

## 13. Appendix A Extra worksheets

### Worksheet 1: Cost of pasture per hectare calculation from Profit & Loss Statement

<b>Pasture production variable costs</b>	Fertiliser Irrigation Fuel & Oil Fodder Conservation Weed & Pest Control		A
<b>Pasture production overhead costs</b>	Pasture Renovation Repairs & Maintenance		B
<b>Total pasture costs</b>	(A+B)		C
<b>Area of pasture (ha)</b>	(grazed, irrigated, fertilised area)		D
<b>Pasture costs per ha</b>	(D÷C)		E



## Worksheet 2: Calculating the cost of pasture from quantities used

Name: _____		Year _____	
Total farm area _____		Grazed area _____	
Irrigation	Wheel water	<input type="text"/> ML	X <input type="text"/> \$ / ML = <input type="text"/> \$
	River water	<input type="text"/> ML	X <input type="text"/> \$ / ML = <input type="text"/> \$
	Bore water	<input type="text"/> ML	X <input type="text"/> \$ / ML = <input type="text"/> \$
	Other	<input type="text"/> ML	X <input type="text"/> \$ / ML = <input type="text"/> \$
<b>Total irrigation costs</b>			a <input type="text"/> \$
Fertiliser	Super, potash	<input type="text"/> t	X <input type="text"/> \$ / t = <input type="text"/> \$
	Nitrogen	<input type="text"/> t	X <input type="text"/> \$ / t = <input type="text"/> \$
	Lime	<input type="text"/> t	X <input type="text"/> \$ / t = <input type="text"/> \$
	Gypsum	<input type="text"/> t	X <input type="text"/> \$ / t = <input type="text"/> \$
	Spreading	<input type="text"/> t	X <input type="text"/> \$ / t = <input type="text"/> \$
<b>Total fertiliser costs</b>			b <input type="text"/> \$
Fodder conserv'n	Hay 5x4 bales	<input type="text"/> bales	X <input type="text"/> \$ / bale = <input type="text"/> \$
	Silage bales	<input type="text"/> bales	X <input type="text"/> \$ / bale = <input type="text"/> \$
	Pit silage	<input type="text"/> t	X <input type="text"/> \$ / t = <input type="text"/> \$
<b>Total fodder conservation costs</b>			c <input type="text"/> \$
Weed & pest	Total costs		d <input type="text"/> \$
Fuel & oil	Topping, etc.		e <input type="text"/> \$
Pasture renov'n	Seeds, soil prep		f <input type="text"/> \$
Fodder crops	Seeds, soil prep		g <input type="text"/> \$
<b>Total pasture variable costs</b>			(a+b+c+d+e+f+g) h <input type="text"/> \$
<b>Total pasture variable costs / ha</b>			(h ÷ Grazed Area) i <input type="text"/> \$ / ha



## Worksheet 3: Pasture consumption per hectare

Name: \_\_\_\_\_ Season: \_\_\_\_\_ Cows milked: \_\_\_\_\_

ESTIMATE PASTURE CONSUMED BY MILKERS			
Annual Milk Fat	<input type="text"/> kg	X 20 kg DM	= <input type="text"/> (a)
Dry Cows	<input type="text"/> head	X <input type="text"/> days away x 8 kg DM	= <input type="text"/> (b)
<b>Total feed consumed by milkers at home ( a - b )</b>			= <input type="text"/> (c)

PLUS PASTURE CONSUMED BY YOUNG STOCK AT HOME			
Rising 1 YO	<input type="text"/> head	X <input type="text"/> days at home X 3 kg DM	= <input type="text"/> (d)
Rising 2 YO	<input type="text"/> head	X <input type="text"/> days at home X 6 kg DM	= <input type="text"/> (e)
<b>Total pasture consumed by young stock ( d + e )</b>			= <input type="text"/> (f)

PLUS PASTURE THAT WAS CONSERVED ON FARM THIS YEAR BUT NOT USED ON FARM			
Include fodder made on home farm this season that was sold, carried over, or fed to cattle off farm			
Hay	<input type="text"/> tonnes	X 660	= <input type="text"/> (g)
Silage	<input type="text"/> tonnes	X 300	= <input type="text"/> (h)
<b>Total pasture conserved on farm but not used on farm (g) + (h)</b>			= <input type="text"/> (i)

LESS BROUGHT-IN FEED FED THIS YEAR			
Include quantity brought onto farm and fodder reserves carried over from previous season but used this year			
Grain or Pellets	<input type="text"/> tonnes as fed	X 1,000	= <input type="text"/> (j)
Hay	<input type="text"/> tonnes as fed	X 660	= <input type="text"/> (k)
Silage (Bale Pasture)	<input type="text"/> tonnes as fed	X 300	= <input type="text"/> (l)
Silage (Other*)	<input type="text"/> tonnes as fed	X <input type="text"/> *	= <input type="text"/> (n)
<b>Total brought-in feed ( j+k+l+m+n )</b>			= <input type="text"/> (o)

EFFECTIVE MILKING AREA IN HECTARES	
	= <input type="text"/> (p)

CALCULATION OF PASTURE CONSUMED PER HECTARE			
<b>Total pasture consumed</b>	= (c+f+i - o)	= <input type="text"/> (q)	kg DM
<b>Pasture consumed/hectare</b>	= (q ÷ p)	= <input type="text"/> (r)	kg DM/ha

\*Select appropriate silage conversion factor: maize silage=300, wilted pit silage=260, direct-cut pit silage=155.



**Worksheet 4: Leaf appearance interval and rotation**

Tiller:	1	2	3	4	5	6	7	8	9	10
Leaf stage (leaves since grazing)										

<b>A</b>	(Avg the 10 tillers above)	Average leaf stage in paddock	<input type="text"/>	leaves
<b>B</b>		Days since paddock grazed	<input type="text"/>	days (ie. current rotation length)
<b>C=B/ A</b>		∴ Past average leaf appearance interval	<input type="text"/>	days

<b>D</b>		Your target pre-graze leaf stage	<input type="text"/>	leaves
<b>E=CxD</b>		Grazing rot'n length needed to get target leaf stage	<input type="text"/>	days

<b>F</b>		Anticipated LAI for next leaf	<input type="text"/>	days
<b>G=DxF</b>		New target rotation length	<input type="text"/>	days

**Worksheet 5: Calculating the number of feeds in various size paddocks**

Total grazing area for next rotation (ha)	Rotation length required (days)	Average 24-hour allocation (ha)	Area for each feed (assuming two feeds per day) (ha)	Paddock size (ha)	No. of feeds in paddock
<b>A</b>	<b>B</b>	<b>C = A ÷ B</b>	<b>D = C ÷ 2</b>	<b>E</b>	<b>F = E ÷ D</b>



**Worksheet 6: Pasture offered to cows in different months**

	A	B	C (A÷B)	D	E (C × D)	F	G (E ÷ F)
	Total grazing area (ha)	Rotation length (days)	24-hour allocation (ha)	Pasture on offer per ha (kg DM/ ha)	24-hour pasture offered (kg DM)	Number of milkers	Pasture offered per cow each day (kg DM)
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

**Worksheet 7: Calculation of total feed requirement for different cows**

Use	Cow 1	Feed req'mt (kg DM)	Cow 2	Feed req'mt (kg DM)	Cow 3	Feed req'mt (kg DM)
Maintenance	kg LWT		kg LWT		kg LWT	
Pregnancy	months		months		months	
Walking to/ from dairy	km,		km,		km,	
Milk production	litres		litres		litres	
Condition gain/ loss						
<b>TOTALS</b>						



Worksheet 8: A feed plan

	Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual totals
d	Days in month	31	31	30	31	30	31	31	28	31	30	31	30	
B	No. milkers on grazing area													
C	Target feed/milker (kg DM/day)													
E	No. dry cows on grazing area													
F	Target feed/dry cow (kg DM/day)													
	Total feed req'ts/day (kg DM)													
	$G=(B \times C)+(E \times F)$													
	Total req'ts/month (t DM)													
H	$H=G \times A/1000$													
I	Grazing area (ha)													
J	Daily pasture consumed (kg DM/ha)													
	Monthly pasture consumed (t DM)													
K	$K=A \times I \times J/1000$													
	Monthly pasture surplus/deficit (t DM)													
L	$L=K-H$													
M	Target APC (kg DM/ha)													
N	Supp'tmnts fed (t DM)													
O	Fodder cons'vd (t DM)													
P	Start APC (kg DM/ha)													
	End APC (kg DM/ha)													
	$P=prev APC+(L+N-O)/I \times 1000$													



**Worksheet 9: Capturing the spring surplus**Maintenance  kgPregnancy  kgCondition score  kgMilk  kgTOTAL (a)  kg DM/cow/day (daily cow requirement)Stocking rate =  number of milkers  $\div$   hectares available for grazing= (b)  cows/ha (stocking rate per hectare)Daily cow requirement (a)  x  stocking rate per ha(b)= (c)  kg DM/ha/day(daily herd requirement per ha)(c)daily herd reqs   $\div$   growth rate x  ha available for grazing=(d)  hectares for the milkersTotal grazing hectare  -  hectares for the milkers(d)=  hectares available for silage or hay



## 14. Glossary and abbreviations

Terms in this glossary are defined in the context of their use in this manual.

% CP	the proportion of the dry matter in a feed that is crude protein.
% digestibility	the proportion of the dry matter in a feed that will provide digestible energy.
% DM	the proportion of dry matter in a feed.
% moisture	the proportion of water in a feed.
% neutral detergent fibre	the proportion of the dry matter in a feed that is neutral detergent fibre.
/	per.
°C	degrees Celsius.
amino acid	the building block of proteins; a cow requires 25 different amino acids for normal metabolic functioning.
APC, average pasture cover	the average amount of pasture on the farm, measured in kg DM/ ha.
as-fed	feed with its moisture still in it. <i>See also</i> dry matter.
body condition	energy stored by cows as fat.
Ca	calcium.
canopy closure	when pasture is tall and or dense enough to create full shade, and leaves yellowing, at the base
carbohydrates	the main source of energy in a cow's diet.
cm	centimetre.
condition	<i>See</i> body condition <i>or</i> condition score.
condition score	objective visual assessment of a cow's body condition on a scale of 1 (emaciated) to 8 (obese).
consumption	the amount of feed, measured in kilograms or tonnes of dry matter, actually eaten by cows. It is the pasture offered multiplied by the utilisation percentage.
CP	crude protein.
crude protein	a measure of all the protein in the diet.
Cu	copper.
digestibility	the proportion of the dry matter in a feed that gets digested; it is the difference between what is eaten and what comes out as manure.

DM	dry matter.
DM/ ha	dry matter per hectare.
DM/ ha/ day	dry matter per hectare per day.
dry matter	the proportion of any feed remaining after all the water has been taken out.
energy	the part of a feed that is used as 'fuel' in carrying out the cow's bodily functions.
energy-dense	having a large amount of metabolisable energy per kilogram of dry matter.
Fe	iron.
fibre	the cell wall, or structural material, in a plant made up of (among other things) cellulose, hemicellulose, and lignin.
g	gram(s).
ha	hectare(s).
ha/ day	hectare(s) per day.
joule	a unit of energy; one calorie equals a bit more than 4,000 joules.
K	potassium.
kg	kilogram(s).
kg DM	kilogram(s) of dry matter.
kg DM/ ha	kilogram(s) of dry matter per hectare.
kg DM/ ha/ day	kilogram(s) of dry matter per hectare per day.
km	kilometre(s).
L	litre(s).
L/ day	litre(s) per day.
leaf appearance interval	the time in days between the appearance of one leaf and the next.
lignin	the indigestible part of plant fibre, in the cell walls.
liveweight	weight of live cow, measured in kilograms.
LWT	liveweight.
maintenance requirement	the energy needed for essential body functions, such as blood circulation, breathing, keeping warm or cool, digestion, and tissue repair.
ME	metabolisable energy.
megajoule	millions of joules.
metabolic activities	for an adult cow, maintenance, milk production, activity, pregnancy, and weight gain; for an immature cow, also growth.

metabolisable energy	the amount of energy provided by a feed after deducting energy lost to faeces, urine, heat, and gas production; it is the energy available to be used by the cow for her metabolic activities. <i>See also</i> digestible energy.
metabolism	a general term for all chemical activities of living organisms; it includes respiration, fermentation, and repair of body tissues. <i>See also</i> metabolic activities.
Mg	magnesium.
mg	milligram(s).
mg/ kg	milligram(s) per kilogram.
MJ	megajoule(s).
MJ ME/ kg DM	megajoules of metabolisable energy per kilogram of dry matter.
mm	millimetre.
Mn	manganese.
Mo	molybdenum.
N	nitrogen.
Na	sodium.
NDF	neutral detergent fibre.
neutral detergent fibre	a measure of all the fibre (hemicellulose, lignin, and cellulose) in a feed; it indicates how bulky the feed is.
P	phosphorus.
partitioning	the metabolic division of energy intake (above the maintenance requirement) between liveweight gain and milk production.
per	in each or for each.
per cent	in or for each one hundred; for example, 5 per cent means 5 in (or for) each 100: if the interest rate on a loan is 5 per cent a year, you pay \$5 a year for each \$100 not yet repaid, or if the dry matter per kilogram is 5 per cent, then 50 grams in each kilogram (1,000 grams) is dry matter.
percentage	the rate or proportion per hundred.
pH	a measure of acidity or alkalinity on a scale from 1 (extremely acid) to 14 (extremely alkaline).
post-graze point	the state the pasture is in just before it is grazed. It includes such concepts as “how hard to graze”, “residue”, “residual”, “stubble height”, “grazing intensity”, “grazing severity”, or “severity of defoliation”.

pre-graze point	the state the pasture is in just before it is grazed. It includes such concepts “readiness for grazing”, “paddock spell time”, “grazing frequency”, “grazing rotation length”, “grazing interval”, or “grazing round”
protein	the material that makes up most of the cows body (muscles, skin, organs, blood); it also is part of milk.
quality	in relationship to feeds, an indication of the level of energy and digestibility.
rotation length	the time in days between two successive grazings of the one paddock.
S	sulphur.
Se	selenium.
shift time	the time the cows are allowed to graze an area before being shifted to a new area. Also known “grazing duration”.
soluble carbohydrates	include the sugars and simple carbohydrates, which are quickly dissolved and digested in the rumen, are non-fibrous, and are found within the plant cell.
soluble protein	nitrate, peptides, and amino acids (the building blocks of protein) which are quickly dissolved and digested in the rumen.
substitution	the extent to which a supplement replaces pasture in the diet.
supplement	a feed or product added to the cow’s diet to increase or decrease some dietary component, such as energy, protein, fibre, vitamins, or minerals.
t	tonne(s).
utilisation	the proportion of offered pasture that is eaten by cows, expressed as a percentage.
Zn	zinc.