Sustainability and Practice on Dairy Support Land

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Introduction:

Many dairy farmers rely on dairy support land (DSL) to control feed supply and graze cows over winter. In addition to wintering cows, many DSL blocks also support the milking platform (MP) by rearing young stock, and/or producing supplements, dairy beef or arable crops, (Richards, 2006, O'Conner, 2003).

Some industry observers (consultants, academics and farmers) have argued that the inclusion of DSL in an intensive dairy farming system often results in problems as management and other resources are over-extended. Possible negative outcomes include a loss of management focus on the dairy farm, neglected DSL, sub-optimal crop or pasture yields, environmental damage and poor financial performance (de Wold, 2006). Furthermore, observers have suggested that DSL allows farmers to transfer environmental problems to the DSL, rather than acting to prevent them occurring in the first place.

It seemed to us that that the way successful DSL farmers perceive sustainability and how their views relate to practice would be valuable in better understanding sustainability issues and appropriate practice within dairy farming systems that include DSL. There are in fact very few documented investigations into the problems that occur with DSL and how to solve them and little hard data on the way DSL sustainability varies across types of DSL unit or across regions.

Objectives and Methods:

The objectives of this project were to examine how successful farmers perceive the sustainability of DSL and the way that this applies to practice across locations and types of DSL. These objectives are encapsulated within three research questions:

1. What are the perceptions of sustainability of DSL farmers who achieve business, environmental and social goals?
2. How do the perceptions of sustainability of DSL farmers who achieve business, environmental and social goals relate to practice on their DSL?
3. How do perceptions of sustainability and practice vary across groupings or regions?

Data was collected and analysed using Yin's Case Study Method (Yin, 2003). This method was chosen because it allows practice to be understood in context; each dairy farming system

faces a unique set of conditions and constraints that guide how the farmer considers sustainability and how he/she achieves a sustainable farm system. The method also provides a means to draw on prior knowledge and industry experience while minimising unfounded assumptions and bias.

Yin's method operates by defining a set of 'propositions', which are essentially a series of factual statements that address the research questions, and which are developed from prior knowledge of the situation either on the part of the researchers or as in this case, through focus group meetings of farm consultants and other industry professionals and through pilot case studies. For each proposition, a 'rival explanation' is established which is an alternative, and mutually exclusive statement on each issue or topic.

The purpose of the 'propositions and 'rival explanations' is to act as a guide to preparation of interviews, collection of evidence, and analysis, and to help maintain validity and ensure that as much relevant evidence as possible is extracted at each case study site. As the case studies proceed, the propositions may evolve to better reflect what is found at the case study sites. The data are then collated and analysed using a variety of techniques that ensure that the topic is investigated thoroughly, and that the central themes of the study are identified and examined. The goal is to improve existing knowledge, to achieve improved insights, rather than to 'dispute the burden of proof' in the sense of the scientific method.

Seventeen case studies were done at various locations around the South Island. Successful DSL farmers were chosen to ensure situations where strategic decision makers thought about and tried to achieve a sustainable farm system. Each case study included a structured interview, direct observation of practices and the current situation, taking photographs, and collection of any existing data records and relevant documents.

Propositions, Rival Explanations and Results:

Propositions were grouped according to the research questions; ie into perceptions of sustainability, how these relate to practice on DSL, and how perceptions of sustainability and practice vary across groupings or regions. In total 29 propositions and rival explanations were examined. An example is given below followed by a summary of the more important or interesting conclusions.

Part 1. Perceptions of Sustainability

Proposition: The most useful framework for understanding DSL farmer's perception of sustainability is created by separation into economic, environmental and social aspects.

Rival Explanation: The most useful framework for understanding DSL farmer's perception of sustainability is created by separation into issues internal to the farm system and issues external to the farm system.

During the analysis, it became clear that the investigation into farmer's perceptions of sustainability of DSL was not completely served by separating the topic into the areas of economic, environmental and social sustainability. Farmers see sustainability in their own terms that are distinct from externally imposed concepts such as 'environmental sustainability'. For example several farmers mentioned that they believed that DSL was a great improvement on previous land use, more money was being made with secondary economic benefits to the local economy. They saw that by using the land more responsibly they were fulfilling their obligation as farmers and leaving the land better than they found it Those interviewed saw their external obligations in terms of stewardship and responsible use, a concept that may be inconsistent with terms that external stakeholders use to describe the environmental obligations of farmers. It also appears that farmers feel threatened by external variables and acquire DSL to manage them, therefore the effect of the inclusion of DSL is to alter the profile of external variables that the farm system is exposed to.

- DSL farmer's perceptions of sustainability are most accurately defined by the division into internal factors that are easy to control and external factors that are difficult to control.
- DSL farmers are very concerned about factors that they cannot control using DSL.
- Reduction of the topic into categories such as economic, environmental and social sustainability is useful in understanding farmer goals with DSL and how farmers attempt to use DSL to internalise or control external factors.

Economic Sustainability

The participants were all of the view that that the addition of DSL enhanced the overall economic sustainability of the system. All of those interviewed believed that the net cost of inputs to DSL is less than the cost of buying the services provided on the open market, even when there are substantial costs associated with the DSL. There are also intangible benefits of using DSL rather than graziers to provide support services that need to be taken into account when assessing the performance of DSL. Intangible benefits include enhanced MP production from better cow feeding over winter, preventing damage to MP pasture in early spring and avoiding exposure to a volatile and uncertain feed market. However, there was an acceptance that the addition of DSL created new risks to the

system. Negative outcomes commented on by the interviewees included underperformance of the DSL block and loss of management focus on the dairy farm

- DSL provides a mixture of clearly defined cost savings and intangible benefits.
- There is an acceptance that the addition of DSL has potential to introduce new risks to the system.

Commercial returns and Business Growth

A number of the farmers made statements to the effect that feed grown is the key variable in the success of DSL rather than commercial returns. The rationale for this is that success with DSL requires good feed production to ensure cows are fed properly and that costs are controlled. Out of the 17 farmers interviewed, only one believed that commercial drivers should be an important part of strategic decision making on DSL. It is interesting to note that in this case feed grown and thus the number of cows that could be supported by the DSL unit was still the primary indicator of the success of the practice of imposing commercial drivers. While quantity of feed grown was generally seen as the key driver, farmers were very aware of the need to contain costs and would strive to achieve low cost DSL operations. In fact the ability to farm at low cost was seen by many as one of the advantages of DSL ownership:

Making the farm system more self-sufficient in support services is the primary purpose of all the DSL systems examined. However it became clear that in the right circumstances, it was appropriate for the DSL to be involved in the expansion of the dairy business as well.

Some DSL systems did not appear to be actively involved in expanding the dairy business with strategic decision makers content for the time being to use the DSL to ensure a stable and sound farm system. In these cases the value of avoiding reliance on others for properly delivered support services was seen as greater than the value of an expansion of the milking business once additional costs are taken into account; comparing the benefits of DSL with the capital investment in shares, cows and a newly upgraded shed for example:

Other farmers were active in using DSL as an intermediate phase in conversion to a dairy farm, by gradual development of soil fertility or drainage for example. It also appeared that using the DSL to grow the dairy farming business was a more common practice in Southland. The differences between Southland and Canterbury case study sites are driven to some extent by the lower dependence on irrigation (which facilitates gradual expansion of the MP area) and the stage of growth of the dairy industry in Southland. On the other

hand, some DSL blocks had shifted from a business growth orientation to a self-sufficiency orientation as the farm system (or the farm owner) matured.

- Most farmers assess the performance of an area of DSL in terms of quantity of feed grown, rather than economic indices such as profit or return on investment.
- The best measure of the ability of DSL to support profitability and the most appropriate measure of performance is the quantity of feed grown.
- The ability to minimize or control costs is also seen as important.
- It appears that using DSL to grow the business and to achieve self-sufficiency are compatible and highly desired goals.
- Achieving self-sufficiency was the primary business goal at most of the case study sites but in some cases, DSL was actively involved in business growth. It appeared that leased DSL could be very helpful for sharemilkers for example.
- The role of DSL may change over the life cycle of the farm.

Environmental Sustainability

DSL systems are likely to enhance environmental sustainability so long as appropriate infrastructure, development and land use are in place. All of those interviewed professed to be concerned to some degree about environmental issues and were confident that the environmental impact of the systems they were responsible for was under control. At sites where negative impacts were apparent, this was seen as a temporary phenomenon that those interviewed intended to address in future. The case study sites where ongoing problems were reported related to lack of resources, or else lack of development or structural problems on leased DSL. There are often short timeframes, and thus short time periods in which to recover invested capital, and there may also be structural problems which cause leased DSL to fail to perform.

- DSL will enhance the environmental sustainability of the overall dairy farm system as long as necessary infrastructure and appropriate enterprises are in place.
- Problems tended to occur on leased blocks where there was no arrangement with the landowner to address structural issues or insufficient time to benefit from invested capital.

Social Sustainability

At several case study sites it was evident that the addition of DSL has the potential to amplify existing social problems. The capabilities of staff become an issue because the

increased need for staff to work unsupervised makes DSL systems more vulnerable to incompetence or mistakes. Problems include underfeeding or neglecting to feed cows and increased pressures on management, as they have to deal with staff problems instead of carrying out other essential duties. Operations managers may be overextended as staff management becomes more complicated or there is a lack of time to properly plan and carry out DSL tasks.

- Failure to address problems with staff is likely to result in economic losses and severe stress for the operations manager.
- The addition of DSL will result in increased pressures for managers, as they are required to take responsibility for ensuring DSL tasks are planned and executed well and supervise staff on DSL as well as the MP.

Part 2. Sustainability and Practice

Resourcing the DSL

Having enough resources allocated to DSL is the key to achieving a balanced and sustainable farm system; this was seen as important across all of the case studies. Adequate resources are fundamental to planning, saving costs, managing staff, feeding cows properly and managing environmental impacts. Enough money and time must be spent so that the system performs as intended, cow condition is controlled and the MP protected. Extra staff, buying extra machinery, upgrading the water system, good fencing with back-up generators, or increasing support for management may all be necessary.

There was consistent evidence across a number of case study sites that including DSL in a dairy farm system puts additional pressure on the operations manager, with the result that they may be unable to find time to properly attend to DSL operations.

There was mixed evidence for the best way to prevent management overload on DSL systems. At some case study sites it appeared that a well-supported management structure had allowed management to function at a high level despite the addition of DSL. At other sites there was evidence that a dedicated management structure with specific individuals responsible for DSL was the only way of preventing problems with management.

The need to fully resource DSL may extend to paying more to attract good staff or to applying resources to gain knowledge of DSL practices.

- Intelligent application of resources is fundamental to success with DSL systems.
- In the context of DSL ‘resources’ extends to physical resources such as feed and machinery, management time and developments done.

- A well-resourced management structure with enough time to devote to planning and decision making on the DSL can lead to sustainable outcomes, however it appears that a dedicated management structure may be necessary for some larger systems.

Planning, Implementation and Control

Planning appeared to be important to success on even very simple DSL systems. Planning is subordinate to resources because time to plan is in itself a valuable resource, furthermore failure to plan will lead directly to unnecessarily wasted resources as the farmer finds other ways to ensure cows are fed properly and that the MP is protected.

DSL operations, particularly when combined with those on the MP can be complex. At several case study sites, multiple jobs or enterprises required an excellent grasp of the operational plan. Several farmers mentioned the time and energy they put into planning, the time they spend thinking about their farms, looking around and consulting with consultants, contractors or other rural professionals. The focus of planning was growing and transferring feed to winter; maintaining pasture quality and growing good crops.

There was strong evidence that timing and attention to detail play a major part in success with particular key tasks or key areas of management, and that a lack of attention to detail would lead to losses as resources are expended for sub-optimal results. Areas that appear to require attention to detail include crop establishment, maintaining pasture quality in spring and soil protection.

On the other hand, there was a solid body of evidence that a formal monitoring program is not necessary if there is sufficient management skill and experience in place. This is particularly with systems where there is a reason for management to be in every paddock every day. Even though most did not do formal monitoring, those interviewed appeared to be highly aware of what was happening on the systems they were responsible for and observation combined with action was quite important, particularly with winter grazing.

The use of indicators was quite common; the state of hay feeders as an indicator of cow appetite for example or the performance of whole crop silage as a measure of soil health.

- Planning is very important in avoiding wasted resources and ensuring tasks are done properly and on time.
- Those interviewed were prepared to spend a lot of time planning and designing good systems.
- Key tasks relate to controlling the process of growing and transferring feed to winter.
- Forage crops require timely and through preparation at the time of crop establishment.

- Success with grass depends on maintaining pasture quality and pasture yield.
- It appears that in cases where management are very familiar with the system, that a formal monitoring program may not be necessary.

The Use of Graziers

Relying on a grazier to supply crucial support services was perceived as risky by all of those interviewed. Graziers may be incapable of providing the level of care that dairy farmers require, they may fail to grow enough feed or fail to look after cows properly. Despite these perceived risks, a number of those interviewed were able to manage these risks and used graziers for some dairy support services without major problems.

Successful grazing relationships appear to begin with communication and involvement. It was also important to ensure graziers had the technical skill and the ability to grow enough feed and look after cows. Building trust and developing a professional and honest relationship is also important, this applies to both the behaviour of the grazier and the dairy farmer. It also appeared that the risk of using a grazier was greatly reduced if there was a small area of DSL available, allowing either wintering some cows at home or wintering of all cows for part of the winter. It is better to have some DSL and partial control than no control at all.

- To be successful with graziers it is necessary to manage the risk of depending on them for support services.
- The relationship between the quality of grazing and milk production means that communication, involvement and trust are key to managing the risk of using graziers.
- Small areas of DSL close to the MP can be very helpful in managing the risk of using Graziers to provide winter grazing.

Trade-Offs Between Environmental and Other Aspects of Sustainability

All of the farmers interviewed were positive of their ability to bring economic and environmental drivers into line.

Careful management of fertiliser and nutrient inputs is necessary to ensure fertilizer is not wasted and to avoid nutrient loss into aquifers or streams. Nutrient budgets, timing of fertiliser application and the use of Eco-N all assisted in nutrient management.

Appropriate tillage methods were important to minimize costs, safeguard crop yields and pasture establishment. In some situations, minimal tillage will result in reduced costs and a more resilient soil structure, while on heavier soils cultivation will help manage soil

health, give more reliable yields and control weeds without relying on sprays to kill old pasture.

On pasture, good grazing management leads to good pasture quality and fully utilised pasture, which reduce the need to apply nitrogen fertiliser and results in silage cuts, which in turn helps to control pasture weeds thus reducing the need to spray.

The ability to resolve environmental and economic drivers is impeded if appropriate developments (stock water systems or drainage) are not in place.

Although sub-optimal outcomes did occur on DSL at times, this seemed to be accepted as part of using DSL to ensure that the MP can continue to function at a high level despite severe weather events that may occur in winter or spring: Economic sustainability may be sacrificed to ensure cows are fed well or because of a lack of viable options for transferring feed to winter. Sacrifices may also be made to secure support services or maintain goodwill beyond the bounds to the DSL component of the business.

In fact, the state of the DSL may be an indicator of the sustainability of the overall system which has implications for those examining dairy farm systems (including those who own them). It seems likely that if the system is under pressure, that economic loss, environmental damage or management overwork will become evident on DSL and thus indicate systemic problems that may not yet be evident on the dairy farm.

- It is possible to farm in an environmentally sustainable manner without resort to uneconomic developments or production losses. In fact, most farmers believed that failure to perform in an economic sense and negative environmental impacts were linked.
- Practices that enhance economic performance while helping to control environmental impacts include: good grazing management, having appropriate developments in place, using fertilizer appropriately, using eco-N and using appropriate tillage methods for the situation.
- The appropriate developments must be in place if economic and environmental drivers are to be brought into line.
- Part of the role of the DSL is to protect the MP from variations in climate or the feed market.
- When forced to choose between the sustainability of the DSL component of the business and the sustainability of the MP component, the sustainability of the MP will always come first.

Part 3. The Various Types of DSL

Leasing DSL

Leasing DSL appears to be a very common practice with 11 of 17 farmers interviewed having at least some involvement with leased DSL. At the time of the interviews, the cost of leasing was substantially lower than servicing an equivalent debt. Leasing also frees up equity for investment elsewhere.

The primary limitation of leasing appeared to be the short timeframe involved, and the lack of capital inputs or unrecoverable investment that may result. With a poorly worked out lease agreement, the farmer may have no way to recoup capital investments on the DSL and there may be no opportunity to benefit from invested capital. There may also be a lack of environmentally focussed development or disagreement about which party should pay for what.

All of the farmers who leased DSL maintained that to be successful they had to be very careful of capital inputs and they had to balance the need to invest capital to get the best out of the land with the reality that they may not have time to benefit from any investment done.

- Leasing DSL allows farmers to control support services inputs and grow their business without the expense of land purchase.
- Leasing DSL suits dairy farmers because it compliments their capital intensive dairy farm.
- To achieve success with leased DSL, care must be taken to control capital inputs while ensuring that appropriate infrastructure developments and/or agreements are in place.

Adjacent DSL

It appears to be easier to achieve sustainable farming on DSL that is adjacent to the MP. Adjacent DSL areas were valued because of the ability to capture cost savings and to protect the MP at key times (when grazing would result in soil damage and runoff for example). Furthermore, marginal areas of land that are too small or of insufficient intensity to be viable as an independent DSL unit may still be viable if adjacent to larger intensive grazing units or MP areas because they provide partial support that greatly reduces the risk of relying on graziers for support services.

The most economically effective DSL may be a relatively small, leased DSL unit, adjacent or very close to the DSL. Leased DSL compliments the capital intensive dairy farming business, while small or low-intensity areas of adjacent DSL can also be very useful in

protecting the MP and saving costs. Even though small, adjacent areas of DSL are useful, it is important to be mindful of what the land is really capable of and to resource the DSL unit appropriately, make appropriate plans, and attend to details and timing.

- While adjacent DSL is valued by those who have it, it does not appear to be essential to achieving sustainable DSL.
- Good practice with adjacent DSL appears to be a matter of capturing synergies and saving costs.
- Most of the adjacent DSL areas were leased. The most cost effective of all were small leased areas that gave the farmer control without a large capital investment.

Soil Types

Farmers prefer light, free draining soils for use as DSL because they are seen as easier to manage when wintering cows, with several of those interviewed specifically choosing farms with light soil for use as DSL units.

Even though some soil types were easier than others it became clear that they all had to be managed properly and resourced well to prevent problems like damage to soil structure or nutrient runoff over winter.

For there to be success, key activities must be planned and carried out at the right time. Resources such as good stock water systems, drainage and the right machinery had to be in place, regardless of soil type.

- A variety of soil types can be used for DSL.
- Whatever the soil type, soils on DSL need to be managed and resourced properly for sustainability to be achieved.

Pasture vs Crops

Although farmers generally favour wintering on grass, forage crops allow wintering of more cows on a smaller area while managing the risk of being unable to grow and transfer enough feed to fully feed cows in winter.

The advantages of wintering on grass are improved control of feeding, the ability to avoid diet changes and possibly enhanced spring production. Secondary advantages include cost savings and synergies with other enterprises such as youngstock grazing and silage making. Ideally all-grass systems are irrigated giving control over pasture growth and pasture quality and mitigating the risk of relying on one type of forage for winter feed.

Forage crops facilitate the transfer of large amounts of high quality feed to winter and give an improved risk profile over all grass systems. The main difficulties with crops are the costs involved and dietary issues that can occur with cows. For the system to be sustainable, measures must be taken to maximize crop yields and to minimize the impact of cows on the soil over winter.

The choice to use crops or rely entirely on grass depends on the quantity of feed that can be reliably grown. For example, it is not feasible to rely completely on grass for winter feed on dry DSL in Canterbury, while in parts of Northern Southland, the summer dry means that it can be very difficult to grow good crops so that grass is probably a better option.

- Wintering on grass is believed to be better for animal health, but it only works financially if production from grass approaches that of an equivalent area of forage crops in the same conditions.
- Forage crops help manage risk. Exceptions to this were a DSL unit in an area where early summer conditions make crop establishment difficult and fully irrigated DSL where there is much greater control over pasture growth.
- Undesirable environmental impacts or production losses can occur under any wintering regime if soils and covers are not managed well.

Conclusions

Dairy farming systems are exposed to a number of external risks and DSL is one way of managing them. Whatever means are used to manage external factors, time and money need to be invested for the dairy farming system to be sustainable.

The participants believed that they were successful in using DSL to control how cows are fed over winter and that environmental risks were contained, however there may be some social impacts that need to be managed.

To successfully manage production risk while avoiding undesirable impacts on staff, management or the environment, the DSL must be well-resourced, there must be good planning and timing and there must be attention to detail with sensitive tasks like crop management.

There are a wide variety of DSL situations, but the fundamentals of practice remain constant. The same concept of sustainability and practice applies across all types of DSL, regardless of location or local conditions. Variations across types of DSL included:

- Leasing DSL can work very well as it compliments the dairy farm business and has a lower capital cost than land ownership.
- Adjacent DSL can confer advantages (especially on dairy farms with heavy soils), but excellent results were also apparent on detached DSL units.
- Although farmers preferred light soils for DSL, excellent results were reported on DSL units with heavy soils.

The choice between crops and grass wasn't as much an issue as how much feed could be grown in a particular situation for a particular cost.

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