STOCKING THE FARM TO MAXIMISE PROFIT AND HOW TO MANAGE THE RISKS

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Key messages

- Optimum stocking rate is that which, when combined with appropriate calving date and management, results in achieving:
  - The target amount of feed cover on the farm at calving, and
  - Cow body condition score target of 5.0 at calving and at least 4.0 at mating each year
- Stocking rate is important but how the system is managed is more important
- The farm needs to implement an appropriate set of farm management decision rules to optimise profit
- Be aware of present and future environmental issues that may place limitations on your system.

Introduction

The efficiency of milk production from pasture is a function of annual pasture production, pasture utilisation, and the efficiency of milksolids (MS) production per cow (Holmes & Macmillan 1982; Penno 1999). Annual pasture production (or feed on farm) determines the total amount of feed energy available for animal maintenance, growth and milk production.

McMeekan (1950) and Bryant (1990) reported that increasing pasture utilisation by increasing stocking rate (SR) would increase total MS production, which would lead to increased farm profitability. However, analysis of operating profit per hectare (formerly expressed as economic farm surplus (EFS)) showed that farms with similar EFS may have large differences in per cow and per hectare production (Silva-Villcorta *et al.,* 2005). This is, in part, because many of the variable costs incurred are directly related to SR, and the SR at which EFS is optimised is generally lower than that required for optimum MS production. At high milk prices, high SR farms are likely to be profitable, providing that costs do not increase. McCall & Clark (1998) and Penno (1998) demonstrated that high EFS can be achieved at a low SR as long as the cows achieve high MS per cow at low cost. In an analysis of New Zealand (NZ) dairy farm financial performance, operating expenses per kg MS were the strongest driver that farmers had control of operating profit per hectare. Hence cost control has a greater influence on profit than the farm's SR. Practical limitations to cows farmed (such as labour requirements and farm dairy shed size) could be reasons to lower SR and increase cow feeding levels.

Principles of stocking rate management

Stocking rate should balance the dual objectives of generous feeding to achieve high levels of efficiency of milk production/cow while maintaining high levels of pasture utilisation to meet the overall objective of optimising farm profitability.

A recent study (Macdonald *et al.,* 2008) showed that the amount of pasture grown tended to increase with increasing SR, as did pasture quality, reducing the potential impact of cows/ha. Milk production per cow declined linearly with increasing SR, because of a lower peak and a less persistent milk profile leading to a shorter lactation. However, while milk production per ha increased linearly there was only a small decline in the efficiency of converting feed energy into milk energy as SR increased. Stocking rate did not affect the in calf rate, but there was a higher level of intervention in the high SR herds.

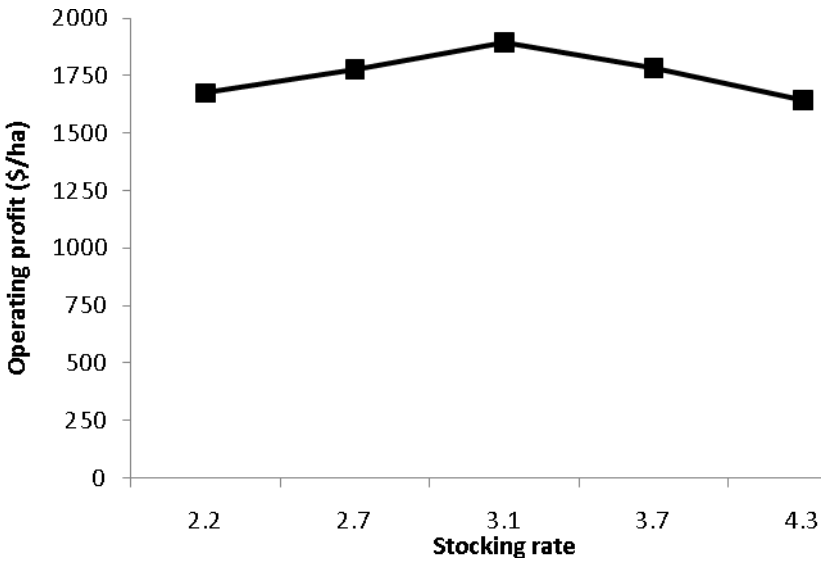

Figure 1. Operating profit for a range of stocking rates in whole farm efficiency trial (adapted from Macdonald *et al.,* 2008)

The operating profit from the range of stocking rates was modelled using marginal analysis for all costs (either per cow, per ha or a combination) and showed that the optimum operating profit ($/ha) was attained at a SR of 3.1, which was the mid-point in the SR's in the trial. Of interest, is the fact that the operating profit was evenly distributed either side of the optimum SR (Figure 1). Hence, there is a range of stocking rates where profit can be maximised providing grazing management is optimal. In this trial the optimal SRs ranged between 2.7 and 3.7 cows per ha.

For the farming system to be sustainable there needs to be a set of management rules to ensure that negative effects from one season are not carried through to the next (Macdonald & Penno 1998). These rules (see appendix for brief summary) ensure that production between years is stable and that there are no carry-over effects from one year to the next. Attaining body condition score (BCS) of 5.0 at calving for cows and 5.5 for first and second calvers must be achieved in all systems to maintain a compact calving with minimal intervention. This will help ensure the cows do not drop below a 4.0 BCS at the start of mating, a prerequisite to good mating management. The rules also allow the operator to have a logical rationale for applying nitrogen or buying in supplement if pasture growth is below average.

The situation in the South Island

In this paper we consider less than 2.4 cows/ha to be a low SR for Southland and greater than 3.0 to be high based on annual average pasture growth.

A farm systems review of high performing farms in Canterbury showed that the key drivers of profit were:

1. Pasture eaten - t DM/ha
2. Operating expenses- $/kg MS
3. Imported supplement used (t DM/ha)- the less supplement fed the higher the operating profit
4. Stocking rate- cows/ha

This analysis showed that profit could be maximised at a range of SRs. This was partly due to the differences in farm potential pasture production (soil type and climate), farm infrastructure (not all costs are marginal costs e.g. labour) and in imported feed costs.

A farm systems review for Southland (DairyBase analysis of 17 farms for the 2009/10 season, unpublished) shows that there was no significant relationship between SR and operating profit per ha (Figure 2), nor was there any significant relationship between MS/ha or MS/cow and operating profit per hectare.

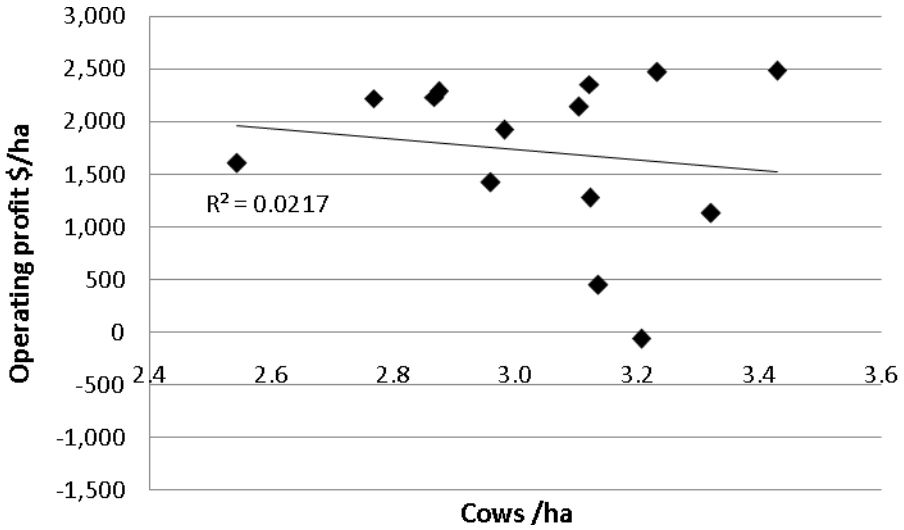

Figure 2. Stocking rate and operating profit for 17 farms in Southland 2009/10

Important factors to consider for your farm

Pasture eaten is obviously an important component of successful farm management, but it is often forgotten in an attempt to maximise per cow intake. The amount of pasture eaten is also dependent on the weather due to variations in seasonal pasture growth and the amount that can be utilised by the cow.

The first risk at any SR is the amount and distribution of pasture production which is driven by climate. In Southland there is a large variation in daily pasture growth between years, particularly in the summer and autumn (Figure 3). Any variation in feed supply from the norm or expected must be planned for. The effects of shortfalls are greater as SR increases.

Observation of grazing residuals as an indication of feed surpluses is useful to determine the potential of the farm to change SR. The Lincoln University Demonstration Farm (LUDF) increased SR based on observation of the farm being in surplus, not on measurement of pasture grown. As in the trial run by Macdonald *et al,* (2008), LUDF found that pasture grown increased with increasing SR.

As SR is set by the start of winter, the feed available per cow for some farms can vary greatly between seasons, therefore, there is no recipe to set the SR for any given year. To manage the seasonal variation requires planning, the appropriate infrastructure on the farm and a set of decision rules that govern pasture management to achieve the critical factors for a sustainable system (average pasture cover (APC) at calving, cow condition at calving and mating).

A high SR farm may need to dry-off early but a low SR farm will need to ensure maximum days in milk and this will require that the appropriate feed is in place at a price that makes the system profitable.

The decision rules need to achieve target levels of APC for different seasons of the year. As rotation length is a key driver of APC and residuals, there need to be rules on rotation length, especially for high stocked farms. On a low-stocked farm a fast rotation may be used to reduce pasture growth to match feed supply while on a high-stocked farm a slower rotation length should be used to maximise growth rates, e.g. rotation length never faster than 21 days. The risks for any farm system need to be identified and minimised by applying the appropriate decision rules.

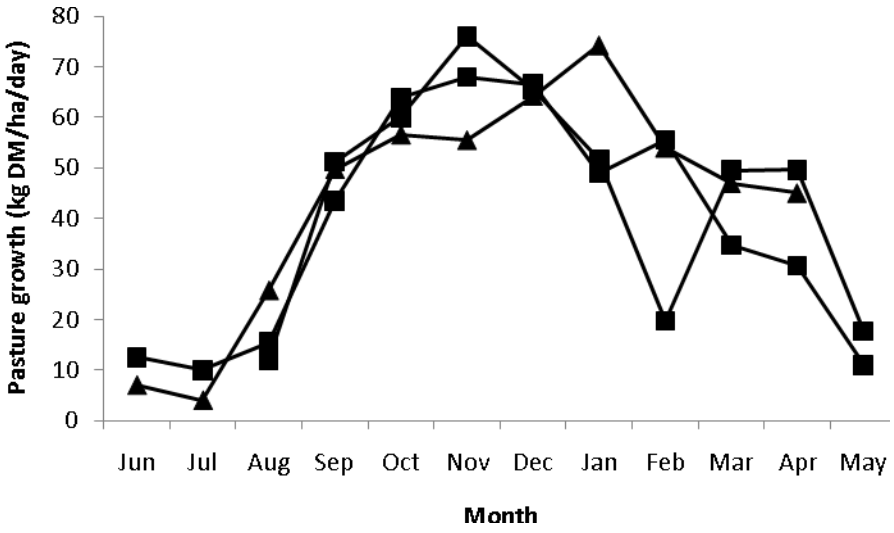

Figure 3. Pasture growth for 3 years on a Southland dairy farm (♦ 2007-08, ■ 2008-09, ▲2009-10)

Droughts

Summer droughts limit feed supply so it is important to ensure that there is a plan that is easy to bring into operation to ensure that milk production or cow condition is maintained. It is particularly important for high-stocked farms as it is a costly exercise to use cow condition to balance the feed budget. This can affect future MS production and reproductive performance. It also increases the risk of not meeting animal welfare standards.

Systems must be in place to allow for an early response to a changing situation. The aim must be to milk as many cows for as long as possible, but this should not be at the expense of lowering herd condition or APC to the extent that all the cows need to be dried off at the same time. The easiest way to reduce herd demand is by removal of the cull cows. Upon removing the 20% of cows each of the remaining cows have 25% more to eat.

On high SR farms there will be only a small amount of silage made so it is important not to squander this feed early on. It should be kept until after the autumn rains with enough saved for winter. As lactation nears an end it is essential that systems are in place to ensure that cow condition and feed supply are adequate at the start of next season. On lower stocked farms there will still be the aim to ensure that days in milk are maximised. Thus there may be a need to supplement the cows with high quality home-grown silage or bought-in feed. This needs to be planned for and the system set up to maximise utilisation of the supplement and the pasture. Normally the feed should be organised before any feed shortage occurs to avoid buying feed at a premium price.

Wet weather

Planning is the most important aspect of wet weather management. Wet weather and poor drainage of soils means that plans have to be in place to limit soil damage. Research in the Waikato (Ledgard *et al.,* 1996) has demonstrated that one pugging event in August depressed pasture production by 20-80%, depending on soil type, and the effects lasted for 4-8 months. Many Southland dairy farms are on Pallic soils which are imperfectly drained, due to an impermeable fragipan (Houlbrooke *et al.,* 2009), and as such are easily damaged. To ensure there is sufficient pasture on the farm in the spring, pugging of the soil must be minimised by removing the cows from the pasture in wet conditions.

Wintering-off can help achieve pre-calving APC targets, particularly at a high SR, but conversely at a low SR it can add to feed quality problems in early lactation. At the planned start of calving there needs to be a wedge of feed ahead of the herd and not a large bank which is unmanageable because all the pasture is ready for grazing at once. Therefore some paddocks are spelled too long, pasture growth rates are slow (canopy closure) and the quality of the feed when grazed is poor. Also when pasture is spelled for too long the regrowth is slowed and the farm can go very quickly from a feed surplus to a deficit. This is particularly so if the calving spread is not compact.

This was one of the early lessons learnt at the LUDF. When the farm was started they kept about 1cow/ha over the winter, but as calving spread was condensed and SR increased, cows were grazed off. Following this example indicates that it is essential to know the effect changes in SR, calving date, calving rate etc will have on the farm and plan for different eventualities.

The spring can be very stressful for farmers when the anticipated pasture growth does not occur due to wet conditions. Farmers who manage to get through with minimal lost production and pasture damage are those who have the infrastructure or systems to prevent pugging

damage, monitor APC and cow condition against defined targets for the farm over the winter, and take action early to improve the situation.

If wet in the spring, DO NOT speed up the rotation in an attempt to feed the herd fully or reduce pugging. It may initially allow better feeding of the herd but will only exacerbate the lack of feed by reducing pasture growth through too short a grazing interval. Instead, have areas to which the cows can be moved (stand-off areas) to reduce soil damage. Recent DairyNZ research (Clark *et. al.,* 2010) has shown that cows can get 80% of their daily required intake in 2 – 4 hour grazings. Therefore cows can be fed reasonably well if after a short grazing period they are removed from pasture to reduce pugging. However, the area the cows go to must comply with environmental requirements.

Operating expenses

Further South Island data for 2006-07 shows that as SR increases, MS/ha also increases (Figure 4a), but operating profit per hectare does not necessarily follow the same trend (Figure 4b). Operating profit depends on the control the farmer has over farm working expenses (FWE) (Figure 4c).

In 2007-08, a year with a higher payout than 2006-07, the operating profit (Figure 4d) was much higher in the higher stocked farms than it was in 2006-07 (Figure 4b). This was due to a higher milk price resulting in a greater margin between gross farm revenue (MS/ha x milk price) and operating expenses, indicating that FWEs did not increase linearly with milk price.

The farm systems review for Southland shows a very strong relationship between operating expenses per kg MS and operating profit per hectare (Figure 5).Therefore, regardless of the SR, having control of **FWE** is critical. In times of high milk price or production, plant replacement and capital work can be done to set the farm up to weather a poor season. Often in the good times, costs creep into the system that are hard to cut out in hard times.

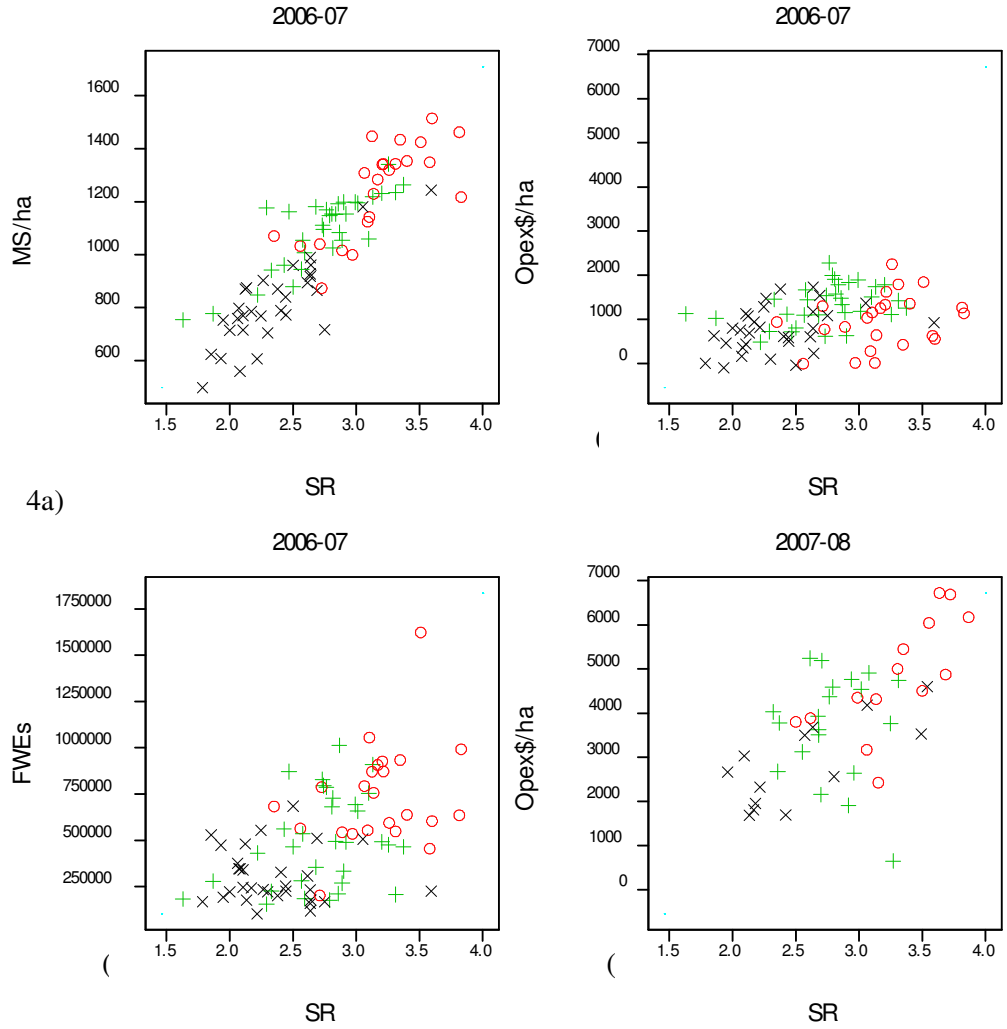

Figure 4a, 4b, 4c, 4d: *4a, Milksolids per ha, 4b, Operating profit per ha and 4c, Farm working* expenses (FWE) for South Island dairy farms for the 2006-07 season (x West Coast-Tasman, + Marlborough-Canterbury, o Otago-Southland) and *4d*, O*perating profit per ha* for 2007-08.

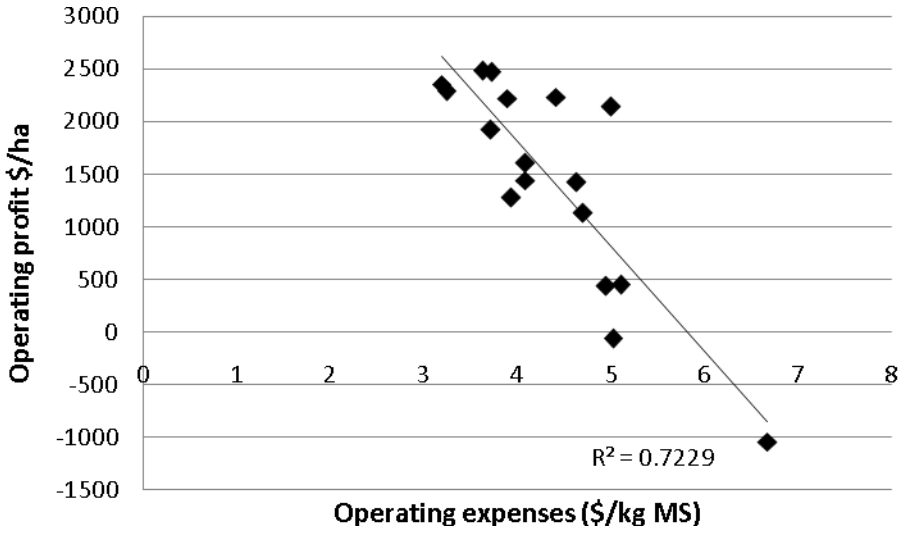

Figure 5. Operating expenses, ($/kg MS) and operating profit ($/ha) for 17 farms in Southland 2009/10

The importance of decision rules

A low demand farm (low comparative SR -kg liveweight per kg DM: CSR) will need to have a greater emphasis on production per cow to achieve high production per ha. This means that the set of decision rules will be different to that of a farm that is aiming for high production per ha. In summary, a low CSR farm must feed cows into the autumn using conserved silage and nitrogen boosted pasture to maximise production per cow and days in milk. Whereas, a high CSR farm has a limited amount of feed on the farm in the autumn and this must be used judiciously to ensure cows at calving have a BCS of 5.0 and adequate feed is available. This may mean the cows have a shortened lactation. With high CSR's it is vital that spring pasture consumption by the herd is controlled so that feed on the farm is not reduced too early, leading to underfeeding and lowered production. This is best achieved by a slow rotation and the use of a system similar to the Spring Rotation Planner (Farmfacts 1.12 & 1.13). On a high CSR farm with little supplement fed in the spring, calving date will be later (50-55 days before feed supply exceeds demand,) than on a low CSR farm or where there is a spread out calving interval (60-70 days before balance date). Therefore, calving date needs to be reviewed when there are changes to SR, calving rate and feed inputs in the spring. However, it is not practical to alter planned start of calving every year; it is more important to have systems and a set of farm management rules set in place to manage seasonal variation. On a low CSR farm there is a need to maximise intake of quality feed. This may necessitate the use of topping or early and large amounts of

conservation and being on a fast rotation when feed supply exceeds demand. In the SR trial (Macdonald *et al.,* 2008) five of the farmlets were managed by use of a computer model (UDDER). At peak spring growth, the low SR farmlet was on a 10 day grazing interval to manage the feed supply. This had the advantage of reducing pasture growth, the need to top or conserve pasture.

Management capability

In general, it is easier to manage a higher SR farm with limited decision making. At high SRs, the period when pasture growth is greater than herd requirements occurs over a very short period and as long as the grazing interval is appropriate, then pasture quality will not be an issue.

Community perception and animal welfare

There has been increasing concern about the supposed "thinness" of NZ dairy cows. There is no doubt today's cow will milk for longer at the expense of retaining body condition. As there is a bell shaped curve for the range of condition scores within a herd, the average herd BCS should not go below 3.5 to ensure that there are no cows less than BCS 3.0 in the herd. The key way to address this is to calve mixed aged (MA) cows at BCS 5.0 and first and second calvers at BCS 5.5. This has been talked about for 30 years. Farmers often have the herd achieve the optimum BCS in June but fail to remember that in the last month of pregnancy the unborn calf requires 3-4 kg DM/day. If the cow allowance is not increased to allow for this, the calf effectively is a parasite, and the cow will lose condition. If dairy farms are to remain viable then it is essential that the cows are managed to attain BCS 5.0 at calving.

There is often the perception that high SRs lead to thin cows. While under a high SR, the cows may at times be in lower condition than on a low SR farm, there is no need for the cows to be thin. The use of a set of decision rules around when to dry off etc, will go a long way to ensuring cows reach the ideal calving target BCS of 5.0 for MA cows and 5.5 for first and second calvers.

The recent public issue of thin cows at a number of saleyards highlights the fact that farmers need to manage the situation. DairyNZ produced a booklet titled "Fit for Transport" (2009) which is designed to help farmers decide if a cull cow is fit for transport. In the introduction it states "making bad decisions about when to send cull animals for processing puts you and your transport operator at risk of prosecution." So the onus is on the farmer to ensure that this does not happen. If the issue is ignored, the resulting publicity is not good for the industry.

Increasing attention, both locally and internationally, is being focussed on the sustainability of modern agricultural production systems, including NZ's dairy industry. To ensure NZ retains its present 'clean green' image, thus adding value to our exported produce, it is essential that nitrogen and phosphate use on dairy pastures has minimal detrimental effects on the wider environment. In Southland, which has seen a steady increase in dairy cow numbers over the past 20 years, concern has been expressed about the impact this expansion is having on ground and surface water quality, particularly in relation to elevated levels of nitrate-N and phosphate in groundwater.

There is also a need to ensure that soil damage is limited and that effluent is applied to the soil appropriately. Higher SR farms need to ensure that there are systems in place to manage the cows in periods of risk. In evaluating the performance of the current farm system and any changes in farm policy the environmental impact needs to be considered. For nutrients this can be done by using OVERSEER™. Changes in farm system need to maintain or improve the environmental impact for the farm to remain viable.

Farmers need to have systems in place to ensure that water use, effluent, fertiliser and soil management comply with environmental rules, now and in the future. The first step to managing this risk is being aware of what is required, not just currently but future requirements. If farmers are not aware of an impending compliance issue, or choose to put their heads in the sand, the risk to their business is very high. Farms with higher SRs may be more at risk especially when wintering cows.

What can go wrong if I don't get it right?

Table 1 has a set of farm management requirements for low, medium and high SR farms.

On a high stocked farm the focus is on having sufficient quantity of feed. Therefore, the risks are around a reduction in pasture grown through low APCs (fast rotations) and low cow condition. High stocked farms need to have decision rules on rotation length to maintain minimum APC, and on reducing cow demand to match feed supply to ensure cow condition and APC at calving targets are achieved.

At low SRs, to achieve the target MS/ha requires high MS/cow and, therefore, the risks are not maintaining pasture quality and/or too few days in milk. If pasture quality, or the quality of supplement harvested is not maintained both cow intake and the energy per kg DM eaten are reduced. To ensure that this does not occur there needs to be rules on how to maintain pasture quality (use of topping, conservation and rotation length) and how to make quality silage (length of closure).

Summary

The pros and cons of increased SR have been discussed for more than 60 years. In 1990, Bryant stated that "*the ultimate determinant of both SR and production per hectare is the amount of feed grown"*. The key to successfully giving farmers confidence to increase SR or maintain the appropriate SR is to have a set of decision rules that govern farm management.

In his book "Grass to Milk" McMeekan (1960), states "No more powerful force exists for good or evil than the control of SR in grassland farming. Properly understood and used, it can influence productive efficiency for good more than can any other single controllable factor. Misunderstood and misapplied, it can lead to abuses which may have permanent harmful effects on land use." We believe that the abuses that McMeekan referred to can be eliminated by having plans (sets of decision rules).

How the farm is operated is more important than choosing the appropriate SR. This requires having the right farm infrastructure (farm is compliant and easy to run), a set of decision rules that ensure pasture is well utilised while reducing the impact of between year variability in pasture production related to climate and the discipline to apply the decision rules.

In conclusion, the optimum SR is that which when combined with appropriate management, results in achieving the target amount of feed on the farm at calving and all cows at BCS 5.0 at calving and BCS 4.0 or above at mating.

Table 1. Management to achieve high performance from a range of stocking rates (decision rules)

	Stocking Rate (cows/ha)		
	Low (<2.2 Southland)	**Medium (2.2 to 3.0)**	**High (>3.0 Southland)**
System Focus	Quality Cows offered quality feed and able to maximise intake	Quality and quantity Cows offered quality feed and intake optimised	Quantity (quality looks after itself) Cows offered sufficient feed to meet their requirements
Topography	Flat (as need to top or have dry stock to follow)	Flat – rolling	Flat – hills
Climate		If wet have the infrastructure to stand cows off to avoid pugging damage	If wet have the infrastructure to stand off and feed cows to avoid pugging damage
Grazing Residuals for Milking cows	Cows offered quality feed and well fed by: - selective grazing - topping - conservation - fast rotation lengths (used to suppress growth at peak growing times)	Cows graze to a consistent and even residual If left uneven for one grazing can restore quality by bringing cows back sooner, or top/conserve (if necessary)	Need to leave no more than 7-8 clicks on RPM 1500 -1600 kg DM/ha (winter plate meter formula) to prevent pre-grazing cover being too high and pasture canopy closure
Pre-Graze Cover (kg DM/ha)	2100-2400	2500-2800	3000-3100

	Stocking Rate (cows/ha)		
Wintering	Low	Moderate	High demand for grazing off and/or conservation
Rotation Length	Fast rotations from when pasture growth gets ahead of herd demand (balance date or magic day) to autumn; 10 days peak growth Early Spring – fully feeding cows is the driver, not rotation length Winter –faster rotation than conventionally stocked systems	Minimum rotation length 18 days Use spring rotation planner (SRP) to allocate feed	Minimum rotation length 21-23 days Autumn – round length rules e.g. 40 day by 15th March Spring -Need to use SRP Winter – most cows off as need bank of feed at calving
Planned Start of Calving to when pasture growth gets ahead of herd demand (days)	60-70	55-60	50-55
Cover at calving	Keep less than 2200 kg DM/ha to ensure that pre-graze cover is not too high	2200-2300 kgDM/ha	2400-2500 kg DM/ha plus some supplement for poor spring
Harvesting supplement – length of closure	Maximum 40 days	Maximum 40 days	Harvest so that paddocks are no more than a week out of the round
Supplements	High quality	Need spare quality supplement for adverse events	Need spare quality supplement for adverse events
Culling	Minimal culling, low producers only to maximise DIM	Summer dry – cull early	Summer dry – cull early; all culls gone early autumn
Drying off	Production per cow and days to calving Feed cover	Cow condition and feed cover Need to have clear decision rules especially if summer dry	Cow condition and feed cover Need to have clear decision rules especially. if summer dry

	Stocking Rate (cows/ha)		
Environment	Milking later into autumn and winter Potentially more stock on the farm when high risk of N leaching Risk of pugging		Higher risk as more cows wintered and prone to pugging damage More effluent to manage
Adverse weather	Medium	Medium	High
Financial risk	Need to achieve production targets Cost control	Cost control	Cost control Poor season flows onto following season
Skill	Hardest time to manage a farm is in a feed surplus; farm in feed surplus for at least 50% of the season Anticipation of spring pasture surpluses		Sticking to management rules and not pugging Avoiding using cow condition to manage feed deficits Prediction of deficits and acting early e.g. drying off autumn
Reproduction	Need tight calving spread to maximise DIM Top reproduction management – high stockmanship		Cows not CS 5.0 at calving; poor allocation of spring feed cows resulting in cows being less than CS 4.0 at mating

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Appendix

A brief summary of a set of decision rules (adapted from Macdonald & Penno, 1998).

Cow condition

Cow condition provides a measure of the amount of energy stored as body fat on cows within the herd. Likewise, average pasture cover provides a measure of the amount of feed energy available within the farm systems at any given time. Meeting the required cow condition and average pasture cover targets is more important in spring than at any other time of the year as severe underfeeding at this time can impair herd performance for the remainder of the season. Therefore, all management decisions need to be geared around these two points to ensure a profitable and sustainable system in used on the farm.

The target calving condition score for all cows is 5.0 (1 to 10 scale) for older cows, and 5.5 for first and second calvers. An increase of one BCS unit has been shown to increase production by 15 kg MS/cow and be worth approximately $40/cow in reproduction benefits. Thus decision rules are required on when to cease lactation to allow the cows adequate time and feed allocation to get back to BCS of 5.0.

Pasture management

Autumn/winter management. – Set up the farm to achieve the desired average pasture cover at calving (Refer Table 1 for targets). The target will depend on the CSR and date of calving relative to when pasture growth will get ahead of herd requirements.

Winter grazing rotation length controls dry matter intake by altering the pasture allowance to the dry herd. Therefore, longer rotations result in more pasture being available at the end of winter.

Spring rotation planner - Feed requirements generally exceed pasture production for several weeks after calving. Therefore, the aim of spring grazing management must be the allocation of pasture to optimise pasture and milksolids production. This is done by ensuring the grazing interval does not get less than 20 days before growth exceeds herd requirements.

Spring management - From when pasture growth exceeds herd requirements in spring, surplus pasture must be removed from the grazing area to maintain appropriate post grazing residuals, pasture quality and subsequent MS production. At the same time the herd must be generously fed to maximise

MS production, and meet reproductive performance objectives. To ensure pasture quality is maintained, and the herd properly fed, surplus pasture is identified and harvested according to a formula or set of decision rules.

Summer management - The key is to have a plan and to make timely decisions based on the best available information. Having no plan, coupled with indecision, leads to unnecessary stress and lower profit. Whatever the summer conditions, the first management rule is to use spring pasture fully and efficiently before dry and hot conditions reduce the growth and quality of pasture.

The use of supplements - Supplementary feeds are of greatest benefit when the carry-over effects of substituted pasture mass, and spared cow condition, are captured within the system or when fed in a severe feed deficit. The returns are greatly affected by the purchase price of the supplement and milk price. In a seasonal dairying system the period of greatest feed deficit is invariably late autumn/early winter when pasture growth is declining, rotation length is being extended and the potential lactation length of many cows is not met. Therefore, greatest benefits come from using supplements to extend the grazing rotation immediately after summer rain.

Reproduction - To achieve high pasture utilisation in early spring, a concentrated calving pattern is required before the onset of spring growth. The combined effect of an early planned start to calving and a concentrated calving period may add 25 more days in milk for each cow, right at the start of the season. The primary causes of poor fertility in NZ dairy herds are anoestrous cows and poor heat detection. Having MA cows calve at BCS 5.0, and first and second calvers at BCS 5.5 is the second greatest way to prevent anoestrous cows other than a compact calving. Heat detection is a critical job and deserves the time and cost to ensure that all cows on heat are mated. Training (showing not telling) of all staff needs to be done annually. The best results are achieved with paddock observations and use of aids – tail paint or heat/mounting detectors. To enable a compact calving spread (6 weeks) it is necessary to ensure that 95% of the herd is inseminated within 28 days of the PSM. Use the InCalf approach to plan how to improve reproductive performance on your farm.