

Key performance measures of farm profitability

This chapter presents a series of key performance indicators (KPIs) to help farmers identify the possible causes of inadequate farm performance and profitability.

The main points in this chapter

- When assessing poor farm profitability, the KPIs can be split into two types: those diagnosing problems with feeding management and those indicating poor herd management.
- As home-grown forage is generally cheaper to source than purchased forage, the more produced on-farm, the better. Too many stock on limited land is a common feature on Asian dairy smallholdings.
- Unlike other forms of livestock, milking cows have very high nutrient requirements, therefore high quality forages and concentrates are essential for profitable dairying.
- Milk income less feed cost is one of the simplest and easiest ways to measure KPIs of farm profitability, and the quickest to respond to small changes in farm practices.
- Problems with herd management can be diagnosed using measures such as the proportion of cows actually milking in the herd, or their peak yield and persistency of production. There are also simple KPIs of herd reproductive performance and of health and growth of young stock that assist in searching for the underlying causes of poor farm profitability.

A rather simplistic way of looking at the economics of milk production is to use the following equation:

$$\text{Milk profits} = (\text{Profit margin}) \times (\text{Milk quantity})$$

Profit margin is the difference between milk returns and all expenses, expressed per kg of milk sold. Quantity is the amount of milk sold, expressed in kg. Together, they determine milk profits. On smallholder dairy farms, this is what largely pays for farm expenses, capital expenditure, loans, and finally for family living.

Without a good margin, farmers have to produce large volumes through milking more cows and/or increasing milk yield per cow. If they have a good margin but a low volume, farmers will not be able to generate a reasonable income for their family living.

Increasing milk volume can improve milk profits in two ways. Firstly, the profit margin is applied to more volume and secondly, unit costs for feed, other variable and

overhead costs are diluted over a larger quantity. Table 13.1 on page 150 highlights the energetic efficiencies of higher per cow milk production.

Knowing their margin, hence cost of production (COP), is then critical to operating a profitable dairy enterprise. Another way of looking at margins is that saving money in producing milk (that is, reducing the COP) is the financial equivalent of increasing milk returns. Farmers must do more and better planning if they are to achieve greater profits. Profits are not something they end up with at the end of the year. Rather, they are something farmers must plan for.

This chapter presents a range of key performance indicators (KPI) to help farmers monitor the profitability of their dairy enterprise.

14.1 Simple measures of farm performance

Comparative farm analyses or benchmarking (see Chapter 8) involves collecting data from farms with similar production systems, then generating relevant physical and financial KPIs to better interpret their farm's productivity and profitability. Farmers can use these KPIs to identify weaknesses in, as well as set targets for, their farm's performance. Farmers are likely to try to improve their systems if they know they are less profitable compared to others. If such an approach encourages farmers to look more critically at their cost structures, it has achieved a major objective of benchmarking. Expressed simply, benchmarking is a diagnostic tool to help farmers identify production weaknesses that adversely affect their financial performance. This chapter describes an initial attempt to document some of these KPIs to provide farmers with a structured approach to address farm profitability. It must be stressed that no single KPI should be used in isolation as each one is the end result of interactions between numerous farming practices. It is important that there is a balance between them so that one KPI target is not achieved at the expense of others within the farm.

The following 10 series of questions should be asked on any farm, big or small, because up to 60% of farm costs are feed related. The first six questions are directly related to feeding management. Even though the remaining four are more related to overall herd management, they are still very feed dependent. Some of the KPIs can be quantified. However, for others, there is no ideal single value because for some, the higher the better (such as on-farm forage production or forage quality) while for others, the lower the better (such as total feed costs, calf mortality and heifer wastage rates). When KPIs are presented, they are best presented as ranges rather than a single value as this emphasises the fact that they are only guidelines. Ten of these key factors are presented in Table 14.1.

14.2 Feed-related key factors influencing farm profitability

14.2.1 Stocking capacity

Forages almost always provide a cheaper source of the key feed nutrients (energy and protein) than do concentrates. It is usually cheaper to grow these forages on the farm

Table 14.1 Ten key measures of dairy farm performance

Measure	Description
Feeding management	
1. Stocking capacity	Is the farm carrying too many stock for the available forage supplies?
2. On-farm forage production	How much of the farm's annual forage requirements must be purchased?
3. Forage quality	Is the forage being harvested or purchased at its optimal quality for milking cows?
4. Concentrate feeding program	What is the quality of the concentrates being fed and how much is allocated per milking cow?
5. Total feed costs	Are the forages and concentrates costing too much per MJ of energy or kg of protein?
6. Milk income less feed costs	How does this compare with those of other farmers with good feeding management?
Herd management	
7. Percent productive cows	What is the percent of adult cows actually milking? What is the proportion of milking cows in the entire dairy herd, expressed as a percentage?
8. Pattern of milk production	What is the peak milk yield of the herd and what is its lactation persistency (rate of decline from peak milk yield)?
9. Reproductive performance	How many days after calving do cows cycle? What are the herd's submission and conception rates? What are the herd's 100-day-in-calf and 200-day-not-in-calf rates?
10. Heifer management	What is the calf mortality rate and the wastage rate from birth to second lactation? What is the age and live weight at first calving of the replacement heifers?

rather than purchase them. It is easier to control forage quality on-farm, through fertiliser and harvest interval, than with purchased forages. When relying on off-farm forage supplies, farmers depend on what is available, either from traders who harvest the roadsides, paddy fields, tree plantations or forests, or from other farmers who sell their excess supplies, either as crop by-products (such as rice straw or corn stover) or forage crops specifically grown for sale.

Table 13.2 on page 154 presents the optimum stocking capacities for smallholder dairy farmers with different yields of home-grown forages. Data are presented for farmers who run replacement heifers on the same farm as their milking herd, and for farmers that have them reared off-farm. The calculations included three levels of forage management, namely poor, average and good, to produce 10, 20 and 30 ha forage DM/ha/yr respectively.

For a farmer growing the maximum quantities of quality forages, to feed his milking cows well, he should have no more than 8–10 milking cows per hectare of forage grown on his farm. However, most dairy smallholders do not manage their forages well enough to produce the highest yields of forage. Therefore, a more realistic recommendation

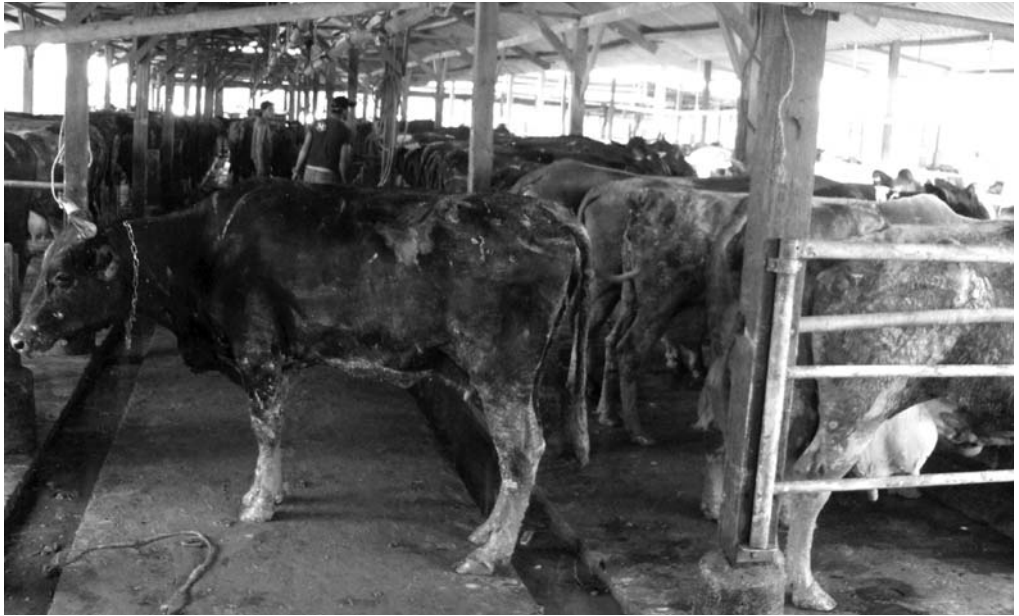


Figure 14.1 Cows will not perform well if maintained in overcrowded unhygienic conditions (Malaysia)

would be six to eight milking cows (plus the replacement heifers) per hectare of forage grown on-farm.

Unfortunately, most smallholder dairy farmers like to keep more cows than this recommendation, meaning they must either have to purchase forages off-farm, underfeed their milking cows (and heifers) with less forage or, if they aim to produce high yields of milk (say more than 12–14 kg/day), feed excessive levels of concentrates to each milking cow. This is a more expensive way to produce milk, and frequently leads to digestive problems, such as subclinical acidosis. Not only will feed efficiency decrease, it will increase the cost of production and reduce farm returns. Therefore, as all astute businessmen know, farmers should be stocking their dairy farms at the optimum level to maximise farm efficiencies and hence profits. In other words, farmers should not put too many cows on their farm, particularly if they cannot feed and manage them properly.

14.2.2 On-farm forage production

If it is generally cheaper to grow quality forages on-farm, the less purchased the cheaper the feed bill. With well-planned dairy production systems it should be possible to supply 95 to 100% of the forages from on-farm supplies. Strategic purchases of small quantities of very cheap, lower quality forages (such as rice straw) for stock with lower daily nutrient requirements, such as dry cows, may still be a good management decision.

The biggest problem with on-farm forage supplies is to produce them 12 months of the year. Forage growth rates are markedly reduced during periods of low rainfall or low temperatures. In Asia, farmers must calve their cows year-round to provide a regular



Figure 14.2 Sheds must be built for optimum cow comfort, not like this shed (Malaysia)

cash flow, so cannot practice seasonal calving to match herd requirement with forage growth rates. Conserving forages through silages and hay during periods of peak forage growth is the best way to overcome seasonal forage supplies. Hay making requires many more days of dry weather than silage making and this is rare during wet seasons when excess forage supplies are more likely. Making silage from forage crops or quality crop by-products (such as legume tree leaves, corn stover or other cash crop residues) can augment supplies of other conserved wet season forages.

14.2.3 Forage quality

To produce milk and calves, dairy cows require feed nutrients which are supplied through both forages and concentrates. To produce acceptable milk yields, say 15 kg/day, cows require a ration containing at least 10 MJ/kg DM of metabolisable energy (ME). The more of this supplied by forages, the less required by concentrates. For milking cows, a realistic KPI for forage quality would be 9.5–10.0 MJ/kg DM of ME and 12–14% crude protein.

The higher the quality of the forage, the less concentrates necessary to achieve the desired milk yield. This was demonstrated by Devendra (1975), as presented in Table 14.2, who calculated the amount of concentrates required for target milk yields in 400 kg milking cows (non-pregnant with zero weight change) when fed ad lib forage of varying qualities. For these calculations, he assumed the concentrate to be home-mixed containing 12.2 MJ/kg DM of ME and 24% protein.

Table 14.2 Required concentrate intakes (kg DM/day) for cows fed forages of varying quality to achieve target milk yields

Milk yield (kg/d)	Forage quality (MJ/kg DM of metabolisable energy)			
	7.3	8.2	9.0	9.9
6	3.2	0.7	–	–
10	4.9	2.5	0.8	–
14	6.6	4.8	1.1	0.3
18	8.2	6.0	3.0	0.7
22	9.8	7.7	5.4	1.7

(Source: Devendra 1975)

14.2.4 Concentrate feeding program

The selection of concentrate ingredients and their formulations is discussed in *Tropical dairy farming* (Moran 2005), so will not be covered here. Relevant KPIs for lactation concentrate quality would be 11–12 MJ/kg DM of ME and 16–18% crude protein.

Many Asian dairy advisers use a general ‘rule of thumb’ that farmers should feed 1 kg concentrate for every 2 kg of milk produced. This is a safety measure because of the lack of knowledge about the nutritive value of the feeds, particularly the forages. It also provides supplemental energy to cows when they are fed only limited amounts of forage.

With knowledge of the feeding value of the forages and concentrates, and their costs, more objective decisions can be made on how much concentrate should be fed to achieve target milk yields. This requires more knowledge and greater effort than following the ‘feed 1 kg concentrate per 2 kg milk’ rule, but such decisions can greatly reduce feed costs hence improve profitability, when expressed as milk income less feed costs.

Table 14.2 listed the level of concentrates required to achieve target milk yields with varying forage qualities. These feeding decisions have been converted into milk:concentrate ratios in Table 14.3. When cows are fed better quality forages, more milk is produced per kg concentrate fed. The 2:1 (for every 2 kg milk, feed 1 kg concentrate) rule is only applicable with very low quality forages, namely those with ME contents of 7–8 MJ/kg DM.

Table 14.3 Milk: concentrate ratios (kg milk produced/kg concentrate DM fed) to achieve target milk yield in cows fed forages of varying quality

Milk yield (kg/day)	Forage quality (MJ/kg DM of metabolisable energy)			
	7.3	8.2	9.0	9.9
6	1.8	8.6	–	–
10	2.0	4.0	12.5	–
14	2.1	2.9	12.7	46.7
18	2.2	3.0	6.0	25.7
22	2.2	2.9	4.1	12.9

(Source: Devendra 1975)

14.2.5 Total feed costs

Chapter 12 discussed formulating profitable rations, with examples for a Malaysian dairy smallholder. The choice of available feeds for milk production will differ from country to country as do their relative costs. The principle of formulating profitable rations is to select various feeds on the basis of their cost per unit energy, because energy is nearly always the first limiting nutrient. When protein deficiencies limit cow performance, the unit cost of protein becomes important. The fibre content of each potential feed ingredient should also be considered to ensure that the voluntary intake of the cow is not too restricted and she cannot eat all that she is offered.

When formulating rations, one has to be confident that the costs and nutritive values of the ration ingredients are representative of the feeds offered on that farm.

14.2.6 Milk income less feed costs

Milk income less feed costs (MIFC) is one of the simplest and easy to measure KPIs of farm profitability. In addition, changes in MIFC are quick to monitor because of the rapidity with which milking cows respond, even to small variations in their feeding management. When introducing new feeds into the diet or varying their amount, the cows' milk responses will reflect these changes within a few days as will their MIFC within a week or two.

Calculations for ration formulation, total feed costs and MIFC have been made easier with a new computer program (FEEDPROFIT) which is available at no cost from the author, at john.moran@dpi.vic.gov.au (or jbm95@hotmail.com).

Chapters 12 and 13 discuss the economics of feeding management and from these chapters it is apparent that the development of generic KPIs for total feed costs and MIFC depend greatly on the base costs of feeds in different dairy regions.

14.3 Herd-related key factors influencing farm productivity

14.3.1 Proportion of productive cows

Proportion of cows milking of those that have calved

One good measure of the performance of the milking herd is the proportion of cows actually producing milk. For herds with a 12-month calving interval, lactation length should be 300 days (for a 65-day dry period), so lactation length would be the calving interval less 65 days, meaning that 82% of the cows are milking at any one time with 100% calving rate. However, in most year-round calving systems, only 75% of the adult cows are milking. The longer the dry period, the lower the number of cows milking at any one time. The number of cows milking at any one time is influenced by several factors, the most important ones being lactation length, inter-calving interval and calving rate. The effects of these factors on percentage of cows and first calf heifers milking in the adult herd have been quantified in Table 14.4. It is assumed that cows with a 12-month inter-calving interval were dried off 65 days prior to calving. It also assumes no cows were culled for poor fertility or production and there were no mortalities among the milking herd. This table highlights the adverse effects of inter-calving interval on the

Table 14.4 Proportion (%) of cows and first calf heifers milking in the adult dairy herd as influenced by lactation length, inter-calving interval and calving rate

Lactation length (d)	Calving rate (%)	Inter-calving interval (mo)		
		12	15	18
330	90	–	65	54
300		74	59	49
270		67	53	44
240		59	47	39
330	80	–	58	48
300		66	53	39
270		59	47	35
240		53	42	32
330	70	–	51	42
300		58	46	38
270		52	41	35
240		46	37	31

proportion of productive cows in the herd and this can easily fall below half the adult cows in the milking herd.

One way to demonstrate the importance of having as many of the adult cows milking as possible is to create a table, as in Table 14.5, in which the percentage of days any one cow is milking is related to the herd's inter-calving interval, the length of the dry period, hence the average lactation length. This is essentially the same as calculating the percentage of adult cows milking for 100% calving rate.

KPIs for tropical smallholder dairy farmers are:

- 74%: excellent
- 60–73%: acceptable
- 50–59%: below average
- 40–49%: not good.

Cows milking as a proportion of the complete dairy herd

Another useful measure is the size of the milking herd as a percentage of the total dairy herd, which includes milk fed and weaned replacement dairy heifers, breeding bulls (if any), dry cows and milking cows. As well as lactation length, inter-calving interval and calving rate, there are other important factors such as heifer wastage, age at first calving, culling of cows for poor performance and mortalities among the milking herd. Heifer wastage quantifies the combination of pre-weaning calf mortality and losses between weaning and second calving.

Based on a model developed by Wattiaux (1999), Table 14.6 presents the effects of some of the key factors, namely lactation length, calf and heifer mortality (up to 24

Table 14.5 Proportion (%) of days milking as influenced by calving interval and lactation length

Calving interval (d)	Dry period (d)	Lactation length (d)	% days milking
365	65	300	82
	90	275	75
	115	250	68
400	65	335	84
	100	300	75
	125	275	69
	150	250	62
450	65	385	86
	115	35	74
	150	300	67
	175	275	61
	200	250	55

months of age) and age at first calving, on the percentage of milking cows (and first calf heifers) in the total dairy herd. A series of assumptions had to be made on other key variables in this model. These were a lactation length of 300 days, calving rate of 90%, with half of the calves born being heifers, and 10% of these heifers were sold before calving, while there was also a 35% annual culling rate within the milking herd.

From this table, the proportion of milking cows decreases with age of first calving because heifers spend a longer time as young stock prior to joining the milking herd. The proportion of milking cows increases with higher calf and heifer mortalities because there were fewer heifers. Longer inter-calving intervals have the most dramatic effect on

Table 14.6 Proportion (%) of cows and first calf heifers milking in the entire dairy herd as influenced by lactation length, inter-calving interval and calving rate

Age at first calving (mo)	Calf and heifer mortality (%)	Inter-calving interval (mo)		
		12	15	18
25	10	44	40	35
30		40	36	33
35		37	34	31
25	15	47	41	37
30		42	37	33
35		39	35	31
25	20	48	42	37
30		43	40	35
35		40	36	32

milking cow numbers. This table highlights the fact that at any one time, less than half the dairy herd (ranging from 31 to 48%) are generating income.

KPIs for tropical smallholder dairy farmers are:

- 48%: excellent
- 40–47%: acceptable
- 35–39%: below average
- 30–34%: not good.

14.3.2 Pattern of milk production

The two major factors determining total lactation milk production are the peak lactation yield (within six to eight weeks post calving) and its rate of decline from this peak (or lactation persistency). The persistency quantifies the average rate of decrease in yield for each month after the peak. The higher this number, the faster the rate of decline, hence the less milk produced. The mathematics of calculating persistency is discussed in Section 5.2.

In Asia, lactation persistencies of less than 8% per month may be achievable on very well managed farms but more realistic levels are 8–12% per month. Over a 300-day lactation, a cow with a peak milk yield of 15 kg/day and an 8% persistency produces 9.9 kg/day average and a total of 2980 kg, while a 12% persistency would equate to 7.8 kg/day average and 2330 kg total. A cow peaking at 20 kg/day with an 8% persistency produces 13.2 kg/day and 3970 kg total, or with a 12% persistency, she would produce 10.4 kg/day and 3110 kg in total. A more productive cow, say with a 25 kg/day peak and 8% persistency, produces 16.6 kg/day average and 4960 kg in total, while a 12% persistency would produce 13.0 kg/day average and 3885 kg total. Such average and full lactation milk yields for the same peak and persistency will vary with lactation lengths. In summary, milk yields at any one time are the result of peak milk yield and persistency. If they are below expectations, it is important to diagnose the cause.

A very high persistency value, indicating a rapid drop off in milk yield post peak, can be indicative of poor feeding management during mid lactation (see Figure 5.1 on page 60) which often, particularly in high quality dairy cows, leads to a rapid weight loss and a delay in the first post-calving oestrus hence reduced fertility. In well bred dairy herds, feeding management must be directed towards supplying adequate nutrients, particularly energy in early lactation, to achieve high peak yields, and also in mid lactation to maintain milk yields.

14.3.3 Reproductive performance

For year-round calving herds, there are four useful measures of reproductive performance. These are:

- **100-day-in-calf rate.** This calculates the percentage of the cows in the herd that become pregnant by 100 days after calving. It also describes how many cows will calve within about 13 months of their previous calving. High 100-day-in-calf rates indicates fewer cows with long intervals between calving and fewer cows culled as empty. Cows that conceive within 100 days of calving will calve again within 13 months

and generate higher profits than cows that take a longer time to conceive or fail to get pregnant. This measure usually allows for the voluntary waiting period (the days between calving and the first mating) of say 55 days plus two oestrus cycles of AI (say 42 days) before cows are put out for natural mating.

- **200-day-not-in-calf rate.** This calculates the percentage of cows not pregnant by 200 days after calving. Farmers want as many cows as possible to calve no more than 15–16 months after their previous calving. This coincides with six months after which non-pregnant cows are often culled. It cannot be calculated until many months after cows have calved, but because it is closely related to 100 days in-calf-rate, it can be estimated from that measure. It cannot be calculated unless the whole herd is pregnancy tested.
- **Submission rate** is the percentage of the herd which received at least one insemination within a specified number of days after calving. To achieve a high 100-day-in-calf rate, a high percentage of cows in the herd must be submitted for insemination soon after calving. An 80-day submission rate is the percentage of cows that receive at least one insemination by 80 days after calving.
- **Conception rates** are the number of services resulting in pregnancy divided by the total number of services. This describes the percentage of inseminations that are successful and result in pregnancy. This has always been considered an important measure of reproduction but it does not fully describe overall herd performance. For example, herds can have high conception rates but poor 100-day-in-calf and high 200-day-not-in-calf rates. Sometimes the first insemination conception rate is calculated by including only the first services after calving in the analyses.

For a smallholder milking herd in Asia, target KPIs are:

- 100-day-in-calf rate: 55–60%
- 200-day-not-in-calf rate: 13–15%
- Submission rate: 65–70%
- Voluntary waiting period: 50–60 days
- Conception rate to first insemination: 45–50%
- Inseminations per conception in an AI program: 1.8–2.0.

Better fed cows have higher fertility which can improve 100-day-in-calf rates from 41 to 57% and reduce 200-day-not-in-calf rates from 15% to 9%.

These measures of reproductive performance are rarely used in Asia, because they require routine pregnancy testing of the entire herd. More typical reproductive measures are days from calving to first service and inter-calving interval. Targets are for cows to be first mated 60–80 days post calving which should lead to 12–13 month inter-calving interval.

STOAS (1999) compared reproduction and calf survival in two rearing systems to calculate their relative replacement rates for a dairy herd with stable stock numbers in Table 14.7. System A's measures presented in this table could be considered as a set of KPIs.

Assuming cows remain in the milking herd for 4–5 lactations, 20–25% should be replaced each year. The supply of 36% heifers from System A allows for the sale of young

Table 14.7 Measures of reproduction and calf rearing to produce replacements for a stable dairy herd.

Rearing system	A	B
Calving interval (month)	12	18
Calving rate (%)	85	65
Stillborn calves (%)	2	5
Calf mortality from 0–24 month (%)	8	20
Non pregnant heifers (%)	5	10
Heifer calves born (%)	36	15

(Source: STOAS 1999)

breeding stock or a higher culling rate to better address genetic improvements in the herd. Only one in every six or seven cows could be replaced annually in System B (in Table 14.7), which would hardly be enough to maintain herd numbers, let alone allow for much genetic selection.

With high ages at first calving (>30 months) and long inter-calving intervals (>15 months), it is very difficult to increase herd size through natural increases. That is why it is so important to seek the underlying causes of herds with high percentages of dry cows, or a high proportion of heifers to cows. The most likely cause is poor feeding management, but there could be others such as disease, heat stress or poor reproductive practices.

14.3.4 Heifer management

Poor heifer management is a major problem in many (if not most) Asian smallholder dairy farms. Young stock receive insufficient attention because they do not generate income for many months while their first three months are the most expensive period in the life of any dairy cow. A low calf mortality rate indicates that early milk rearing practices are adequate and allow for greater opportunity for economic and genetic improvement in the herd. When a heifer dies, there are fewer opportunities for culling unprofitable cows.

There are many hidden costs arising from poor management of the replacement dairy herd. The milking potential of small stunted animals that do not calve until three years of age has been markedly reduced, while very high mortality (death) and morbidity (sick) rates in calves during their milk feeding period represent an enormous waste of genetic potential in the dairy herd as well as cash outlay.

There are easily quantifiable benefits in having more newly calved heifers available to replace older unprofitable cows as heifer and reproductive managements improve. These benefits are:

- 1–2% more first calf heifers for every month reduction in age at first calving
- 3–5% more first calf heifers for every 10% reduction in calf mortality
- 2–3% more first calf heifers for every month reduction in inter-calving interval

Farmers should aim to rear 20–25% of their milking herd each year as replacements, to calve down for the first time by about two years of age and produce at least five calves during their productive life. Realistic KPIs for tropical dairy systems are:



Figure 14.3 A poorly managed veterinary storage is often indicative of other poor farming practices (Sri Lanka)

- Calf mortality up to weaning, 4–6%
- Heifer wastage rate, from birth to second calving, 20–25%
- Live weight at mating, 250–300 kg at mating
- Live weight at first calving, 400–500 kg (depending on breed type)
- Age at first calving, 28–30 months.

Another good indication of heifer management is first lactation milk yield, expressed as a percentage of mature cow production, with a target of 80–85%. If this is less than 75% of the mature equivalent, then the heifer rearing program should be reviewed.

Wither height (or height at the shoulder) is a good measure of bone growth and potential body frame size in heifers. Frame size can influence ease of calving and appetite of milking cows. Farmers should aim for wither heights of 115–120 cm by 15 months and 125–130 cm by 24 months of age.

14.4 Ease of collecting raw data to calculate KPIs

Each of the above KPIs can provide a valuable insight into the farm resources and management skills of individual smallholders. However, it is important to prioritise them based on:

- Their relevance to the farmer's current stage of farm development
- The farmer's ability to interpret the data and use it in future decision making
- The ease and accuracy of collecting the necessary raw data.

The ability of smallholder dairy farmers to collect the raw data would vary greatly with their management skills, level of education, support from service providers and – of most importance – their motivation to want to use the particular KPI in their farm decision making.

Some of the easiest to collect are the raw data to calculate the proportion of productive cows (KPI 7 from Table 14.1) as virtually every smallholder farmer knows the number of milking cows, dry cows, heifers and calves in his herd. In a matter of minutes, the author collected such data from a dozen smallholders at a dairy farmer conference in Vietnam, which indicated that most of these particular farmers had acceptable values for the percentage of milking cows in the milking herd and the percentage of milking cows in the entire herd (KPI 7). Another 'easy to collect' data set is the stocking capacity (KPI 1), as most farmers know their forage production area. These same farmers had eight to nine total stock/ha and five to six adult cows/ha, indicating that they did not overstock their farms. As they were selected to attend the conference, one could assume they were considered to be 'good' farmers.

It is not difficult to collect raw data on patterns of milk production (KPI 8) as many farmers record daily milk yields from individual cows. The level of concentrate feeding (KPI 4) is another data set readily available while many farmers could estimate their daily forage feeding program (as a guide to KPI 2). Likewise, some of the reproductive (KPI 9) and heifer data (KPI 10) can be easily calculated from raw data on dates of inseminations, calvings and ages at first calving, while a chest girth tape can provide estimates of live weights of different classes of stock.

With limited experience, the raw data for the two spreadsheets described in section 11.6 (FARMPROFIT and FEEDPROFIT) can be quite easily collected, thus providing valuable measures of farm profits, such as KPIs 5 and 6.

14.5 A final word about KPIs

The above diagnoses require the calculation of many KPIs to allow a value judgement to be made on business performance. It is timely to issue a word of caution about KPIs. Many KPIs are simply ratios or proportions assessing some level of output in relation to some level of input. Others measure success simply with numbers or amounts, such as target forage quality or heifer live weight. Although they are valuable guides, there is no all encompassing or perfect indicator of business success. All KPIs must be viewed within the whole business, with each one contributing only a part.

It is possible to achieve high performance in an indicator which does not translate into business financial success. For example, a farmer whose farm has very poor quality soils may not be able to grow as good a quality forage as he can purchase at a good price, close by. Therefore, it would be more profitable to let someone else grow the bulk of his forages.

Low performance measures in some key factors, well below the KPI, often lead to high performance measures in other key factors, which can produce a false sense of security about the ability to achieve some of the production targets. One example is low peak milk yield and short inter-calving intervals in cows of low genetic merit. Because such cows are not ‘genetically programmed’ to use their body reserves to supplement the limited intakes of feed nutrients during early lactation, their live weight will hardly change and they may cycle soon after calving. When farmers plan to improve the genetic merit of their herd through using imported cows or high grade semen, they must improve their feeding management during early lactation. If not, peak milk yields may not greatly improve and herd fertility is likely to drastically fall.

This has occurred (and is still occurring) all too frequently in national dairy development programs where over the last two decades, many thousands of purebred and crossbred Friesian heifers have been imported and placed on smallholder farms but with little attention given to the farmer’s ability to provide the necessary feed supplies. Many of these expensive imported heifers had very poor fertility, with the program having little impact on national milk production targets. The blame was unfairly placed on the imported stock rather than their poor feeding management.

As discussed in Chapter 2, profitable dairy farming can be broken down into nine key task areas, which can be considered as steps in the supply chain of profitable dairy farming (see Figure 2.3 on page 22). Just as any chain is only as strong as its weakest link, each step in this supply chain must be properly managed. Weakening any one link through poor decision making can have severe ramifications on overall farm performance and hence profits.