IMPROVING HERD MANAGEMENT

for profits

Assisting farmers to identify areas of herd management which will help improve profits

DAIRY CHECK

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Foreword

Change is occurring at a rapid rate in the NSW dairy industry due to the cost-price squeeze associated with reduced milk prices and increasing input costs.

Many farmers wishing to stay in the industry are at the crossroads, having to make decisions regarding the adoption of cost effective technology and the extent to enlarge their business.

It is difficult to speculate on future milk prices but the cost of production and living expenses suggest that we will need to continually challenge existing herd sizes and levels of production per hectare and per farm.

Gradual increases in the price of milk will not be the complete answer and productivity gains will have to be made at even faster rates, and in greater magnitude, than in the past.

It is estimated that there will be a reduction in the number of farms but in terms of the production per farm and the adoption of new technology, dairying in NSW will be a growth industry.

Change will no doubt continue and a common factor will be the need to increase the effectiveness of existing operations to reduce costs then consider ways to graze and milk larger herds to improve total farm income. This will involve close examination of the key drivers of profit ie herd, shed, feed, labour and farm management.

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WHAT IS DAIRYCHECK?

DairyCHECK is about farmers selecting the most appropriate technology and farm management to improve the overall profitability of their farm.

DairyCHECK is based on a series of integrated technical packages and activities (eg. Tutorials and workshops) to help farmers make better decisions during a period of rapid change.

The project comprises of three stages:

Stage 1 – Farm Management Audit - using a "Checklist" to determine management opportunities for your farm by:

- Calculating the impact of deregulation on farm income.
- Knowing the strengths and opportunities of your farm.
- Identifying financial and physical key performance indicators.
- Examining ways to improve profits.

Stage 2 – Farm Business Management - using various tools and packages to determine the best ways to optimise the use of resources by:

- Understanding the financial and physical performance of your farm.
- Identifying your goals and needs.
- Considering ways to be profitable.
- Analysing farm profits and performance.

Stage 3 – Profitable Production System - using the most up-to-date knowledge and skills to develop and introduce new technology and different production systems by:

- Examining different production scenarios.
- Identifying and analysing cost effective technology.
- Planning the implementation of different systems.
- Analysing future options and alternatives to improve profits.

HERD MANAGEMENT BOOKLET

This booklet looks at herd management to improve farm profitability.

STEP ONE Attention to technical detail

- Identify the strengths, weaknesses and opportunities of your present herd management.
- Attend to herd health issues to improve herd productivity and profitability.
- Examine the production of the herd and performance of individual cows.
- Monitor the Body Condition Score of your cows and the levels of milk composition.

STEP TWO Assess breeding and replacement programs

- Examine ways to improve the present and future capacity of your herd.
- Ensure that your management meets the genetic merit of your herd.
- Use good heat detection and insemination management to reduce calving intervals.

STEP THREE Identify cost effective technology

- Look at options and alternatives that reduce costs and improve profit margins.
- Identify and examine the benefits of alternative technology.
- Use partial budgets to examine the benefits of different management.

This DairyCHECK Herd Management Booklet provides some key management areas and key performance indicators to help you achieve higher profits and farm income.

The booklet will hopefully be an introduction to other herd management packages, available through your participation in DairyCHECK.

This self-help booklet on Herd Management to improve profits was compiled by:

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INTRODUCTION

This booklet outlines some important areas of herd management that need to be considered before making major changes to herd management and breeding programs. It is not meant to comprehensively cover all the possible factors but rather emphasise some herd management areas that will have an economic impact on existing farm operations.

The key management areas and key performance areas will hopefully challenge the reader to think about ways to improve the internal efficiencies of the business.

Topics discussed may lead to actions that make "a real difference" to herd management and farm income.

The booklet emphasises the need for attention to existing technology and breeding programs and identifying cost effective options.

Hopefully, by attending the Herd Management workshops you will have the opportunity to source other packages that will further improve farm productivity and profits.

HERD MANAGEMENT CHECKLIST

The following checklist allows farmers to examine your performance against Key Performance Indicators (KPI) that relate to herd management.

Checklist	KPI Range	My farm	Action		Things to consider
			OK (✓)	Check(?)	
Calving interval	100 day in calf rate >64% 200 day not in calf rate –<7% 80 day submission rate –>77%				• Heat detection. • AI technique. • Semen handling. • Voluntary waiting period. • Conception rates. • Nutrition-energy balance. • Herd health programs. • Calving pattern.
Age and weight at first calving	24–27 months 500–550 kg (Holstein) 370–410 kg (Jersey)				• Cost of rearing • Monitoring growth rate of heifers. • Number of heifers being reared. • Reducing age at first calving from 30 mths to 24 mths equates to rearing 25% less heifers, and significant savings.
Replacement rate	20–25%				• Fertility. • Age at first calving. • Voluntary culling rate. • Herd health. • Consider buying replacements, or contract rearing heifers. • Cost of rearing heifers to first calving.
Production/cow	Dependant on your individual system; >6000L Holstein/ Friesians >4000L Jersey				• Fixed costs are spread over more litres, this usually results in more profit. • More litres dilute cow maintenance costs. • Too high may mean too low stocking rates or excessive costs for last litres produced.
Calving pattern	Arranged to suit each farm, availability of feed and payment system				• Increased herd size puts strain on labour for calving cows, calf rearing, heat detection and mating. • Batch calving reduces labour costs, can result in improved cow productivity, health and farmer lifestyle. • Seasonal calving can improve pasture utilisation. • Consider calving programs to take advantage of higher profit margins.

Checklist	KPI Range	My farm	Action		Things to consider
			OK (✓)	Check(?)	
Herd health	BMCC <200,000 minimal risk JD & EBL, vaccinated against leptospirosis and clostridial diseases. Bulls also vaccinated against bovine campylobacteriosis (vibriosis)				• Health issues will influence market access in the future. • Milk quality and farm HACCP accreditation will have an increased influence on pay rates. • Human health issues with leptospirosis and Q fever.
Condition score	Calving 5.5 – 6.0 Mating 4.5 Drying off 5 – 5.5				• Condition score has major influence on production, milk composition and reproduction.

SECTION1

Herd Husbandry Factors

BACKGROUND

Improving farm profitability has become the major aim of dairy farmers. Whilst herd management costs are only a small portion of total variable costs, herd management has a large impact on the capacity and growth of the future herd.

CHALLENGES

Any plans to increase your profit margins must look closely at the effectiveness of existing practices and technology. Attention to detail can improve your productivity and profits.

Key herd husbandry issues include:

- Using technology to improve production and profits
- Monitoring and improving herd production and performance
- Sound production and herd health programs

HERD RECORDING

Herd recording should be used to identify your herd's production capabilities, strengths and weaknesses. Herd recording is one way to access thorough, accurate and comparative information about your herd. Herd recording is used to "weed, breed and feed" your herd.

Herd records are also useful if you make annual and seasonal comparisons and compare your actual figures to production and herd management goals.

The following table summarises how herd recording can be used:

***Table 1**: Using herd recording to "Weed, Breed and Feed" your herd.*

Information	How to use it
Weed	• Use cell counts as one criteria for culling. • Identify chronic mastitis cows that should be culled from the herd. • Lowest production indexes identify cows that should be considered for culling.
Breed	• Herd recording provides Australian Breeding Values (ABVs) or Australian Profit Rankings (APRs) which identify the best genetic material from which to breed and select replacements. • If farmers do not have accurate records (information on sires and dams), the production index could be used to select cows from which to keep replacements. If however, pedigree information is available, then breeding values are the most accurate tool to identify the best genetics from which to keep replacements. Breeding values are much more reliable than the production index in identifying a cow's genetics.
Feed	• Low protein and fat tests can identify nutritional and non-nutritional problems. If fresh cows are not meeting peak milk production targets, then nutritional needs should be addressed. • If herd protein tests are declining, then cows are mobilising body tissue - this is an indication that there is not enough energy in diet creating a negative energy balance, which will have a dramatic effect on reproduction. • Low fat test could indicate a lack of fibre in the diet, and could also indicate possible subclinical acidosis problems (eg. sick cows, reduced production, and rumen damage).
Benchmarking	• Herd recording provides details of a comparative nature within a district. Averages below the district average may indicate underfeeding, fertility or herd management problems.

If you do not use herd recording information to your advantage, you may be better off using the labour and money involved elsewhere in the business. Herd recording must not simply be an expensive reporting program. Different herd recording systems are available and cost benefits will depend on the options chosen and reports requested.

Check with your local service providers to see which herd recording system will suit you best.

HERD HEALTH

Herd health is important in the production of quality milk and maintaining a "clean green" image. Incorrect use of antibiotics and chemicals can lead to residues in the milk. Access to future milk markets will increasingly depend upon the quality of milk.

***Table 2**: Herd health issues and their potential effects.*

Health issue	Problem/concern	Potential loss	Prevention	Publications/contacts
Cell counts	Poor milk quality - Indication of infection or disease (eg. mastitis)	Usually a 1c/L penalty over 200,000 for a 1 million L herd this could add up to $10,000 pa.	Follow a complete milking management program for mastitis control.	*Countdown Downunder* - contact your local veterinarian, or NSW Agriculture offices.
Bovine Johnes Disease (BJD)	Gastrointestinal disease - highly contagious in calves. Positive tests result in herds being quarantined.	Loss of stock if severe. Positive tests result in all stock sold off the property having to go to slaughter. Severely reduces agistment options and prevents sale of stock to other farmers.	Only buy animals from Market Assurance Program tested dairy herds. Rear calves and heifers away from adult herd. Keep calves away from effluent storage and application areas.	Rural Lands Protection Boards NSW Agriculture Private veterinarian
Buying stock	Can introduce disease such as BJD, mastitis and EBL	*Strep agalactiae* causes a highly contagious mastitis, with greatly elevated cell-counts. Any clinical case of mastitis that you treat costs you $150. Pestivirus can cause early abortion, weak calves, increased return to service. BJD –see above. EBL can lead to quarantine of your herd and lower prices at sale; may also result in milk payment penalties, or rejection of milk altogether.	Beware of buying stock without a herd history. Try to obtain records of herd health programs and individual cow cell counts. Obtain Vendor Declarations from vendors, particularly regarding BJD and EBL.	Private veterinarian RLPB District veterinarian.

Health issue	Problem/concern	Potential loss	Prevention	Publications/contacts
Vaccination programs	HACCP programs require a vaccination program to be in place. Vaccinate against clostridial diseases, leptospirosis, and vibriosis (bulls).	Clostridial bacteria can cause stock losses through tetanus, pulpy kidney and black leg. Leptospirosis can cause milk drop, abortion, and has human health risks. Bulls should be vaccinated against vibriosis, a cause of infertility in naturally mated cows.	Be sure to follow manufacturer's recommendations for initial and annual booster vaccination. The protection offered by the vaccine against disease is usually short lived and booster vaccinations are important for life long protection.	Private and RLPB vets. Agribusiness. NSW Agriculture. Processor for HACCP requirements.
Chemical use	Chemical residue in milk and meat	Antibiotics used for any purpose can appear in the milk or meat if withholding periods are not followed exactly. Chemical or antibiotic residue in the milk can lead to severe penalties, including rejection of the whole vat of milk.	Follow label directions exactly, including dosing schedule and withholding period. The presence or absence of blue dye in the milk not an accurate indication of antibiotic presence. Only use drenches and pour-ons that are registered for use in the particular animal (eg. lactating cow).	Supplier of chemical. Manufacturer of the chemical. NSW Agriculture.
BSE, or "Mad Cow Disease"	Bovine spongiform encephalopathy (BSE) does not occur in Australia	Reduced consumption due to human health concerns. Dealing with infected stock and the long incubation period of disease.	Disease has been shown to spread through meat meal fed to cattle. The NSW government banned the feeding of meat and bone meal to ruminant animals in 1997. It is illegal to do so. All stock feeds must be labelled if they contain meat or bone meal. Pig and poultry feeds may still contain meat and bone meal,	NSW Agriculture has various literature regarding mammalian products in stock feeds. Also check the AQIS web site – http://www.affa.gov.au/outputs quaratine.html

Health issue	Problem/concern	Potential loss	Prevention	Publications/contacts
			so it is important to keep your cattle feed separate.	
Laminitis	Lameness, culling and wastage. Animal welfare Symptoms of acidosis	Reduced mating and grazing. Reduces pasture intake and milk production – often associated with acidosis. Problems with inefficient conversion of food and reduced milk production.	Improve feed management. Balanced rations. Introduction of grain feeding programs. Provide feed buffers (eg. Sodium bicarbonate). Buffers are not substitutes for adequate intakes of good quality roughage.	RLPB veterinarians. Private veterinarians. NSW Agriculture – DairyLink–Realistic Rations.
Metabolic disorders eg. hypocalcaemia	Milk fever in recently calved cows Grass tetany Ketosis (acetone breath) in cows	Death in severely affected and untreated cows. Downer cows after calving require treatment. Cows with grass tetany can cause major production and management problems. Increased risk of clinical mastitis in downer cows. Decreased production in subclinical and clinical ketotic cows.	Calve cows in body condition score 5.5-6.0. Use transition feeding and, if necessary, anionic salts or similar feed additives in last three weeks of pregnancy. If possible, restrict dry cow access to high potassium pastures in late lactation.	Private Veterinarians. Nutrition consultants. NSW Agriculture DairyLink–Realistic Rations.
Internal and external parasites	Liver and stomach fluke can affect growing stock and adult cows Worms can cause reduced growth, ill thrift, scours and death in young growing stock Lice can cause skin irritation in cows and calves.	Reduced milk production in fluke affected cows Heifer replacements not reaching required height or weight targets Death of severely affected animals.	Drenching programs using treatments registered for dairy cows. Take care with the use of any treatment in lactating cows - avoid milk residues.	RLPB veterinarians. Private veterinarians. Agribusiness. NSW Agriculture.

COW HANDLING

High milk production and good labour management are helped by the layout of your farm and good milking facilities.

***Table 3**: Considerations regarding cow handling*

Issue	Questions to ask	Precautions	Results
Cow flow through dairy shed and yards	Are cows moving constantly through the dairy and yards, or are they standing for too long? Are your shed and yards designed to allow for good cow flow?	The less time cows spend in the shed or yards, the more time they have to graze pastures. With poorly designed dairies the use of extra labour to push cows along could get expensive.	Possibly more milk production. General cow health– cows are better off spending more time on pasture than on concrete or mud around the dairy and yards.
Laneways	Are cows moving well through laneways? Are surfaces free of sharp gravel, and well drained? Are the laneways wide enough for the herd size and for moving machinery?	Improving surfaces can prevent bruising and lameness: good drainage will reduce the risk of mastitis infection from walking through muddy areas. Keeping gates and laneways to optimum width will ensure free movement of cattle (see Table 4 below).	Reduced effort and time to move cows to and from the bails.
Heifer management	Are heifers unsettled in the dairy?	Heifers that have started off with low levels of stress will be more likely to have good milk letdown in current and later lactations.	Better letdown will lower risks of teat end damage and mastitis, and the heifer may milk out more fully
Stresses in the dairy	Are cows shifting their weight from side to side once the cups have gone on? Do cows let down straightaway or does flow stop for some time after residual milk has been milked out? Is there 'free' electricity in the shed?	Stresses can lead to a delay in letdown, meaning that the machines are essentially pulling on less-than-full teats. This can lead to discomfort (leading to even less letdown) and teat end damage, increasing the risk of mastitis infection. If recent renovations have been made to the shed and cows are not wanting to enter the dairy, not letting their milk down or are agitated, have the shed checked for stray voltage.	Improved milk let down and reduced manure in the dairy. Eliminating the stresses can make the cows milk out more fully and lessen the teat end damage.
Heat stress	Has production reduced, and reproduction been affected?	Provide shade and shelter and if economically possible, mechanical cooling. Feed and loafing pads, if covered, can protect from direct radiation. Reduce the distance walked in hot weather, and feed grazing pasture in the cooler hours.	Production can be increased by up to 2L/day by 'sprinkling' before milking, depending on the temperature and the time spent cooling.

Issue	Questions to ask	Precautions	Results
Wet conditions	Has feed intake been reduced and pastures damaged?	Feeding and loafing pads are a solution to mud and water.	Improved feed intake and less damage to pastures.

***Table 4**: Recommended laneway widths for optimal cow movement*

Number of cows	Width of laneway (m)
<120	5.0
120-250	5.5
250-350	6.0
350-450	6.5
>450 (operated as two herds)	5.5

CONDITION SCORE

Body Condition Scoring

Body condition score (BCS) indicates the amount of stored energy reserves in a cow's body. These reserves affect health, production and reproduction.

There is no one ideal BCS for a cow; instead, there is a range of desirable scores that can vary during lactation and the dry period. It is the change in BCS for individual cows over time that is important.

Regular body condition scoring of your cows and heifers helps you to fine-tune feed and reproductive management.

One body condition score provides the following liveweight (energy) for milk production:

- 42 kg liveweight in a Holstein-Friesian
- 34 kg liveweight in a Friesian-Jersey cross
- 26 kg liveweight in a Jersey.

Regular body condition scoring helps to determine the effectiveness of various feed and herd management practices. Select a small group of fresh, mid-lactation and stale cows, and record cow number and condition score; then rescore those same cows at each stage of lactation. This will give a good indication of the status of the rest of the herd.

***Table 5**: Appropriate condition scores at different stages of lactation*

Condition scoring at:	Target	Things to consider
• Calving	5.5- 6.0	Cows calving in with higher BCS are likely to lose condition more rapidly and have calving problems. Low BCS can lead to low fertility and low production.
• At the time of mating	4.5	Cows need to be in a positive energy balance.
• Mid-lactation	4.5 +	Cows should be putting on weight to maintain targets.
• At drying off	5.0-5.5	Cows lay down energy much more efficiently when they are lactating than when they are in the dry paddock; therefore cows should be dried off in the condition that you want them to calve in.

MILK COMPOSITION

Milk production and composition are affected by several non-nutritional factors. The most important are breeds and breeding, stage of lactation, disease and heat stress.

Breeds

Differences in the components of milk of the various breeds are well documented (Table 6) but variations in management can accentuate differences between herds.

***Table 6**: Milk composition of various breeds and within herd differences*

					Protein	
	Fat%	Protein%	Lactose%	SNF%	Min%	Max%
Ayrshire	3.97	3.35	4.46	8.51	3.00	3.54
Guernsey	4.75	3.60	4.76	9.06	3.40	4.10
H-Friesian	3.62	3.19	4.57	8.46	2.85	3.65
Jersey	4.95	3.88	4.81	9.39	3.30	4.30
Illawarra	3.65	3.31	4.61	8.62	3.03	3.78

Implications

- The higher producing breeds have the highest yield of constituents
- Variations in feeding and management combined with breed differences can cause wide variations between herds.
- Breed and herd averages mask even greater differences that occur between herds and between individual cows.
- Introducing mixed breeds into the herd does not necessarily solve milk composition problems, and can make herd management more difficult. Quite large numbers of a high-testing breed are required to raise the average herd test.

- Research has shown that cross-breeding, and its major benefit of hybrid vigour, increases the length of time the cow remains in the herd by one lactation and significantly increases fat and protein produced over the lifetime.

Genetic selection

The present composition of milk is the result of past selection processes.

Selection for milk yield and component yield allows higher milk production and higher yields of milk components. Selection primarily on milk composition reduces milk production (Table 7).

***Table 7**: The effects of selection based on various criteria (expected change)*

Select for	Milk	Fat yield	Fat test	Protein yield	Protein test
Milk	+ + +	+ + +	—	+ +	—
Fat yield	+ +	+ + +	+	+ +	—
Fat test	—	+	+ +	0	+ +
Protein yield	+ +	+ + +	0	+ + +	+
Protein test	—	—	+	0	+ +

+ + + Change most likely to occur — Reduction 0 No change

Research suggests that about 60% of the variation in milk composition is due to inheritance and 40% due to environmental factors.

Studies show that selection for a single trait can affect milk composition in one generation, for example:

- Selection for milk fat percentage alone could increase milk fat by as much as 0.19% and protein by 0.05% with a drop in milk production (approximately 130L).
- Selection for milk protein alone could increase both protein and milk fat by as much as 0.08%, but this could lead to a drop in milk production (approximately 110L).

***Table 8**: Breeding progress based on trait selection for Holstein-Friesians*

	Sire Selection Criteria = Best 5% of Bulls					
	Milk yield		Protein yield		Protein %	
	Protein (%)	Milk (L)	Protein (%)	Milk (L)	Protein (%)	Milk (L)
BASE	3.2	6000	3.2	6000	3.2	6000
After 6.5 yrs	3.15	6942	3.21	6821	3.56	5272
After 10 yrs	3.08	7448	3.17	7326	3.74	4066

Source: Ken Phillips, Dairy Express

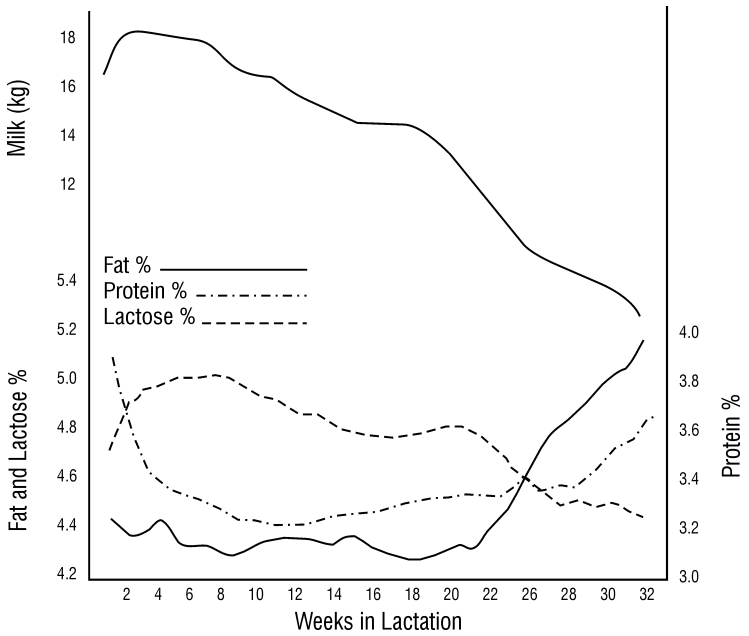
Implications

- Milk composition can be changed genetically more rapidly than milk yield but even so changes are achieved slowly.
- Since changes are permanent and slow, they need to be planned as a long term strategy.
- Future payment systems will be based on components and this needs to be considered when selecting and planning breeding programs.
- Long term decisions to change milk composition need to be discussed with your processor.
- The Australian Profit Ranking (APR) is a selection scheme that takes into account both milk yield and milk composition (see Section 3 for more information).

Stage of lactation

Milk comprises of water (87.7%) and total solids (12.3%). Typical figures for total solids are fat (3.7%), lactose (4.7%) and protein (3.3%), and minerals (0.6%).

***Diagram 1**: Stage of lactation effect of milk composition*



Maximum yield coincides with maximum negative energy balance and when high producing cows are frequently at the lowest condition score.

Older cows tend, with each successive lactation, to produce milk of lower milk composition (0.2 – 0.4 units).

Implications

- Stage of lactation can limit efforts to improve milk composition by feeding.
- Protein percentage is most vulnerable at peak lactation and maximum negative energy balance.
- Seasonal calving can make the effects of stage of lactation seem larger.
- Age, disease and poor herd management can make problems worse.

Climatic factors

Temperature consistently above 27°C, particularly in humid conditions, reduces feed intake, milk production and milk composition. High temperatures also reduce feed quality which aggravates the low dry matter intake of tropical pastures.

High producing cows are most affected by heat stress. High concentrate and minimum fibre diets reduce heat stress on dairy cattle because they are more efficient (less heat production) than high forage diets. Herd management precautions include the supply of adequate high quality of water, the use of shade and sprinklers, and milking in early afternoon to allow cows more grazing during the cooler period of the day together with the provision of good quality paddock feed at night.

Disease

Clinical mastitis can influence milk composition decreasing fat, casein and lactose content in milk.

Illness (eg. metritis, ketosis, laminitis) can seriously affect intake and subsequently milk production and composition.

Milking management

Milk left in the udder after milking is harvested at the next milking. Poor milking management however, does affect milk fat content and milk protein content to a lesser extent.

Milk protein content can vary between milkings because of various herd management, and behavioural patterns (eg. stress and oestrus).

"Making a difference"

- Accurate records are important for good herd management
- Use herd recording records to cull low producers and problem cows. Select cows for your replacements using accurate records for production, reproduction and disease.
- Monitor the herd's production, and re-evaluate herd and feed management strategies frequently.
- Use herd health tools such as Countdown Downunder and InCalf to prevent and correct problems.
- Introduce a herd health program to maintain high levels of performance and therefore unnecessary cow wastage.
- Avoid stresses on your cows to maintain yield, components, udder heath and overall cow health.
- Set and analyse your performance using industry benchmarks (ie. KPI's, see page 6 and 7).
- Breeding and changes to the herd structure to improve milk composition are long term changes that need to be planned strategically.
- When making changes to improve milk composition, consider both nutritional and non-nutritional factors.
- At calving, one body condition score means extra production during the first 20 weeks lactation:
  - + 130 Litres milk
  - + 10 kg protein
  - + 15 kg butterfat.

HERD HUSBANDRY FACTORS

Tools and Packages

Issue/Package	**Contact/source**
Countdown Downunder	NSW Agriculture offices, local vets, processor. Countdown Downunder project
Bovine Johnes Disease	NSW Agriculture has many informative Agnotes regarding BJD. See your district office. NSW Agriculture website: www.agric.nsw.gov.au
BSE - Mad Cow Disease	Various Agnotes from NSW Agriculture AQIS website: http://www.affa.gov.au/outputs/quarantine.html
Cow movement and handling in the dairy	DairyCHECK "Shed Management" module - available from NSW Agriculture
Heifer management and rearing	DairyLink module "Growing heifers", available from NSW Agriculture
Heat stress	"Managing hot cows in Australia" - available from Queensland DPI
Genetics of milk components	Australian Dairy Herd Improvement Scheme; Genetics Australia - packages on Australian Profit Ranking
Feed and loafing pads	NSW Agriculture Agfact 1.7.3 "Loafing pads for dairy cattle"; "Feed pads Down Under" Queensland DPI.
Body Condition Scoring	Charts available from Elanco and most nutritionists.
Herd Recording	Contact your processor for details of herd recording services available in your area.

PLANNING FOR CHANGE
(FORM 1A)

Limits to your herd husbandry (please tick one box)

Issue	Problem			
	No	Slight	Moderate	Serious
Knowledge of cow production levels.				
Identification of problem cows.				
Low milk composition.				
Penalties for residues and milk quality.				
Forced culling due to health problems(eg. lameness, infertility, mastitis).				
Excessive time in cow movement.				
Low throughput in the bails.				
Low condition score.				
Elevated cell counts.				
Cow death rates above 3%.				

CAN YOU ADD TO THIS LIST?

PLANNING CHANGE
(FORM 1B)

Herd Husbandry Factors

Using your knowledge and key performance indicators please consider the following questions:

- What are your strengths in herd husbandry?

- What are your herd husbandry opportunities?

- What do you need to change?

- What do you need to change first?

- How will you make the changes?

- What will you achieve by changing?

SECTION 2

Breeding and Replacement Factors

BACKGROUND

Reproductive performance has a major influence on profitability and farm performance, for example the average milk production per cow, the number of replacements, the opportunities for selective culling, the genetic progress of the herd and overall herd losses. There is no question that even modest improvements in reproductive performance can improve the profits in most herds.

CHALLENGES

The ideal calving interval for cows is 12 months, and this requires high submission and conception rates. Each day the cow stays open after 100 days costs money. To decrease days open cows have to be bred earlier after calving. Key herd management factors in improving herd performance include:

- Heat detection and good insemination management
- The management of high genetic merit cows
- Measuring and monitoring herd management and performance.

REPRODUCTIVE MANAGEMENT

Managing dairy cows to achieve high production while maintaining a desired standard of reproductive performance involves a wide range of factors.

Two reproductive aims are common.

- To get the maximum number of cows pregnant by 100 days after calving, particularly in the first 4–8 weeks of mating
- To minimise the number of non-pregnant cows by 200 days after calving.

To achieve a better understanding of these factors it is important to have a common definition of terms and key performance indicators.

***Table 9**: Terms and definition for year-round calving*

Terms	Definition
100 day in calf rate (100 day ICR).	Percentage of cows that became pregnant by 100 days after calving. Aim for 64% or higher.
200 day not-in-calf rate (200 day NICR).	Percentage of cows that had not become pregnant by 200 days after calving. Aim for 7% or lower.
Voluntary waiting period (VWP).	The period after calving when inseminations/natural matings are withheld from cows seen on heat. Aim for herd average of 50 days or less.
80 day submission rate (80 day SR).	Percentage of services that resulted in pregnancy as determined by manual rectal pregnancy diagnosis.
Conception rate.	Percentage of first services that resulted in pregnancy as determined by manual rectal pregnancy diagnosis.

***Table 10**: Terms and definitions for seasonal, or batch calving herds*

Term	Definition
Mating start date (MSD).	The calendar date that marks the commencement of inseminations for a group of cows.
6 week in-calf rate (6 week ICR).	Percentage of cows that became pregnant by 6 weeks after MSD.
21 week in-calf rate (21 week ICR).	Percentage of cows that became pregnant by 21 weeks after MSD.
3 week submission rate (3 week SR).	Percentage of cows that received at least one insemination by 3 weeks after VWP or MSD. Note that this definition is based on cows, not inseminations.
Body Condition Score (BCS).	A subjective score that assesses the amount of fat and muscle reserves present on a live animal. Cattle are typically allocated a score between 1 (emaciated) and 8 (extensive fat and muscle reserves). Aim to calve cows at 5.0 to 6.0 BCS.

(From: The InCalf Project 2000)

***Table 11**: Herd performance based on SR, CR and PR*

Performance	SR%	CR%	PR%	Things to consider
Very good	95–100	>60	62–65	• Body condition Score (BSC) at calving. • Body weight loss post-calving. • Energy balance of the diet prior to the MSD. • Identification of dystocia's with early and appropriate intervention. • Identification with timely and appropriate treatment of retained placentas and uterine infections. • Accurate heat detection. • Correct semen handling, AI technique and timing of insemination. • Sufficient "bull power" if using natural mating.
Good	90–94	55–60	54–56	
OK	85–89	>55	46–49	
Check	<85	>50	<42	

Note:
1. The key to good reproductive performance is good heat detection and managing insemination or natural service matings.
2. It is important to aim for a calving interval (CI) of 365 days to get the best returns from your herd.
3. If this calving interval is greater than 365 days there will be a greater population of the herd dry for an extended period of time.
4. The ultimate measure of reproductive performance is live calves born in a specific period (12-13 months).
5. Pregnancy Rate (PR) is a function of SR x CR.

CALVING PATTERNS

Calving patterns vary between farms and districts with the choices being:

Year round
Seasonal and/or batch

The choice of a system is dependent on many seasonal factors eg:

- Pasture production and growth periods
- Milk pricing
- Facilities available to rear large numbers of calves
- Different conception rates
- Costs of production.

It is important to consider the effect of all these factors on management, facilities and profit.

Year Round Calving Herds

This spreads the cows calving across most months of the year. The advantages and disadvantages of this management system include:

Advantages:

- ✓ fresh calving cows spread throughout the year.
- ✓ more level production across the year.
- ✓ small numbers of calves being reared at any one time.
- ✓ even work load for mating, calving, calf rearing.
- ✓ milk storage and cooling volumes are lower than needed with the big "peaks" of production of other systems.

Disadvantages:

- ✘ more labour intensive.
- ✘ extended Calving Intervals (C.I.).
- ✘ increased herd size required to maintain desired production levels.
- ✘ poorer heat detection efficiency.
- ✘ calving heifers at varying ages to cover extended C.I. and to get "fresh" milkers at certain times of the year.
- ✘ poorer pasture utilisation.

Seasonal and/or batch calving/mating

Batch calving offers the following advantages and disadvantages:

Advantages:

- ✓ concentrated calving pattern.
- ✓ concentration of calving cow supervision.
- ✓ groups of similar aged calves simplifies rearing.
- ✓ increased heat detection due to larger groups of sexually active cows.
- ✓ improved conception through breeding efficiencies.
- ✓ reduced calving intervals.
- ✓ increased utilisation of pasture.

Disadvantages:

- ✘ greater shed capacity for peak numbers on milkers.
- ✘ vat capacity needed to meet peaks in production.
- ✘ calf facilities for larger calf groups.
- ✘ the need for more effective reproductive management.

Managing reproductive performance

The reproductive performance of the dairy herd can be defined by the following factors:-

- Voluntary waiting period (VWP).
- 100 day IC rate.
- The culling rate for reproduction reasons.

The first oestrus cycle after the VWP offers the greatest opportunity for getting the highest number of cows pregnant in one oestrus cycle. With each subsequent oestrus cycle, as some of the cows become pregnant the number of eligible pregnancies decreases.

The greatest potential improvement in the 100 day IC rates for most herds occurs by increasing the proportion of cows that are inseminated during the first oestrus following the VWP.

Changing patterns of reproduction

Reports from many countries using similar genetics indicate that days open and services per conception have increased and the efficiency of heat detection has decreased in the last decade. Lower performance may be the result of a number of integrated factors (eg. environment and increased herd sizes) but lower submission rates due to lower oestrus behaviour and delayed cycles are major factors. This is associated with negative energy balance (NEB) and level of milk production.

Since the heritability of fertility is low, little progress will be made by selecting for fertility. Most progress will be the result of addressing key herd and feed management factors.

Systematic Breeding – Synchronisation

The SR, CR, and 100 day IC rates can be improved by synchronisation and timed insemination. Synchronisation is simply a management tool, not a substitute for good heat detection and insemination techniques.

Synchronisation programs can be initiated before the end of the VWP resulting in timed insemination immediately after the end of VWP. This can reduce the interval from calving to first insemination.

The advantages of heat synchronisation programs:-

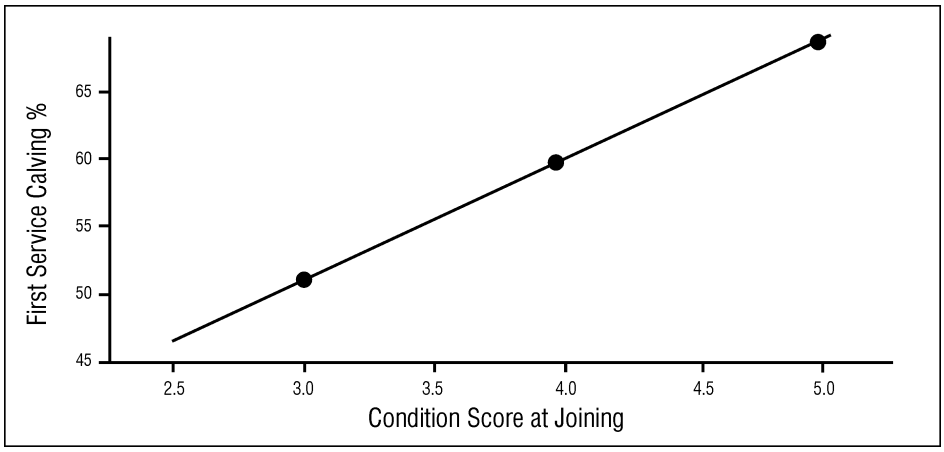
- Cows with silent heats can be included in mating programs.
- It minimises false heat detection.
- Mating and calving supervision is condensed into a much shorter period with less time and labour used.
- Heat detection is improved because activity is more concentrated.
- Assists with batch mating and batch calving.
- Can give tighter control of the calving interval by presenting individual cows or groups of cows for insemination at the optimum Voluntary Waiting Period from calving, ie. 50 days.

- Heifer feeding regimes and growth rates must be closely monitored to ensure well grown, cycling heifers when the synchronisation program starts.
- Conception rates are highest when insemination occurs after heat detection, rather than at a fixed time.
- However, no program will result in 100 per cent reliability (ie. all heifers and cows will not be in oestrus simultaneously).

Body condition and reproductive performance

The benefits of a suitable body score at calving are shown in Diagram 2. Some studies suggest however that cows with a BCS 4 and a rising plane of nutrition can have suitable reproductive performance (eg. CR to first service %).

***Diagram 2**: Effect of condition score at joining on first service calving percentage.*



Source: Moate and Harris

Excessive weight loss at calving reduces reproductive performance (Table 12).

***Table 12**: Relationship between BCS loss during the first 2 weeks of lactation and reproductive performance*

Body condition loss	Interval from calving (Days)			
	1st ovulation	1st heat	1st service	Conception rate to 1st service %
less than> 0.5	27	48	68	65
0.5 - 1.0	31	41	67	53
greater than 1.0	42	62	79	17

(Source: Bullen and Smith)

The greater the body condition loss, the longer it takes for the first ovulation after calving and reduced CR to first service resulting in large delays before successful service. Cows that lose the least weight after calving and gain weight at time of service have higher conception rates than cows that do not gain weight.

Feeding and condition score

Both of these factors at calving are important. Poorly fed thin cows take longer to get in calf (Table 13).

Cows in low BCS and/or losing a lot of body weight and not properly fed are difficult to get in calf. Cows that are overweight (BCS 6+) and fed poorly balanced diets are also difficult to get in calf.

***Table 13**: Effect of feeding level after calving and condition score on the days from calving to first heat of Jerseys.*

Feeding level	**Condition score at calving**			
(*DM%)	**3**	**4**	**5**	**6**
	Days from calving to first interval			
60	53	47	41	35
100	46	40	34	28

** Dry Matter Intake percentage* *(Source: McGowan)*

Energy status and reproduction

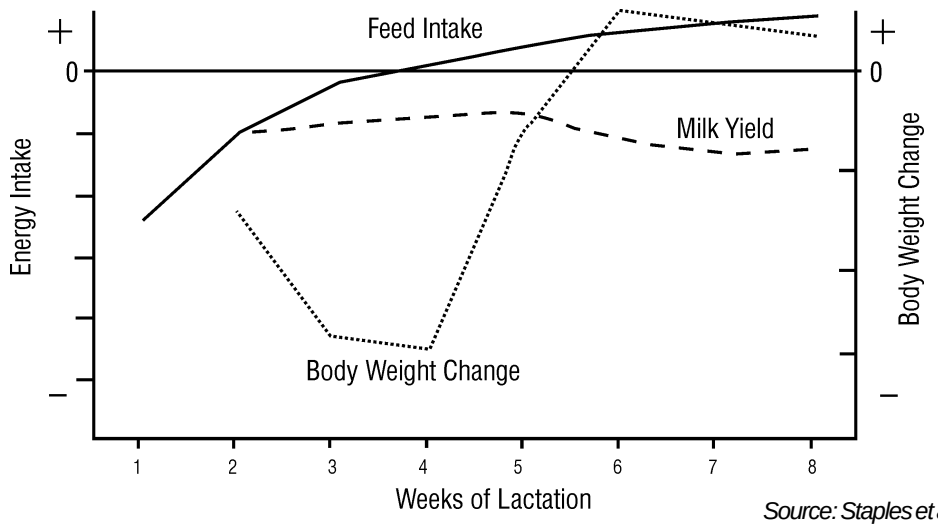
The energy status of a lactating cow/heifer can be positive (gaining weight), negative (losing weight), or zero (no weight change).

In early lactation energy for milk production exceeds intake and the cow sheds body tissue to compensate for negative energy balance (NEB). In high producing cows, negative energy status extends the time between calving and first ovulation. The quicker the feed intake increases and energy balance becomes positive, the earlier the cow cycles. The earlier the cow begins to cycle after calving, the greater the chance of early conception.

The length of time a cow spends in NEB depends on the level of production, condition score and the feed management program.

Peak milk production occurs before peak dry matter intake (DMI) leading to a negative energy balance and significant weight lost (Diagram 3). Energy balance is reflected by a change in BCS.

***Diagram 3**: Change in body weight, milk yield and feed intake after calving*



Source: Staples et al.

Protein status and reproduction

Protein imbalances (ie. too much or too little) in the diet have important implications to reproduction. With high levels of crude protein, particularly feeds with high levels of rumen degradable protein (RDP) there can be significant fertility problems. In the case of suspected high levels of RDP, feeding high energy cereal grains can "mop up" excess nitrogen in the rumen.

Feeding higher starch diets and reducing protein levels prior to mating can improve energy balance and therefore fertility.

Reproduction and heat stress

At temperatures of 25°C and 50% relative humidity, reproductive performance declines significantly. Increased heat loads have the following effects:

- delay the return to cyclic activity.
- reduced expression of heat.
- alter the production of reproduction hormones.
- decrease conception rates and increase the mortality rates of embryos.

Reproduction rates have been shown to be 10 -15% lower in summer than winter in southern NSW and 15-20% in northern NSW.

Longevity and performance

Factors affecting how a long a cow is able to stay in the herd include:

- Suitable performance (production and reproduction).
- Structural soundness and disease resistance.
- Temperament and other functional factors.

Low milk yields and poor reproductive performance are the primary reasons for voluntary culling. Cows that are profitable stay in the herd.

Herd profitability is a balance of retaining well selected heifers for herd and genetic growth and retaining high producing cows for production and replacements.

Studies suggest that selection for certain type traits (eg. udder soundness) may increase longevity but in general type (eg body characteristics) contributes little to longevity.

Longevity and reproductive efficiency makes significant contributions to herd profitability. Longevity is to a considerable degree dependent on reproductive because more than 20 per cent of cows are culled due to reproduction failure. Longevity is also influenced by milk yield since approximately 32 per cent of cows are culled due to low production.

Good management promotes both better reproduction and production. If high genetic merit stock are well fed and managed, farmers will continue to benefit from their breeding program. Genetic progress would be seriously reduced if further emphasis was not given to management.

Importance of AI and superiority of high genetic merit

Because genetic merit is permanent and cumulative across time, the potential for improving the quality of the NSW herd has increased as the percentage of cows bred to AI increased.

Clearly defined goals are necessary to improve profits. Criteria suggested to determine stock selection should include:

- can the trait be measured accurately?
- is the trait heritable?
- will the trait contribute to performance and income?

Other considerations include:

- price of semen relative to genetic potential.
- skill in reproductive management.
- availability of young unproven bulls (semen and natural service).

Reproduction and wastage

If one or more aspects of reproductive management are sub-optimal, then both calving interval and wastage rates can increase, reducing profitability. For example, inadequate or inaccurate heat detection combined with poor insemination technique can increase days open and increase culling due to reduced reproductive performance.

Calving and wastage rate statistics can be used to identify levels of reproductive management; and possible problem areas.

Oestrus detection

The single most important factor affecting the efficiency of reproduction is oestrus detection. The three types of errors are:

1. Omission – Surveys indicate that 40% of heats are missed in year round calving herds. Undetected heats are a major cause of reduced efficiency in reproduction management.
2. Poor identification – this leads to non-oestrus animals being inseminated. Pregnant animals can be inseminated unnecessarily and early pregnancies disrupted. These errors produce erratic and irregular returns to service patterns, low pregnancy rates and delays in the identification of problem breeders.
3. Diagnosis of oestrus – cows are inseminated when not in oestrus. Inseminations made within 3 weeks of a previous mating can disrupt conception.

HEIFER MANAGEMENT

Well grown heifers are a good investment to a well managed herd. Efficient heifer rearing systems involve:

- high performance (growth and production) at minimal cost.
- management that allows ease of calving.
- achieving weight for age target economically.
- minimal cost of inputs and operating cost.
- effective utilisation of labour and good facilities.

Growth goals and targets

It is recommended that dairy replacement heifers calve at 24 months of age with a post calving liveweight of 520kg for Holstein-Friesians and 400 kg for Jerseys. Reaching these targets can cost more than low cost - later age calving programs; however, the additional benefits for weight for age targets include:

- increased lifetime production.
- less number of total replacements.
- increased production in the first two lactations.
- less calving problems.
- improved SR and CR.

Studies clearly show that milk production levels drop sharply when heifers calve below target weights – stressing the importance of size not age (Table 14).

***Table 14**: Liveweight targets for Jersey and Holsteins*

Age	Target liveweight (kg)	
	Jersey	Holstein -Friesian
Birth	20-25	34-45
Weaning	65-85	90-100
15 months (joining)	240-275	330-360
24 months (calving)	370-410	500-550

Why do heavier heifers produce more milk?

Heavier heifers have less growth remaining to reach mature body size so nutrients can be used for milk production and reproduction not growth. Larger heifers when in groups with older cows can forage more competitively for feed. Over-conditioned heifers (BCS 6+) perform poorly due to higher incidences of dystocia and reduced feed intake (poor appetite).

Why 24 months?

Studies show improved lifetime production in early calving (24-25 months) heifers.

Weaning to Breeding

Age at the onset of puberty is highly related to bodyweight. Holstein-Friesian heifers and Jersey heifers cycle at about 340 kg and 250 kg respectively (Table 14). Good replacement management impacts on age at first breeding. Too little or too much weight gain is a problem (Table 15).

***Table 15**: Weight gain for heifers*

Weight gain	Issues
Too low, 0.5kg/day	Delayed puberty, late breeding and calving, reduced milk production
Too high >1.0 kg/day	Less secretory tissue, more fat, reduced appetite, feed intake and milk production, increased calving problems.
Optimum 0.7kg/day	Avoids delays in calving and increases lifetime performance

Breeding age of heifers

Getting heifers to breed at 14-15 months and calve at 24-25 months is critical to the replacement program, numbers of replacements, stocking rates and voluntary culling programs.

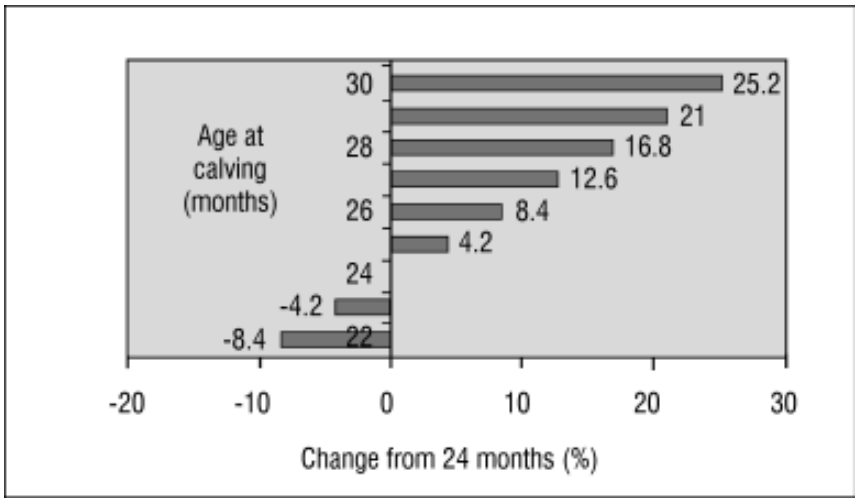
For heifers to reach the breeding goals and high conception rates they require a high quality diet. Growth and reproduction targets drop when heifers lose weight or are in poor BCS.

Breeding until calving

Mated heifers are often the least well managed stock on (or off) the farm. Since calving dates are set at mating, the heifers must gain sufficient bodyweight to reach desired calving weights (Table 14). Excessive weight gain and condition 1-2 months from calving leads to problems due to accelerated foetal and mammary growth (Table 15).

It is important to monitor the growth and weight gains of heifers (eg. scales, height and girth measurements).

***Diagram 4**: How age at first calving affects replacement herd size*



The average age of first calving in NSW has been 30 months. Diagram 4 shows that calving at 24 months would allow for 25% less heifers needed to maintain current herd size. This would allow for better nutrition for the other heifers, or the opportunity to sell surplus heifers or milk more cows.

"Making a difference"

- Condition scoring is a practical management tool to analyse herd and feed management changes and initiatives.
- Improved reproductive and replacement management improves farm productivity and profitability by:

Reproductive management	**Replacement management**
• Reduced % of cows empty	• Reduced numbers of replacements
• Improved calving intervals	• Better quality stock
• Increased lifetime yields	• Reduced calving problems
• Reduced AB costs	• Improved voluntary culling
• More calves per lifetime	• Increased lifetime production
• Less forced culling	• Improved herd capacity

- Select calving patterns that incorporate cost effective technology and production systems (ie. Improved margins).
- Use performance data to allow more informed decisions on how the key management drivers (ie. Feed, Herd and Labour management), interact.
- Improve lifetime production and profit through efficient heat detection, good insemination technique and proper identification and records of stock.
- Plan breeding programs that enhance semen options and purchases, replacement matings and the selection of bulls for vealer and beef dairy cross markets.
- Consider the potential benefits of different calving programs ie.:

Batch/Seasonal	**All year**
• Condensed mating period	• More consistent quality of milk
• Managing stock at similar production status	• Level production and incom
• Group rearing of calves	• Small groups of calves
• Match herd requirements to feed supply	• More even workloads
• More effective use of labour for calving, mating and calf rearing	• Reduced scale of facilities to handle peak production
• Strategic feeding of supplements	
• Scope to improve stocking rates	

TOOLS AND PACKAGES

Breeding and Replacement Management

Package	Contact	Source
DairyLink – Growing Heifers	NSW Agriculture	NSW Agriculture Offices
InCalf	NSW Agriculture	DRDC
Oestrus Synchronisation	Genetics Australia	Genetics Australia
Cattle Breeding and Reproduction	NSW Agriculture Offices	NSW Agriculture
Cattle Breeding Technologies – New Frontiers in Breeding for the Cattle Industry	Genetics Australia	Genetics Australia

PLANNING CHANGE
(FORM 2A)

Limits to your Breeding and Replacement Programs

(Please tick one box)

Issue	Problem			
	No	Slight	Moderate	Serious
Reproductive efficiency				
Breeding goals				
Time spent on breeding management				
Heat detection				
Moving cows				
Milking cows				
Rearing calves				
Weight for Age targets				
Breeding facilities				
AI Skills				
Availability of information				
Interpreting new technology				
Keeping records				
Genetic quality of cows				
Milk composition problems				
Reproduction targets				

CAN YOU ADD TO THIS LIST?

PLANNING CHANGE
(FORM 2B)

Breeding and Replacement Factors

Using your knowledge and key performance indicators please consider the following questions:

- What are your strengths in breeding and replacement management?

- What are your opportunities in breeding and replacement management?

- What do you need to change?

- What do you need to change first?

- How will you make the changes?

- What will you achieve by changing?

SECTION 3

Profitable Herd Management Factors

BACKGROUND

Many factors are involved in improving farm profits from herd management. Improving returns involves looking at the benefits and costs of existing and new technology. Before making major changes to your operations it is important to look at "cost effective" practices that will make a "real" difference to your economic survival and future goals.

CHALLENGES

Dairy farmers will need to closely examine the effectiveness of their existing operations to improve profit margins and farm income.

This involves the following factors:

- Examination of breeding and replacement costs
- Identifying technology and management options to reduce unit costs of production
- Different alternatives to improve time and labour utilisation

USING MILK TO REAR X-BRED CALVES.

At low milk prices (eg. 15c/L), milk could be used to rear cross-bred calves.

Cost to rear a calf from birth to weaning: (6 weeks):

Milk:	170L @ 15c/L	=	$25.50
Pellets:	20 kg @ 23c/kg	=	4.60
Straw:	20 kg @ 14c/kg	=	2.80
Vaccine (7-in-1):			2.00
Drench (fluke and worm):			2.00
			$37.00

Cost to rear from weaning to 12 months (~300 kg):

Pasture:	(10 MJME/kg DM)	900 kg DM @ 12c/kgDM	=	$108.00
Grain:	(12 MJME/kg DM)	300 kg grain @ $180/t	=	54.00
Hay;	(8.2 MJME/kg DM)	320 kg DM@ 16.2c/kgDM	=	51.80
Drench (fluke and worm):				5.00
Vaccine (7-in-1):				6.00
				$225.00

Total cost birth to sale: = $37 + $225 = $262

(NB: labour has not been included in these costs)

***Table 16** : Potential profits of selling 300kg yearling*

Cost of rearing ($)	Price (c/kg)	Return ($)	Agent's fees ($)	Net return	Profit
262	110	330	50	280	18
262	130	390	50	340	78
262	150	450	50	400	138
262	170	510	50	460	198

The table above shows that profits depend the price received per kg at the sale. With current buoyant beef prices, there is an opportunity to make extra income provided that facilities, labour and feed are available.

HEIFER REARING

There are various rearing replacement options.

Rearing at home

Cost of raising a heifer to gain 0.7kg/day (from 6 months to 24 months):

***Table 17**: Feed schedule and approximate costs of rearing heifers (6 –2 4 months)*

Feed	kg DM/day for age		Total fed (kg DM)	Cost of feed (c/kgDM)	Total cost ($)
	6-12 mths (180 days)	12-24 mths (365 days)			
Pasture	4.0	6.0	2910	12	350
Grain	1.0	1.5	728	16.2	118
Hay	1.0	1.0	545	16.2	88
Total					556

(NB: This example does not take herd health or labour cost into account).

Agisting heifers off farm

The cost of agisting heifers typically ranges from $3-$5 per week; agistment from the age of 6 months to 24 months could range from $234 to $390/heifer.

Advantages:

- ✓ More land is available for the milking herd.
- ✓ Opportunities to increase the numbers of milkers.
- ✓ Reduces risk of disease from the milking herd.

Disadvantages:

- ✘ Increases the risk of illnesses being missed.
- ✘ Reduced opportunities for supplementary feeding.
- ✘ The costs of transport.
- ✘ Health risks involved with moving animals between properties (eg. internal parasites and BJD).

Contract rearing

Contract rearing of heifers is usually based on a price per kg body weight gained. The cost at $1.50/kg and a weight gain of 0.7 kg/day from age 6 months to 24 months is $560.

Advantages:

- ✓ Cost usually includes herd health costs (drenches, vaccines).
- ✓ No extra labour costs involved.

Disadvantages:

- ✘ Concern over moving stock between properties for health reasons.
- ✘ Transport costs.
- ✘ Dependence on the contractors skills and reliability.
- ✘ Need to check on liabilities and insurance costs.

Buying heifers

As shown above, the feed costs of raising a heifer from 6 months of age is approximately $560.

Add in the cost of feeding from birth to weaning (6 weeks of age): $37 on cows milk (see above).

Add in the cost of feeding from weaning to 6 months:

Pasture	2 kg DM/day for 93 days @ 12c/kg DM	=	$22.00
Grain	1 kg DM/day for 93 days @ 16.2c/kg DM	=	$15.00
Hay	1 kg DM/day for 93 days @ 16.2 c/kg DM	=	$15.00
Total feed costs (from birth to 24 months)		=	$649
Herd health costs			$25
Labour (about 4hrs @$15/hr)			$60
TOTAL COSTS (Feed + herd health + labour)			**$734**

Advantages:

- ✓ There is an "opportunity" cost available - having around $730 sitting in the bank, earning interest.
- ✓ You will free up labour for other tasks.
- ✓ More feed available for milkers; or you could leave the stocking rate the same and run more milkers.
- ✓ Less stock to worry about on the property.
- ✓ You don't have the risk of losing the heifer to ill health or accident when she is nearly ready to join the milking herd.

Disadvantages:

- ✗ Availability of accurate breeding records of purchased heifers.
- ✗ Concerns over health issues on different properties.
- ✗ Price fluctuations.
- ✗ Availability of suitable quality heifers.
- ✗ Availability of heifers when you need them.
- ✗ Most heifers that are sold are the leftovers from the herd, not the best ones.

FEEDING CALVES

Once-a-day feeding of calves

Feeding your calves half the amount twice a day has no nutritional benefit, and in fact will not result in early rumen development. Calves being fed milk once a day are more likely to eat hay and pellets. Feeding once a day also reduces labour requirements and costs.

Calf feeds – milk vs replacer

Whilst whole milk meets the calves nutritional requirements, milk replacer is sometimes fed due to its added supplements. It is more economical to feed the calves whole milk rather than replacer, especially if milk is a low price. (Table 18.)

***Table 18**: Cost difference between whole milk and milk replacer*

Feed	Dry matter (%)	Energy (MJ/kgDM)	Cost (c/kgDM)	Cost (c/MJME)
Whole milk				
15c/L	13	22.3	115	5.2
20c/L	13	22.3	154	6.9
25c/L	13	22.3	192	8.6
30c/L	13	22.3	231	10.3
Replacer				
$50/20kg	96	19.4	260	13.4
$60/20kg	96	19.4	312	16.1

Cost savings of early weaning

A well-reared calf can be weaned between 4-6 weeks of age. This reduces milk costs, and also helps rumen development, enabling the calf to make better post-weaning liveweight gain.

COST BENEFIT OF FEEDING FOR BODY CONDITION

High producing cows reach their full appetite after peak production. Cows should calve at a body condition score (BCS) of 5.5-6 to allow the conversion of body condition to milk in early lactation. This weight loss will result in about 5.4L of extra milk per day. For every additional litre that the cow produces at her peak, she may produce an extra 200L over the whole lactation. The extra milk produced over the lactation from 1 BCS could be as much as 1080L (200 x 5.4).

1080L @ 29c/L = $313.20

Cows are more efficient in putting on weight in late lactation, rather than the dry period.

In a lactating Friesian, about 1500 MJME is required for her to gain 1 BCS. In a dry cow, about 2000 MJME is required.

***Table 19**: Possible gain by feeding grain to increase BCS by 1 at time of calving, for a Friesian cow*

Cow status	Energy required to gain 1 BCS	Barley required to gain 1 BCS	Cost of grain @ $170/t	Income from extra milk	Net return
Lactating	1500 MJME	115 kg	$19.55	$313.20	$293.65
Dry	2000 MJME	154 kg	$26.18	$313.20	$287.02

The table shows the benefits of keeping cows in optimal condition, and also the economic importance of putting condition on while the cow is lactating rather than after drying her off.

CROSSBRED COWS

New Zealand studies have shown that crossing Holstein-Friesians with Jerseys can significantly increase production of milk solids, reproduction, and survival traits in pasture-based systems. Table 20 shows some comparisons between the average cow in New Zealand and crosses of Jersey and non-New Zealand Holstein-Friesian genetics.

***Table 20**: Example of differences in performance between cows of different genetics*

Trait	Average	Holstein-Friesian x Jersey
Milk solids (kg/cow over 270 days)	615	631
Milk volume (L/cow over 270 days)	6210	6367
Liveweight (kg/cow)	381.0	391.4
Days to first mating	16.1	14.6
Successful AI calf (%)	60.3	70.4
Survival 1st to 2nd lactation (%)	87.8	96.6
Survival 1st to 5th lactation (%)	56.1	74.4

***Note**: Consideration also needs to be given to stocking rates to achieve the same volume of milk, variable size in the milking shed and the higher nutrient requirements for cows with higher milk composition.*

VALUE ADDING DAIRY STOCK

With higher beef prices there are opportunities to value add sale stock. Following are some suggestions:

Cull cows

Many cull cows are sold in poor condition. Top quality culls receive higher prices (c/kg) than poorer cows. Some abattoirs offer premiums if fat cover is between 3 and 10 mm. With the average farmer selling 40 culls a year, this is an area for extra income, if there is surplus feed to finish off animals. Some problem cows (eg. dropped udders or arthritis) often bring a better return if sold direct to the abattoirs. In fact, many farmers send animals direct to meatworks, saving agents commissions, yard dues and avoiding the chance of receiving lower prices.

Beef cross calves

There is a high demand for dairy-beef vealer mothers. Beef producers are paying around $100 for calves at one week of age. Having a contract and a line of females, (eg. weaners, yearlings, heifers) attracts higher returns.

The male cross-bred calves may be a little more difficult to value add. Most of them are being sold as bobbies, some have been multiple suckled and sold as baby vealers while others have been reared to sell at the spring store sales. Consideration needs to be given to marketing these types of animals to avoid problems experienced in the past.

Holstein-Friesian bull calves

There is currently a very strong demand for straight bred Friesian bulls, both for the live export trade and the bull beef market. Some stock trading companies have been seeking bulls for the live export trade and paying around $1.60/kg. Other companies have been sourcing calves to rear for the hamburger/grinding beef trade. Prices of around $250 can be expected for autumn calves reared to 105 kg liveweight, weaned off milk for at least six weeks, drenched and vaccinated. This is a good opportunity to use excess milk if you can secure an arrangement with one of these companies.

PLANNING SEMEN PURCHASES

Planning and following a few key rules, can make purchasing semen a relatively simple process.

Planning

Irrespective of the calving program, by making two or maybe three semen purchase decisions per year you can "uncomplicate" the breeding program and split your semen purchases.

Planning reduces "spur-of-the-moment" decisions and ensures that you only purchase what you need.

There are two aspects – financial and semen budgeting.

Financial budgeting – Establish what you can afford to spend on semen. For a herd of 200 cows, $6000 with an average price of $19/dose, is more than enough.

Semen budgeting – You need to establish three things:

1. The number of cows you need to join
2. Your submission rate (% of cows to be mated in the joining period), an estimate of your conception rate
3. Type and quality of bulls to be used (eg. proven and unproven bulls)

The example below is based on 200 cows split into 2 batches with an annual semen budget of $6000. It shows what you expect if you joined a batch of 100 cows over a 9 week period with a 55% conception rate and 90% submission rate (cows presented for insemination).(90 X 55 = 50% PR)

100	cows to be joined
90%	submission rate
90	cows to join in first 3 weeks (round) of mating
55%	conception rate
50	cows in calf after first 3 weeks (round) of mating
50	cows left to join in the second round
90%	submission rate
45	cows to join in second 3 weeks of mating
55%	conception rate
24	cows in calf from second round of mating
74	cows in total in calf after second round.
26	cows left to join in the third round
90%	submission rate
23	cows to join in third 3 weeks of mating
55%	conception rate
13	cows in calf from third round of mating
87	cows in total in calf after third round
13	cows not in calf at the end of mating period
158	doses needed or 1.6 doses per cow (1 dose for every cow submitted)

Budgeting has established two things: how much to spend and how many doses are required. The average price per dose is $19, ie. $3000 (6 months worth of semen or 50% of budget) divided by 158 doses = $19 (including GST).

Terms and definitions

APR or Australian Profit Ranking. This ABV was recently developed by ADHIS (The Australian Dairy Herd Improvement Scheme) in consultation with various industry groups. It combines production, type, workability and survival ABVs to predict the profitability of bull's daughters.

The ASI or Australian Selection Index is the production component of the APR. The ASI was introduced to stop the decline in milk fat and protein percentage. It does this by placing positive emphasis on the fat and protein yield ABVs and a small negative emphasis on the milk ABV. The ASI favours bulls with good yields of fat and protein and higher fat and protein deviations over the high milk, low test sires. The ASI formula is (3.8 x Protein ABV) + (0.9 x Fat ABV) - (0.048 x Milk ABV).

Australian Profit Ranking (APR) =

(3.8 x Protein ABV) + (0.9 x Fat ABV) - (0.048 x Milk ABV) + (3.9 x Survival Index)* + (1.2 Milking Speed ABV) + (20 x Temperament)

***Survival Index =**

(0.25 x Survival ABV) + (0.38 x Likeability) + (1.34 x Overall Type) + (2.30 x Udder Depth) + (1.66 x Pin Set)

ADHIS is now using this ranking as the primary ranking for bulls in their literature. By subtracting the ASI from the APR you can see the contribution of the non-production traits to the APR, for example: ALLORA's APR is 95 and his ASI is 77. Therefore, the contribution to the APR by the non-production traits is $18 as the APR is expressed in dollars per lactation.

An APR of 100 means that the genetic impact of a bull is expected to result in an extra $50 per daughter per year (half of the ABV as the bull only passes on half of his genes to his daughters) when compared to a bull with an APR of zero. A difference between 2 bulls of 20 APR suggests that the better bull will transmit genetics to his daughter that are worth and additional $10 per lactation.

Within the next 2 years the APR will also include somatic cells and daughter fertility. These components will be included as ABV's for these traits are developed.

Rules and tips

Number of bulls. The selection of 4 or 5 bulls per mating period provides enough genetic variation.

Progeny test. At around $6 per dose, it is a great way to keep semen costs down. You get the next generation of sires early and you add pedigree diversity to your herd. Commit no more than about 50% of your herd to progeny test semen. The proven sires are too good to ignore completely.

Reliability. Reliability is important. The higher the reliability, the more confidence you can have in the stability of the proof. If you want to use a low reliability bull, do not use too much from that bull because you may be disappointed if the proofs are less than first estimated.

Complete ABV's. Only use bulls that have complete or publishable ABV's. Bulls without type or workability proofs are not average for those traits. A low reliability type or workability proof (particularly if it does not meet the ADHIS publishable standard) is often more a reflection of the bulls pedigree (sire, dam and maternal grand sire) than of the bulls assessed daughters. The ADHIS brochure published after each proof run contains most of the information you need to make your decisions. If a bull does not appear on this brochure, then you need to ask yourself why you are using it.

Inbreeding. You should always avoid inbreeding. The best way to avoid inbreeding is to ask your herd recording centre to generate an inbreeding report for your herd. This report will outline what matings to avoid. Don't eliminate a bull because he is a son of, or related to, a successful bull that you have used previously. The inbreeding report indicate how to use the bull to your herd's advantage.

Corrective Mating

Corrective mating programs are becoming popular. Unfortunately, corrective mating programs don't deliver all that they promise.

The corrective mating messages are:

1. The same result can be achieved if you use the group of bulls randomly and avoid inbreeding.
2. Genetic improvement in your herd has more to do with the bulls you select than how you use those bulls.
3. Select bulls that improve your profits.

Common sense applies. There is no point breeding bad traits to bad traits (eg. poor udders).

If organising matings is a chore, don't worry. Select the best bulls you can afford, within your budget, avoid inbreeding and mate your herd randomly.

NATURAL SERVICE VS AI

Many farmers are thinking about ways to reduce breeding costs. When comparing the costs of artificial breeding and natural service (NS) all the factors should be considered.

The immediate semen and insemination costs are usually outweighed by the extra costs and risks of natural service. These include:

- Number of bulls in large herds
- Managing the bull movements at milking
- Reduced genetic gain is negative (and cumulative)
- Bulls do not out-perform good heat detection techniques
- Replacement of injured bulls
- Securing bulls with adequate bull power (positive libido and genetics)
- Reduced value of natural service heifers
- Risk of exposing the herd to disease
- Maintenance costs of bull (feed and vet expenses)
- Damage to cows mounted on concrete
- Availability of suitable heifer replacements

Comparison of AI and NS

Costs of a bull $1500 with a cull value of $1000

Assuming maintenance costs of $1000

The bull produces 15 heifer replacements for 90 matings

On this basis, the cost of NS is $\frac{\$1500}{15} = \$100$

With AI, semen @ $19/mating (plus AI costs) and 5 matings to produce a heifer replacement, the cost will be around $100 ($19 x 5 = $95, plus liquid N, gloves, lubricant etc) ie. AI is competitive to natural service.

Note: The cost of introducing disease and a poor fertility bull can be a sizeable and unexpected cost. Time used in AI allows operators to monitor BCS and reproduction.

"Making a difference"

Economic benefits of heifer management

The bottom line is increased profitability and realising the potential benefits of efficient heifer management. For example: Improving the weight of a 2 year old Holstein-Friesian by 100 kg at calving is likely to produce an extra 2500 litres of milk over their productive life. This would return $625 at 25 cents/litre and return an extra $140 as a cull cow.

The cost of 750 kg grain to achieve an extra 100 kg liveweight at 2 years would be $135 (at $180/tonne of grain). The extra milk produced would be from grass (70%) and supplements (30% conserved and grain).

The profits above rearing costs would be $625 + $140 = $725 less approx $200 grain = $565. The additional benefits include less replacements, less stocking rate, more room for milkers, improved fertility, reduced culling and wastage and increased opportunities for voluntary culling.

Economics of better reproduction

Reproductive status substantially influences herd yield, lifetime performance, forced culling and herd profitability.

Increasing days open (period of time between calving and first conception) reduces milk produced per day by increasing the average days in milk, reduces calves born per year, increases the number of replacements reared, and reduces scope for voluntary culling due to reproduction wastage.

Most studies indicate a linear relationship between pregnancy rate and gross margin per herd, ie improving reproductive performance will increase the gross margin in most herds. The value of pregnancies depends on a number of factors (eg. age, level of milk production, days in milk, costs of replacement, value of culled stock, price of milk). Nevertheless, pregnant cows have more value than empty cows.

The most important change most dairy farms can make is to improve the 100 day IC rate on the first cycle following VWP. A further valuable contribution is to reduce the interval between an unsuccessful insemination and re-insemination.

Economics of AI

According to the Australian Herd Recording Statistics for 1999/2000, AI bred Holstein cows produced 567 litres of milk, 18 kgs of fat and 17 kgs of protein more than their naturally bred counterparts. Artificial breeding and herd recording are the keys to genetic improvement in your herd. By planning and following a few simple rules, you can maximise your profit through genetic gain.

PLANNING CHANGE
(FORM 3A)

Profitable Herd Management Factors

Issue	No plans	Intend to make plans	Implementing plans
Plans to reduce the costs of production			
Plans to increase the costs of milk production			
Plans to improve: • Herd health			
• Heifer management			
• AB skills			
• Heat detection			
• Milk composition			
Plans to change: • Calving intervals			
• Calving patterns			
• Age at first calving			
• Replacement rate			
• Calf feeding			
Plans to reduce: • Chemical use			
• Disease			
• Days open			
• Heat stress			

CAN YOU ADD TO THIS LIST?

PLANNING CHANGE
(FORM 3B)

Profitable Herd Management Factors

Using your knowledge and key performance indicators please consider the following questions:

- What are your strengths in profitable herd management factors?

- What are your opportunities for change?

- What do you need to change?

- What do you need to change first?

- How will you make the changes?

- What will you achieve by changing?

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DAIRY DO IT!

An initiative of the NSW Government and Dairy Industry

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