

ASSESSING CURRENT DAIRY FARM MANAGEMENT USING KEY PERFORMANCE INDICATORS

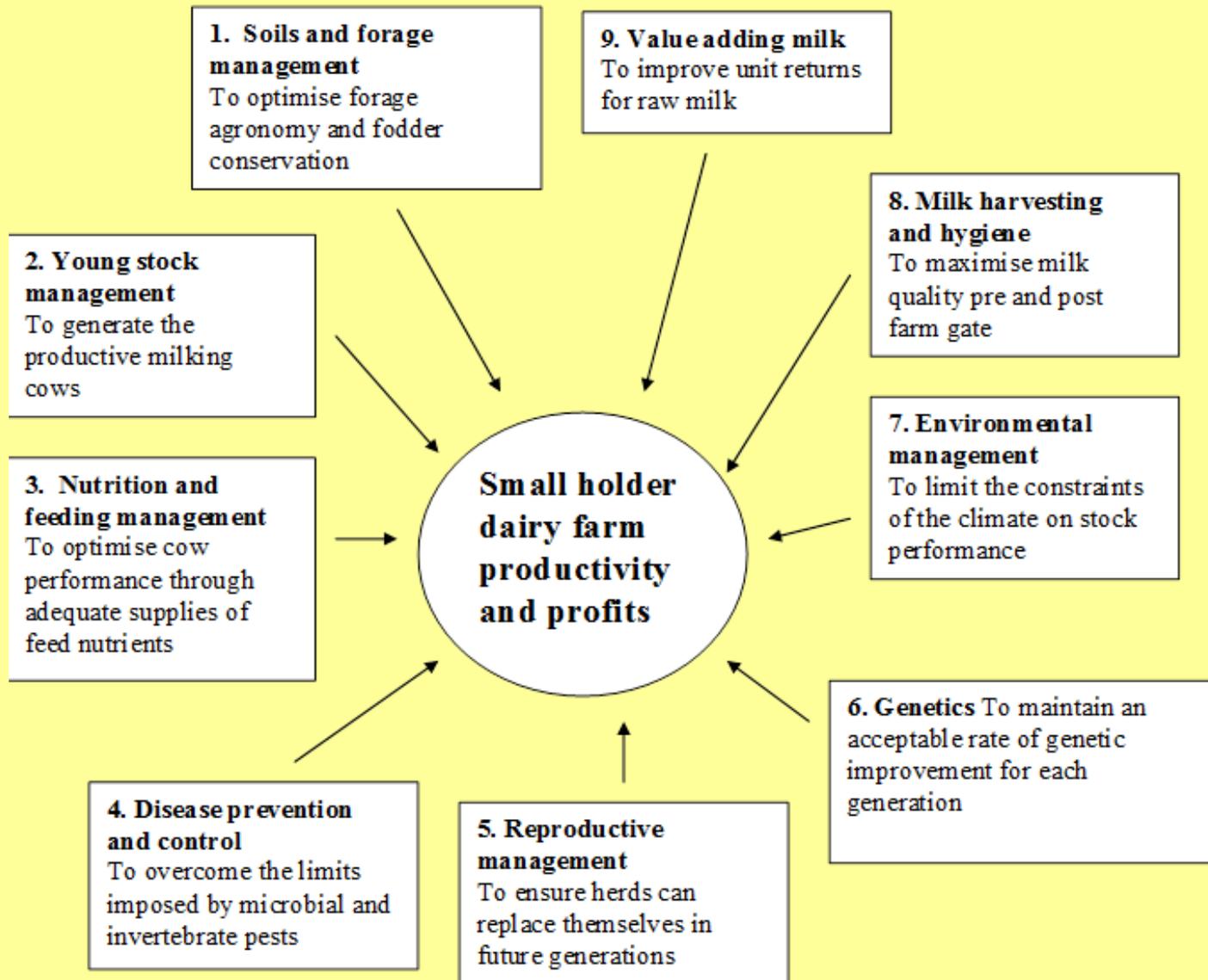


John Moran
Coordinator, Asian Dairy Network, APHCA
& Profitable Dairy Systems
Kyabram, Victoria
AUSTRALIA
Website: www.profitabledairysystems.com.au
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TOPICS COVERED

- This presentation is specifically about on-farm measures of cow and herd performance
- Key farm management activities
- Diagnosing farm profitability
 - 10 KPI's of profitability
 - 6 for feeding management
 - 4 for herd management
- Detail of some KPI's
 - Optimum stocking capacities
 - Some dairy herd dynamics
 - % productive cows in the herd
 - Pattern of milk production
 - Heifer rearing
 - Principles of feeding milking cows
- Cow milk yields
- Indonesian dairy GAP glossy brochure
- *Assessing current management*
- *Grading farmer skills*

FARM MANAGEMENT ACTIVITIES



HOW PROFITABLE IS YOUR FARM?

- Profit doesn't just happen; it must be planned for
- Many good indicators of the profitability of your farm
- More than half the costs on your farm are feed related
- Increasing profit can be achieved by:
 - Reducing these feed costs
 - Improving the efficiency of converting feed to milk
 - Improving herd performance through better feeding
- The following 10 questions can be asked on any farm
- These are the Key Performance Indicators we should all use

DIAGNOSING FARM PROFITABILITY 1

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 unit of feed energy or protein?

DIAGNOSING FARM PROFITABILITY 2

6. **Milk income over feed costs:** How do these compare with those of other farmers with good feeding management?

Herd management

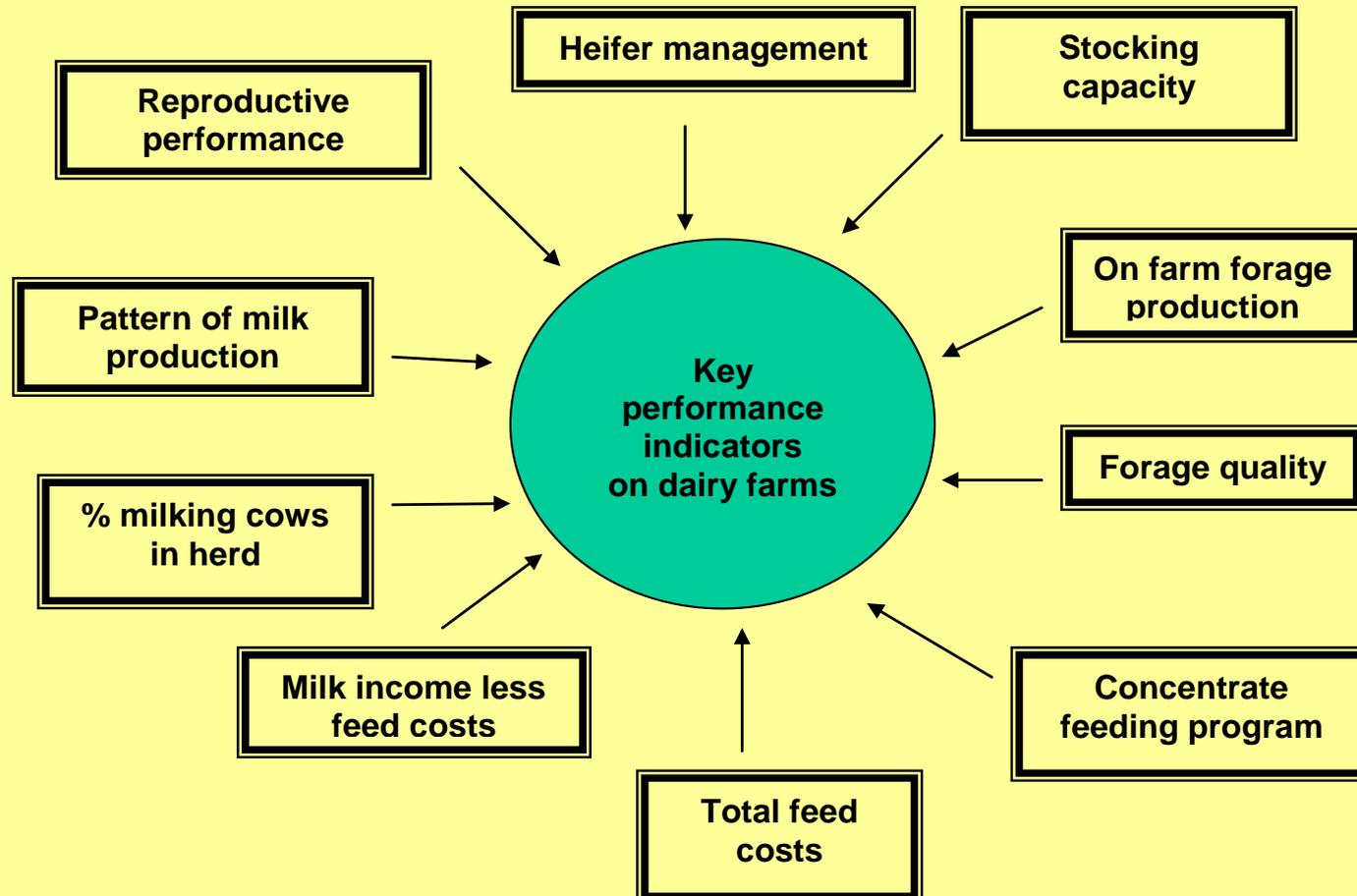
7. **% productive cows:** What % adult cows are milking? What % of milking cows in entire herd?

8. **Pattern of milk production:** What is the peak milk yield of the herd and what are their lactation persistencies (rate of decline from peak milk yield)?

9. **Reproductive performance:** How many days after calving do cows cycle? What is the submission rate and the conception rate to first insemination?

10. **Heifer management:** What is the pre weaning calf mortality and the heifer wastage rate from birth to second lactation? What is the age and live weight at first calving?

KEY PERFORMANCE INDICATORS



OPTIMUM STOCKING CAPACITIES

- Annual forage requirements for each animal type
 - Milking cow: 13,750 kg fresh or 2.06 t DM (71% of total)
 - Dry cow: 2700 kg fresh or 0.40 t DM (14% of total)
 - Heifer: 2920 kg fresh or 0.44 t DM (15% of total)
 - Adult milking cow unit: 19,3750 kg fresh or 2.91 t DM
- Typical farm should run no more than 7 to 8 cows per ha forage

Quality of forage management	Poor	Typical	Good
Forage yield			
t DM/ha/yr	10	20	30
t fresh/ha/yr	67	130	200
Milking units/ha forage	3.4	6.9	10.3
Adult cows/ha forage	4.0	8.1	12.1

OPTIMUM STOCKING CAPACITIES 1

- *To calculate the optimum stocking capacity:*
 1. *Assess farm forage management as poor v typical v good;*
 - *10 v 20 v 30 t DM/ha/yr with 15% DM content,*
 - *67 v 130 v 200 t fresh forage/ha/yr*
 2. *Excess forage is conserved for dry season feeding*
 3. *Adult cow milking unit is 1 cow & 20% of replacement heifer*
 4. *75% adult cows milking at any one time*
 5. *Forage feeding program is*
 - *Milking cows: 50 kg fresh (7.5 kg DM)/cow/day for 270 d*
 - *Dry cow: 30 kg fresh (4.5 kg DM)/cow/day for 90 d*
 - *Heifer: 20 kg fresh (3.0 kg DM)/cow/day for 24 mth*
 6. *Concentrates and purchased forage provide balance for target milk yield, hence not included in calculations*

% PRODUCTIVE COWS IN HERD

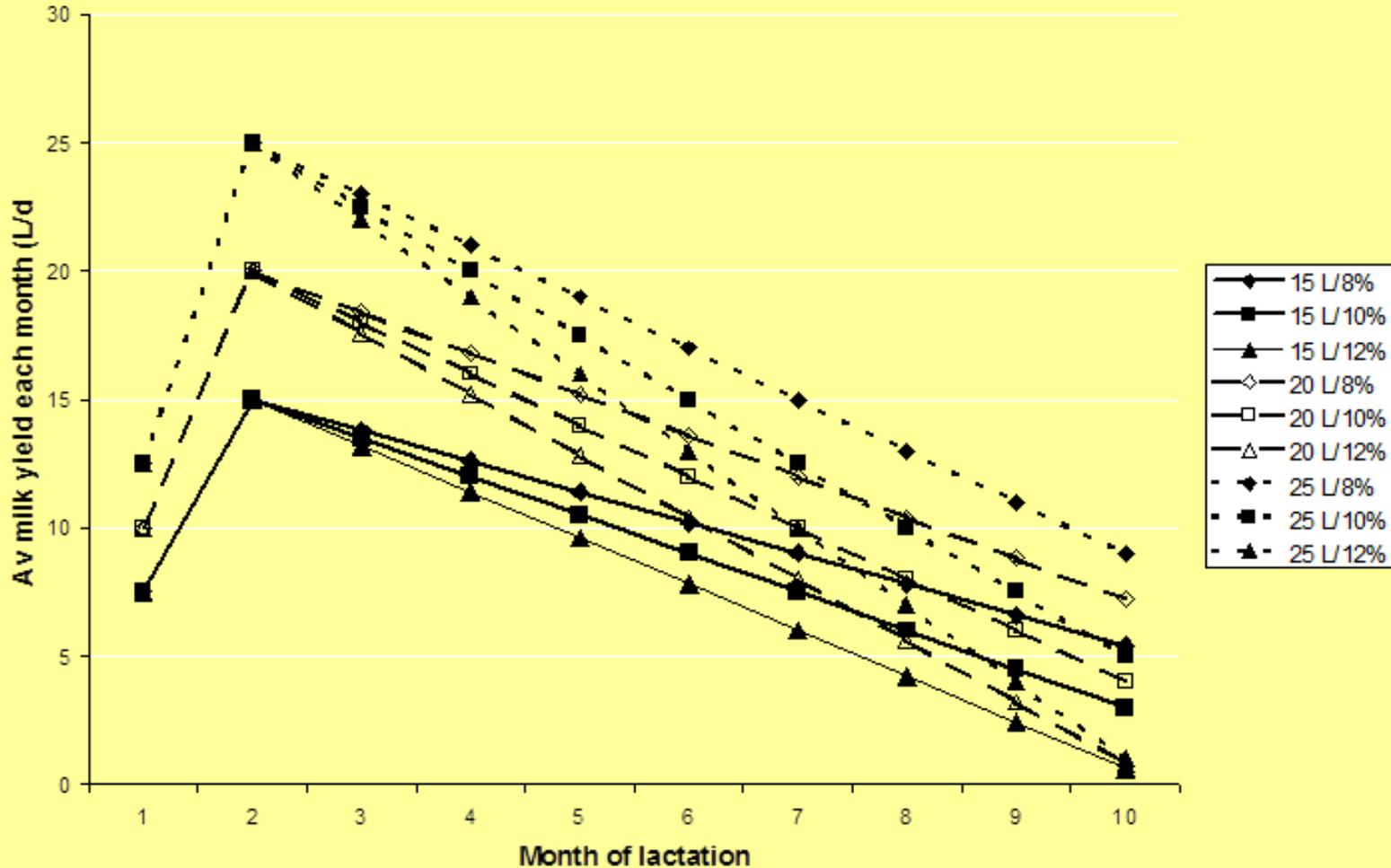
- Not all stock in any dairy herd generate income
 - Milking cows generate daily income
 - Dry cows do not & neither do heifers and calves
- It is then desirable to have as many milking cows as possible
- % milking cows in adult herd (including first calf heifers)
 - Depends on calving rate, calving interval, lactation length
 - 74%; maximum
 - 60-74%; acceptable
 - 50-59%; below average
 - 40- 49%; not good
- % milking cows in entire herd (incl calves & growing heifers)
 - Depends on calf/heifer mortality, age @ 1st calving, calving interval
 - 48%, maximum
 - 40-48%; acceptable
 - 35-39%; below average
 - 30-34%; not good

PATTERN OF MILK PRODUCTION

- The 2 major factors influencing total lactation yield are:
 - Peak lactation (within 6-8 weeks post calving)
 - Rate of decline from peak (or lactation persistency)
- Persistency quantifies average rate of decline in yield
 - In % per month from peak yield
 - The higher the number the faster the rate of decline
 - So the less milk produced
 - In Asia, 8% per month is achievable on well managed farms
 - But 8-12% is more realistic
- For 300 d lactation, total (& average) lactation yields:
 - 15 L/d peak & 8% persistency; 2980 L total (or 9.9 L/d average)
 - 15 L/d peak & 12% persistency; 2330 L total (or 7.8 L/d average)
 - 20 L/d peak & 8% persistency; 3970 L total (or 13.2 L/d average)
- See graph of lactation curves on following page

Milk yields each month for cows varying in peak yield and persistency

Legend shows peak yield (L/d) and persistency (% decline/mth)



PERSISTENCY OF LACTATION

- Effect of peak yield and persistency on total and average milk yields

Peak yield (L/d)	Persistency (%/mth)	Monthly milk decline (L/d)	Full lact yield (L)	Average milk yield (L/d)
15	8	1.2	2980	9.9
	10	1.5	2650	8.9
	12	1.8	2330	7.8
20	8	1.6	3970	13.2
	10	2.0	3540	11.8
	12	2.4	3110	10.4
25	8	2.0	4960	16.6
	10	2.5	4420	14.8
	12	3.0	3885	13.0

KPI's FOR HEIFER REARING

- Data for two herds with differing performance
- Herd A supplies 36% heifers
 - enough for higher culling rates, hence better genetic progress
- Herd B supplies only 15% heifers
 - insufficient to maintain herd numbers, let alone have genetic progress

Herd	A	B
Calving interval (m)	12	18
Calving rate (%)	85	65
Still born calves (%)	2	5
Calf mortality from 0-24 m (%)	8	20
Non pregnant heifers (%)	5	10
Heifer calves born (%)	36	15

MATHEMATICS OF HEIFER REARING

- *Assuming cows remain in milking herd for 5 years, 20-25% should be replaced every year*
- *What are the KPI's to ensure such replacement rate?*
- *Depends on:*
 - *No of milking cows that conceive*
 - *Those that produce a live calf*
 - *Those that are heifers*
 - *Those that survive until calving*
 - *Those that conceive as maiden heifers*
 - *Those suitable for milking cows*
- *Key factors are:*
 - *High age at first calving (>30 m) & long inter calving intervals (>15 m)*
 - *High calf mortality (> 10-15% ++)*

COW MILK YIELDS: A GUIDE TO CURENT FARM MANAGEMENT

- Range in rolling herd average milk yields on tropical SE Asian dairy farms

Milk yield (kg/cow/day)	Adequacy of dairy production system
5	Very poor feeding and herd management and low genetic merit cows
7	eg Indian buffalo farmers in Malaysia
9	Typical of many SE Asian smallholder and government farms, even with high grade Friesians
11	Gradual progression with grade and crossbred Friesian type cows to improved feeding, herd, young stock and shed management.
13	
15	
17	Milk yields of 15 kg/day are considered acceptable by many dairy advisers.
19	Potential level in lowland humid tropics following improved management of body condition throughout lactation
20	
25	High genetic merit cows in tropical highlands or lowland dry tropics with good overall management
30	Peak milk yields in herds with 25 kg/cow/day rolling herd averages
35	Unrealistic in SE Asia except where all major constraints to milk production have been overcome

COW MILK YIELDS: OTHER FACTORS TO CONSIDER

- *It is important to differentiate between rolling herd averages and peak milk yields*
- *Should also consider milk composition as indicators of feeding management:*
 - *low milk fat can indicate possible subclinical rumen acidosis*
 - *high milk protein can indicate good dietary energy intake*
 - *however milk lactose levels are fairly constant*
- *Excessive body condition is indicative of low protein diets, due to:*
 - *inability of cow to partition nutrients from body reserves to milk synthesis*
 - *poor fertility as cows cannot easily cycle hence conceive*
- *Very poor body condition is indicative of low energy intake as:*
 - *High genetic merit cows preferentially partition body reserves to milk synthesis*
 - *Cows will not cycle due to excessive weight loss*
- *Herd dynamics can also indicate adequacy of dairy farm management*
 - *Excessive number of dry non-pregnant cows can indicate very poor farm management*
 - *Low percentage of lactating adult cows can also indicate poor farm management*

PRINCIPLES OF FEEDING MILKING COWS

- In all dairy feeding systems, the golden rules are:
 1. Feed sufficient quality forages first
 2. Supplement with concentrates which are
 3. Formulated to overcome specific nutrient deficiencies
 4. To achieve target milk yields
- The usual “bottom line”
 - **Feed fewer cows better**

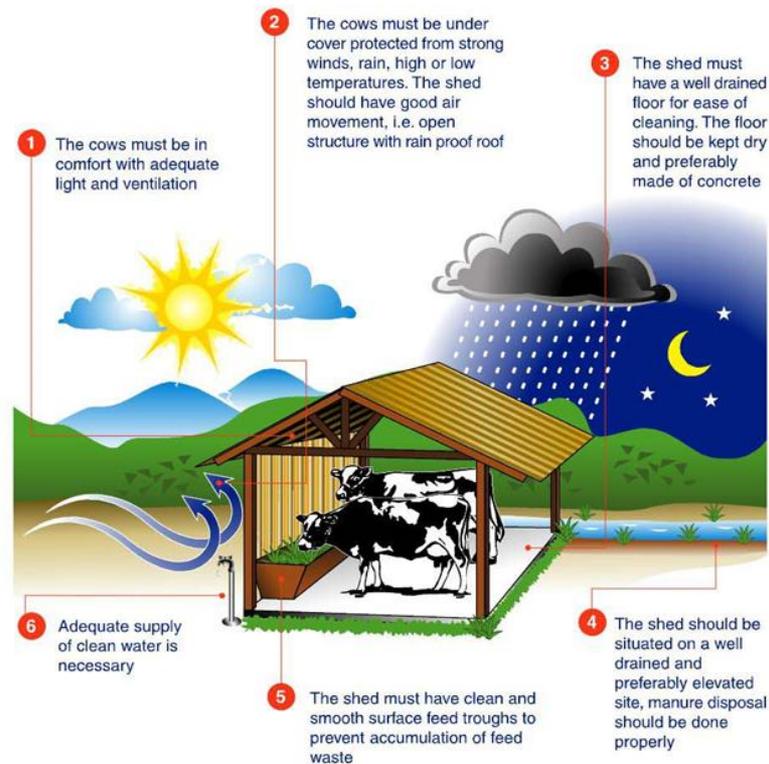
Tips For Proper Managing of Dairy Cows On Indonesian Smallholder Farms

(Edition 2)

All dairy cows have one thing in common, their milk production and quality are directly related to the way they are looked after, and the way they are milked. Caring and gentle treatment directly affects a cow's well-being, improving its milk production and general health.

A. Housing for Dairy Cows

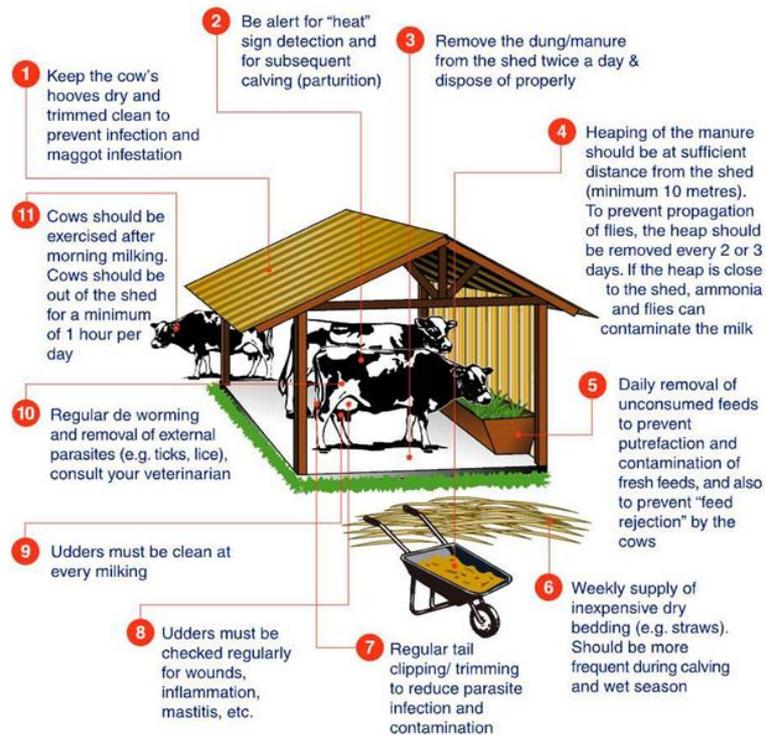
To ensure that the cows are in a proper environment resulting in higher milk production, the animals must be in proper shelters;



Tips For Proper Managing of Dairy Cows On Indonesian Smallholder Farms

B. Livestock Health and Hygiene

A good dairy farmer should be capable of detecting the early symptoms of ill-health in dairy cattle and to take steps to eliminate the sources of disease on the farm, e.g. contaminated water supply, infected buildings or roughages, etc. Other important factors are:

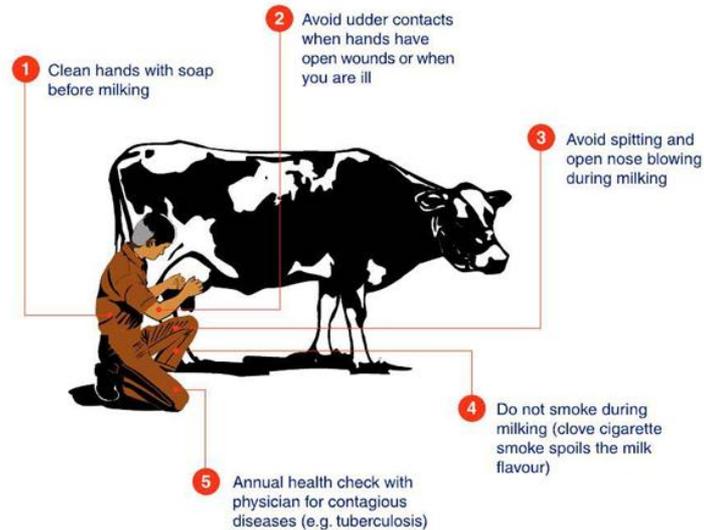


Tips For Proper Managing of Dairy Cows On Indonesian Smallholder Farms

C. Recommended Feeding

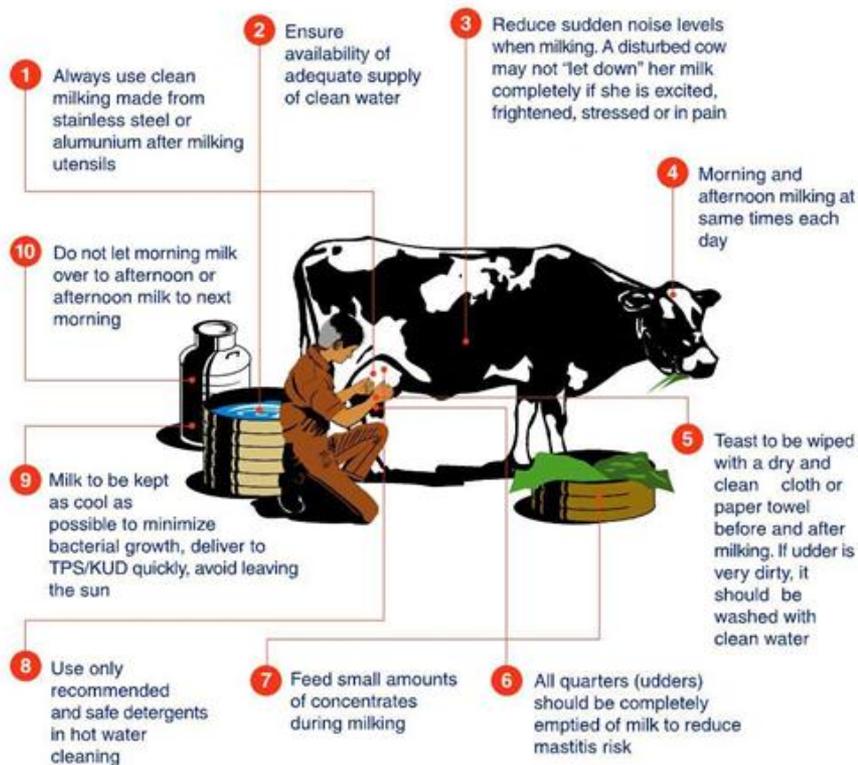
Follow the recommendations from the dairy training centre, i.e. a cow must eat the right quantity and the right quality of green roughage and concentrates, depending on the stage of development (calf, grower, heifer, pregnant, dry cow, bull) and milk production level (higher milk production needs more feeds) to maintain satisfactory milk production and ensure cow gets back in calf within 100 – 150 days of calving. Ideally milking cows should be fed 40 – 50 Kg fresh, high quality forage each day plus 1 kg quality formulated concentrate per 1 – 2 L milk. Wet or dry (ampas tahu, onggok, rice bran) by products can substitute for some of the concentrates so long as they.

D. Dairy Farmer Personal Hygiene



Tips For Proper Managing of Dairy Cows On Indonesian Smallholder Farms

E. Recommended Milking and Milk Handling



Important:

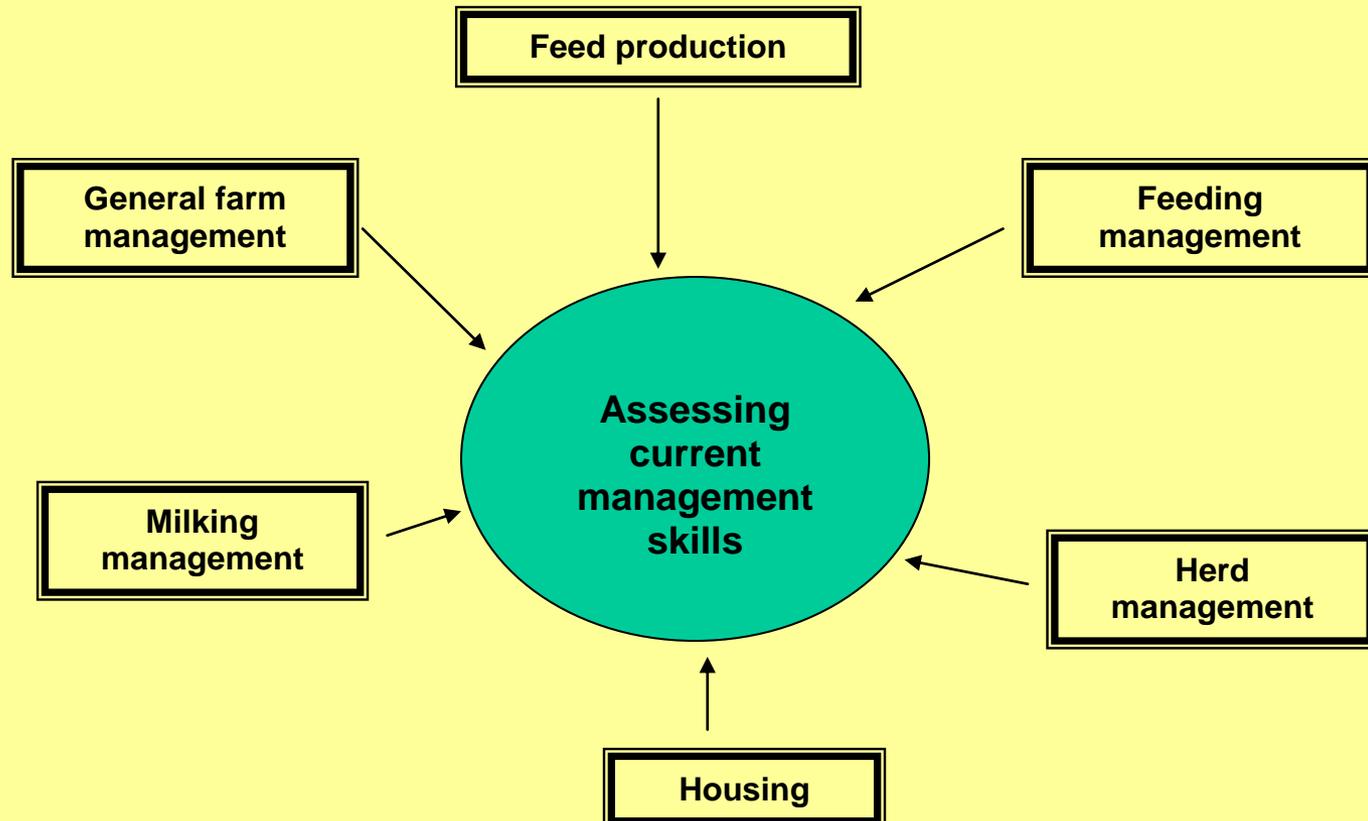
IF COWS SHOW SIGNS OF ILL-HEALTH, CONTACT IMMEDIATELY THE DAIRY CENTRE OR VETERINARIAN ON DUTY.

All these recommendations will ensure that the dairy cows will remain healthy, thus increase milk production and improve milk quality which result in higher income.

IMPORTANCE OF FARM MANAGEMENT

- Dairy stock require high level of farm management to grow well, remain healthy & become productive milking COWS
- Poor management before and after 1st calving can lead to
 - Low growth rates
 - Delayed breeding
 - Stock diseases
 - Even stock deaths
- It is important to assess current management
- Six categories of farm management practices
- Many of these assessments may be subjective

SIX FARM MANAGEMENT PRACTICES



1. FEED PRODUCTION

- *Size of forage area (in m²)*
- *Types of forages grown (grass, legume, cash crop byproducts)*
- *Quality of forage at harvest*
- *Fertiliser management (manure, inorganic)*
- *Forage harvest interval in wet & dry seasons (days)*
- *Fodder conservation practices (silage, hay)*
- *Year round supplies of fodder*
- *Number of stock on farm (cows, heifers, calves)*
- *Stocking capacity (too high, optimum or too low)*
- *Proportion of forages from home grown supplies*
- *Proportion of forages sources off farm*
- *Types of forages sourced off farm*

2. FEEDING MANAGEMENT

- *Does each animal have feeding trough and water trough*
- *Access to ad lib clean water*
- *Typical daily allocation of fresh forages (kg fresh/milking cow/d)*
- *Forage preparation (wilted, chopped)*
- *Hand or machine chopped*
- *Types of concentrates fed (formulated, by products)*
- *Knowledge of energy/protein contents*
- *Vitamin/minerals or other additives*
- *Allocation of concentrates (kg fresh/milking cow/d)*
- *Measures of cow milk yield (peak, current yield, days in milk)*
- *Pattern of milk prod (decline from peak)*
- *Body condition (at calving, mating, drying off)*
- *Cow live weights (mating, pre calving)*
- *Target weights and condition scores*

3. HERD MANAGEMENT A

- *Milk fed calves (colostrum, kg milk/d, weaning age, calf mortality)*
- *Source of milk (whole milk, calf milk replacer)*
- *Treatment for scours (antibiotics, electrolytes)*
- *Calf pens (type, cleanliness)*
- *Weaned heifers (conc feeding, mating age, weight at 1st calving)*
- *Visual assessment of condition of young stock*
- *Disease manⁿ (vaccⁿ, vet support and protocols, drug storage)*
- *Breeding man^t (heat detection, preg testing, calving interval, conception rate, selection of sires)*
- *Lameness (locomotion test)*
- *Access to free exercise area*
- *Mastitis (incidence, routine CMT, management & control)*
- *Heat stress (resp rate, outdoor access at night)*

3. HERD MANAGEMENT B

- *Typical days between calving and conception*
- *Typical age/live weight at first calving*
- *Typical calf mortality*
- *Structure of dairy herd (% prod cows in milking and entire herd)*
- *Record keeping (board in shed, note book, computer)*
- *What records are maintained*
- *Target setting (daily milk yield, long term herd size)*
- *Density of stock in shed*
- *Welfare issues (cow comfort, stock transport, any obvious problems)*
- *Surplus stock (disposal, grow out male stock)*
- *Other sources of dairy income (manure, excess fodder, biogas)*

4. HOUSING A

- *Shed design (floor slope & comfort, roof height, ventilation)*
- *Access to drinking water (adequate, continual)*
- *Climate control (temp/RH in shed v outside, sprinklers, fans)*
- *Incidence of obvious heat stress (>70 breaths per minute)*
- *Shed cleanliness (layout for cleaning, frequency of cleaning)*
- *Presence and thickness of rubber mats*
- *Cow stalls (tie stalls, free stalls, sufficient lounging area)*
- *Calf pens (crates or deep litter, cleanliness, access to calves)*
- *Grouping of milking cows based on stage of lactation*
- *Yard for heat detection and free exercise*

4. HOUSING B

- *Pen layout in shed (young stock, isolation/hospital pen)*
- *Location of milk fed calves pens (away from adult cows)*
- *Feed storage (separate to stock, bird/insect/vermin proof)*
- *Chopper for forages & mixer for concentrates*
- *Services (electricity, water, hot water)*
- *Effluent disposal (pit, frequency of emptying)*
- *Staff facilities (space/furniture for relaxing, lockable drug storage)*

5. MILKING MANAGEMENT

- *Separate milking area (good layout for machine milking)*
- *Cleanliness of milking area*
- *Hand milking (personal hygiene, milking method, milk bucket)*
- *Machine milking (cleanliness, replacement of rubber liners)*
- *Milk storage (milk cooler, stored in cool location)*
- *Milking hygiene (hot water, soap, sanitisers, stored upside down)*
- *Milk quality (Fat%, SNF or protein%, TPC, grade)*
- *Milk return (market outlets, ?/kg, relative to highest return)*

6. GENERAL FARM MANAGEMENT

- *Record keeping & office space*
- *Extent of record keeping (milk yields, farm inputs, labour)*
- *Systematic record keeping (accessibility, referred to in future)*
- *Extent of financial records (referred to in future, creditors)*
- *Knowledge of cost of production*
- *Knowledge of lactation cycle and persistency of milk production*
- *Short, medium, long term plans for farm*
- *Making good use of service providers (free, aware of potential)*
- *Efficiency of utilising employed and family labour*
- *Communication with paid labour*
- *Milk marketing (member of local coop)*
- *Considered value adding*
- *Subjective assessment of farm management skills*

GRADING FARMER SKILLS

- *To provide framework for assessing suitability of farmer to receive imported stock.*
- *This was developed in Central Java in Nov 2008*
- *Farmers graded as good v average v poor*
- *Objective criteria:*
 - *Milk yield/cow, kg/d (>12, 10-12, <10)*
 - *Milk return, Rp/kg (>3000, 2500-3000, <2500)*
 - *Fresh forage fed in wet season, kg/d(>30, 20-30, <20)*
 - *Record keeping (daily milk yield, AI, vet visit, vaccn, predicted calving date) writes down, good; remembers, average; forgets, poor.*
- *Subjective criteria:*
 - *Cow shed (size, ventilation, floor, hygiene, manure pit)*
 - *Herd management (cow weight & condition, health, young stock weight for age & condition, calving interval)*
 - *Milking management (equipment, hygiene, post harvest handling)*