Appendix 1: John Moran's golden rules of calf and heifer rearing

John Moran's ten golden rules of calf rearing

- Ensure each calf receives 4 L of top-quality colostrum within 6 hr of birth. Remember the 3 Qs for colostrum feeding (quality, quantity, quickly). Dip or spray the umbilical cord with iodine solution.
- Remember that feeding milk only once each day encourages faster rumen development, reduces rearing costs, ensuring fewer health problems and better post-weaning performance.
- Provide continual access to clean water and high-quality concentrates from day 1. Also provide a palatable roughage source, such as clean straw.
- Give individual attention to each calf and make time to check at least twice daily for signs of ill-thrift or sickness.
- Develop a disease action plan that includes good hygiene, isolation of sick calves, fluid replacement and TLC (tender loving care). Drugs should only be used a last resort, to complement a well-managed system.
- Milk rear calves in a clean, dry, well-ventilated shed, in groups no more than six animals, providing at least 1.5 m^2 per calf.
- Ensure good record keeping, because this will help pinpoint problems in your system.
- Minimise stresses by following set routines each day, reducing over crowding and 'keeping your troubles' out of the calf shed.
- People rear calves, systems don't! Do not rear calves if you don't enjoy it – find a specialist.
- A good calf-rearing system produces healthy, fully weaned calves weighing 90–100 kg at 12 weeks of age.

John Moran's golden rules of heifer rearing

The principles of good heifer rearing can be summarised in the following key points:

Targets

- Ranges of target live weights for ages with Friesian and Jersey heifers in well-managed herds are:

Age (months)	Friesian	Jersey
3 (fully weaned)	90–110	65–85
6	150–175	110–130
9	210–235	155–180
12 (yearling)	270–300	200–230
15 (mating)	330–360	245–275
18	390–420	290–320
21	455–485	335–365
24 (pre-calving)	520–550	380–410

- The optimum pre-calving live weight of heifers varies with their target milk yield as mature cows. In Friesians, this can range from 500 kg in herds averaging 5000 L/cow/yr to 560 kg in herds averaging 7000 L/cow/yr.
- During their first lactation, well-reared heifers should produce at least 80% of the full lactation milk yield of their mature herd mates.
- Heavier heifers must be fed well to achieve their economic benefits. There is little point in growing out heavy heifers then underfeeding them as milkers.
- Heifers should be managed to grow at an average of 0.7 kg/day from weaning to first calving, although this can vary during the 24 months from 0.5 to 1.0 kg/day depending on seasonal conditions.

Feeding

- Heifers should be provided with a good-quality diet for their first 12 months, containing 10–11 MJ/kg DM of energy and 12–16% protein.
- High-energy supplements are often required to achieve target growth rates of young heifers (up to 6 months of age), particularly during their first winter.
- Any hay or silage fed must be of good quality: at least 10 MJ/kg DM of energy and 14% protein.
- Be wary of feeding an unbalanced diet containing too much low-protein grain during the 3–9 months of age critical period, because excessive growth rates can lead to fatty udders and reduced milk potential.

Management

- If young stock are allowed to lose weight or grow very slowly for lengthy periods, they will not achieve their potential frame size.
- Low mating live weights can lead to calving difficulties 9 months later. Excessive feeding after mating can also result in dystocia. Dystocia reduces milk yield and increases the number of days to the second conception.
- Use artificial insemination and quality Friesian semen on well-grown heifers to provide replacement calves from first-calf heifers.
- Heifers should be regularly weighed, at least every 3 months, with wither heights recorded at each weighing.

Appendix 2: Conversion of units of measurements

1. Abbreviations

k	kilo or thousands
M	mega or millions
mm	millimetre
cm	centimetre
m	metre
ha	hectare
mL	millilitre
L	litre
J	joule
MJ	megajoule
min	minute
hr	hour
yr	year
mg	milligram
g	gram
kg	kilogram
t	tonne
lb	pound
ft	foot
$	dollar
c	cent
<	less than
>	greater than

2. Conversion of Imperial units to metric units

Length:	1 inch = 25.4 mm
	1 foot = 30.5 cm

	1 yard = 0.91 m
	1 mile = 1.61 km
Volume:	1 cu ft = 0.028 m^3
	1 pint = 0.57 L
	1 gallon = 4.54 L
	1 bushel = 36.4 L
	1 acre foot = 1.23 ML
Area:	1 acre = 0.40 ha
	1 sq mile = 2.59 sq km
Weight:	1 ounce = 28.3 g
	1 pound = 0.454 kg
	1 hundred weight = 50.8 kg
	1 long ton = 1017 kg (2240 lb)
Energy:	1 calorie = 4.19 joules
Density:	1 lb/ft^3 = 0.063 kg/m^3
Rate:	1 gallon/acre = 11.23 l/ha
	1 pound/acre = 1.12 kg/ha
	1 gallon/ton = 4.17 l/tonne
Pressure:	1 pound/sq in (psi) = 1.45 kPa (kilopascals)
Yield:	1 lb/ac = 1.12 kg/ha
Temperature:	1°F = ((9/5) × C) + 32
	1 degree F is equivalent to 0.56 degrees C
	50°F = 10.0°C
	60°F = 15.6°C
	70°F = 21.1°C
	80°F = 26.7°C
	90°F = 32.2°C
	100°F = 37.8°C
	110°F = 43.3°C

3. Conversion of US units to metric units

Volume:	1 gallon = 3.79 L
	1 bushel = 35.2 L
Weight:	1 hundred weight = 45.4 kg
	1 short ton = 907 kg (2000 lb)
Milk prices:	$10/hundred weight = 22.0 c/L
Forage maize yields @ 30% DM:	
	25 ton fresh weight/acre = 16.8 t DM/ha
Food energy:	1% unit TDN = 0.185 MJ/kg DM of metabolisable energy
	30% TDN = 3.7 MJ/kg DM of ME
	40% TDN = 5.5 MJ/kg DM of ME
	50% TDN = 6.4 MJ/kg DM of ME
	60% TDN = 7.4 MJ/kg DM of ME

70% TDN = 8.3 MJ/kg DM of ME
80% TDN = 9.2 MJ/kg DM of ME
1 MCal/lb = 9.22 MJ/kg
1 MCal/kg = 4.19 MJ/kg

4. Conversion of other specific country units to metric units

Most countries now use the metric units of measurement, but certain countries have their own historical units, which are still used by farmers and advisers.

China

Length:	1 chi = 33 cm
	1 li = 500 m
Volume:	1 gongsheng = 1 L
Weight:	1 jin = 500 g

Thailand

Length:	1 nui = 2.1 cm
	1 kheup = 25 cm
	1 sawk = 50 cm
	1 waa = 2 m
	1 sen = 40 cm
	1 yoht = 16 km
Weight:	1 baht = 15 g
	1 tamleung = 60 g
	1 chang = 1.2 kg
	1 haap = 60 kg
Area:	1 sq waa = 4 sq m
	1 ngaan = 400 sq m
	1 rai = 1.6 ha

Appendix 3: Currency converter for South and East Asia

Instead of expressing costs and returns in one currency (conventionally US dollars), this manual makes use of currencies from various South and East Asian countries. For the reader's benefit, rather than convert them all to a single currency in the text, the following currency converter can be used to compare their values in January 2012. More up-to-date conversions can be obtained via the internet from a currency converter located at <www.xe.com/ucc/>.

	AFN	AUD	BDT	CNY	INR	IDR	MYR	PKR	PHP	LKR	THB	USD	VND
AFN	X	49.6	0.589	7.66	0.91	5.31	15.3	0.534	1.09	0.424	1.52	48.3	2.30
AUD	0.020	X	0.012	0.153	0.018	0.011	0.309	0.011	0.022	0.009	0.031	1.035	0.046
BDT	1.70	84.2	X	13.00	1.54	90.90	26.0	0.907	1.86	0.553	2.59	69.50	3.90
CNY	0.130	6.52	0.077	X	0.119	0.069	2.00	0.070	0.144	0.047	0.200	6.30	0.299
INR	1.09	55.0	0.645	8.435	X	5.08	16.8	0.586	1.213	0.47	1.689	53.14	2.52
IDR	1.88	9.50	1.11	1.457	1.72	X	28.9	1.01	2.095	0.80	2.918	91.79	0.043
MYR	0.065	3.25	0.038	0.489	0.059	0.035	X	0.035	0.072	0.028	0.100	3.139	0.149
PKR	1.87	93.3	1.102	14.37	1.706	9.91	28.7	X	2.058	0.79	2.865	90.15	4.430
PHP	0.91	45.4	0.537	6.89	0.830	4.83	13.98	0.486	X	0.39	1.39	48.31	2.01
LKR	2.36	117.9	1.139	18.06	2.147	1.25	36.2	1.26	2.600	X	3.62	113.9	5.41
THB	0.655	32.6	0.386	5.018	0.597	0.347	10.00	0.35	0.718	0.260	X	32.61	1.50
USD	0.021	0.966	0.012	0.158	0.018	0.011	0.317	0.011	0.022	0.009	0.031	X	0.047
VND	0.435	21.59	0.256	3.334	0.397	0.231	6.67	0.232	0.478	0.184	0.66	21.1	X

Abbreviations

AFN: Afghanistan afghanis
AUD: Australian dollar
BDT: Bangladesh taka
CNY: China yuan renminbi
INP: India rupee
IDR: Indonesian rupiah × 100
MYR: Malaysian ringgit
PKP: Pakistan rupee
PHP: Philippines peso
LKR: Sri Lanka rupee
THB: Thai baht
USD: US dollar
VND: Vietnam dong × 1000

Appendix 4: Workshop expectation and evaluation forms

IMPROVED YOUNG STOCK MANAGEMENT ON TROPICAL DAIRY FARMS

Expectations of workshop

Date/Location: .....

1. Name: .....
2. Address: .....
3. Position held (farmer, dairy cooperative staff, milk collection centre staff, government adviser):

   .....

4. How many milking cows do you have?

   .....

5. What is your total number of dairy stock (calves, heifers, cows, bulls)?

   .....

6. How many litres of milk each day do **all** your milking cows produce (on average)?

   .....

7. How many dairy heifer and bull calves do you rear each year?

   .....

8. How many of these heifer and bull calves die each year?

   .....

9. What topics would you like to learn about in this workshop?

   a) .....

   b) .....

   c) .....

Please answer the following questions with a Yes or No.

	Yes/No
10. Do you have a good calf-rearing system?	
11. Do you have a good system for growing out your weaned heifers?	
12. Do you think farmers can improve their calf- and heifer-rearing systems?	
13. Do you think government advisers can help you to improve your calf- and heifer-rearing system?	

IMPROVED YOUNG STOCK MANAGEMENT ON TROPICAL DAIRY FARMS

Evaluation of workshop

Date/location: .....

Participant's name: .....

1. **Expectations:**
   What were your expectations of the workshop? Please list:

2. **Outcome:**
   What knowledge have you gained from this workshop?

3. **Relevance of training:**
   Please describe how this training will be of use to your work.

4. **Program delivery:**
   Please tick the appropriate space to indicate your views on the way the workshop has been delivered.

	Not enough	About right	Too much
Overall program			
Lectures and/or formal instruction			
Discussion			
Visits on site/fieldwork			
Reading matter provided			

5. **Services:**
   How do you rate the services provided for you? (Please tick)

	Excellent	Good	Fair	Not good
Training/trainers				
Training location				
Other				

6. **Other comments:** .....

   .....

7. **Overall assessment:**
   How do you rate this program in terms of its relevance to your role in the dairy industry? (Please tick)

	Excellent	Good	Fair	Not good
Personal relevance to you				

8. **What are the weaknesses of the workshop?**

.....

.....

.....

9. **What improvements can be made for future workshops?**

.....

.....

.....

10. **List the most important messages/information that you found most useful to you.**

.....

.....

.....

11. **List the least useful messages/information that you found least useful to you.**

.....

.....

.....

Please rank the following questions for their importance to you (1 to 5), where 1 is low/not much and 5 is high/a lot.

	Score
12. How do you rate farm visit?	
13. How do you rate small groups and reporting back sessions?	
14. How do you rate overhead presentations?	
15. How do you rate importance of improved young stock management skills in your job?	
16. How much have you improved your knowledge of young stock management skills?	
17. How well will you be able to apply knowledge to farmer situations?	
18. When should you do a refresher course? Please score 1 for 3 months; 2 for 12 months; 3 for 2 years; 4 for never	

Thank you for your participation in this workshop