aligns with their understanding and reality, the extent to which some of the findings are surprisingly counter-intuitive: ‘complex answers that emerge from simple questions’. Others note that for them, the range and complexity of the questions are the learning while others, perhaps even more astutely, note that ‘the question is the answer’.

Although not directly an extension activity, it is often the members of the steering committee who gain the greatest benefit from the project. Just recently, a farmer from our committee expressed how much his involvement in the project had influenced his decision making on farm, particularly with respect to risk. He now builds greater margins into his decisions, and is more confident in his farm’s resilience under future variability.

## **4. Conclusion**

Mastery of information is the most outstanding characteristic of the farmers who pursue their goals single-mindedly and succeed. Much of the information they master comes from outside their business. Some of the information they master comes out of investments in scientific and economic research, such as the Dairy Directions project. Scientific and economic researchers in farming systems are well rewarded by staying close to people making decisions about running the current types of farm systems in question and who face making the decisions about running the farm systems of the future. ‘Staying close’ means having (i) good access to the tests of common sense of the practitioners, (ii) learning from the smartest farmers about the way they think, including, and especially, identifying the fallacies to which even the best of them subscribe sometimes. The result of ‘staying close’ is not only is the research project well-placed within the relevant farm and agribusiness service system to disseminate information, but equally important, scientists and economists can avoid answering questions no-one is asking such as ‘what is the optimally efficient farm plan for a year’. Instead the researchers can identify more useful questions, such as ‘how do I change my business to achieve more of my goals over the medium term planning period, under conditions of change, risk and uncertainty’. As the man said, getting the question right is most of the answer.

## 5. References

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