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HAND BOOK: FARMER MANUAL

DROUGHT RESILIENT DAIRY FARMING

Dry Zone

ipid
Institute for Participatory Interaction in Development

UWU
Uva Wellassa University

The study was conducted by ***UWU- IPID,*** sponsored through the EU-funded ***Enhancing Gender inclusive Socio-economic Development (EGSD)*** Project under the aegis of the ***Oxfam Sri Lanka.***

This booklet was published through ***Australian AID*** funded ***GISED*** project.

PURPOSE

This manual was prepared exclusively for both small and medium scale dairy farmers who are:

- Practicing tethering during the daytime or stall-feeding during the day
- Facing feed shortage during drought period
- Rearing tropical crossbred or non-descriptive cattle
- Spending minimum amount of money for investment
- And facing those typical problems such as low production, infertility, poor infrastructure etc.

Considering these situations, this Manual has been produced to alleviate these issues and the practices shown here are;

- Easy and practical.
- At minimum cost.
- Mostly things you can do with what you could find easily.

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PREFACE

Sri Lanka is divided into three zones based on agro-climatic conditions. The Dry Zone covers the whole Northern and Eastern areas of the country and some parts of the South and West consisting of 4,171,781 hectares of the total land area. Dairy cattle farming practised in the dry zone accounts for approximately 55% of the cattle population and the dairy cattle breeds reared in the dry zone mainly comprised of indigenous cattle, Zebu cattle and their crosses. The dry zone contributes more than 64% of the national milk production during the past decades without many financial and infrastructure interventions and there is a huge potential to increase milk production in these areas. However, there are several limitations, which caused the dry zone to underperform in milk production such as low rainfall, high evapotranspiration rates, seasonal availability of good quality feed for dairy animals, heat stress during day time, etc. Therefore, both lactation and reproductive performances of dairy cows in dry zone areas are low during the dry season or drought periods of the year. Therefore, it is essential to adopt coping strategies by dairy farmers in this area to mitigate such challenges during the drought period. Consequently, there is a need of creating coping resources to maintain resilience in drought conditions by the dairy farmers in the dry zone of Sri Lanka.

Recently, there were several initiatives to develop dairy farming in Sri Lanka. However, little has been done to document the drought-resilient dairy farming in the dry zone of Sri Lanka. This farmer manual, which is funded by European Union (EU) is a contribution by Enhancing Gender Inclusive Socio-Economic Development in Uva and Central Provinces (EGSD) Project towards articulating evidence and analyses into a model proving that drought-resilient dairy farming is a viable and profitable economic activity in dry zones. It offers useful technical tools to the smallholder and medium scale dairy farmers in Sri Lanka to fulfil the information gap on the adaptation of drought-resilient dairy farming techniques into the dairy industry.

Therefore, this manual will significantly help to promote drought-resilient dairy farming as a viable and profitable economic activity in dry zones of Sri Lanka and to increase the family income of the smallholder dairy sector and that of the nation at large.

HOW TO USE THIS MANUAL?

This guidebook is designed to guide dairy farmers who are involved in dairing as a small or medium scale business in Sri Lanka. Specifically, this manual will provide helpful tools for a dairy operation, which runs under extreme climate events such as seasonal variations or prolonged drought. Prolonged drought led to increased mortality of calves and cows, increase in diseases, decrease in milk production levels, poor reproduction etc. and during this season the pastures dried up and the abundance of less nutritious grasses. This guidebook presents various strategies to cope with these challenges, including the management of feed and water while reducing the heat stress of the animals.

This guide will also serve as a useful document for students, undergraduates and interested parties to gain essential information as well as practical advice and suggestions on dairy cattle management. The tools included in this manual will guide extension workers, who want to support dairy farmers to adopt coping strategies for climate-resilient dairy farming and thereby make a transition from subsistence to commercial or semi-commercial farming. Dairy farmers will be able to get the most benefit from their investment and keep their valuable animals healthy and productive during the drought period of the year.

This training manual is comprised of 14 tools that will help the farmer to move step by step towards running a profitable dairy business continually throughout the year including the dry/drought periods. These tools will help farmers to acquire essential knowledge and skills on feeding management, feed conservation, reproduction, health management, heat stress management, general farm management and financial management. Farmers, who wish to adopt these tools for their dairy business would be able to run, drought-resilient dairy farming in a profitable manner.

CONTENTS

NO. 1

GIVE YOUR COWS WHAT THEY NEED!

WHAT DO YOU GIVE THEM AND WHAT FOR?

No	Feedstuffs:	Given for:	
		Maintenance	Milk Production
		Negligible ⬅➡ Important	Negligible ⬅➡ Important
1	Water		
2	Grass		
3	Concentrates*		
4	Minerals		

(*) Grain-based feeds such as Coconut Poonac, Cattle Feed, Rice Polish, etc.

*If your feed has "60%" TDN your animals can get 600 g TDN (of energy) from 1 kg of feed.

**If your feed has "20%" DCP your animals can get 200 g of protein from 1 kg of feed.

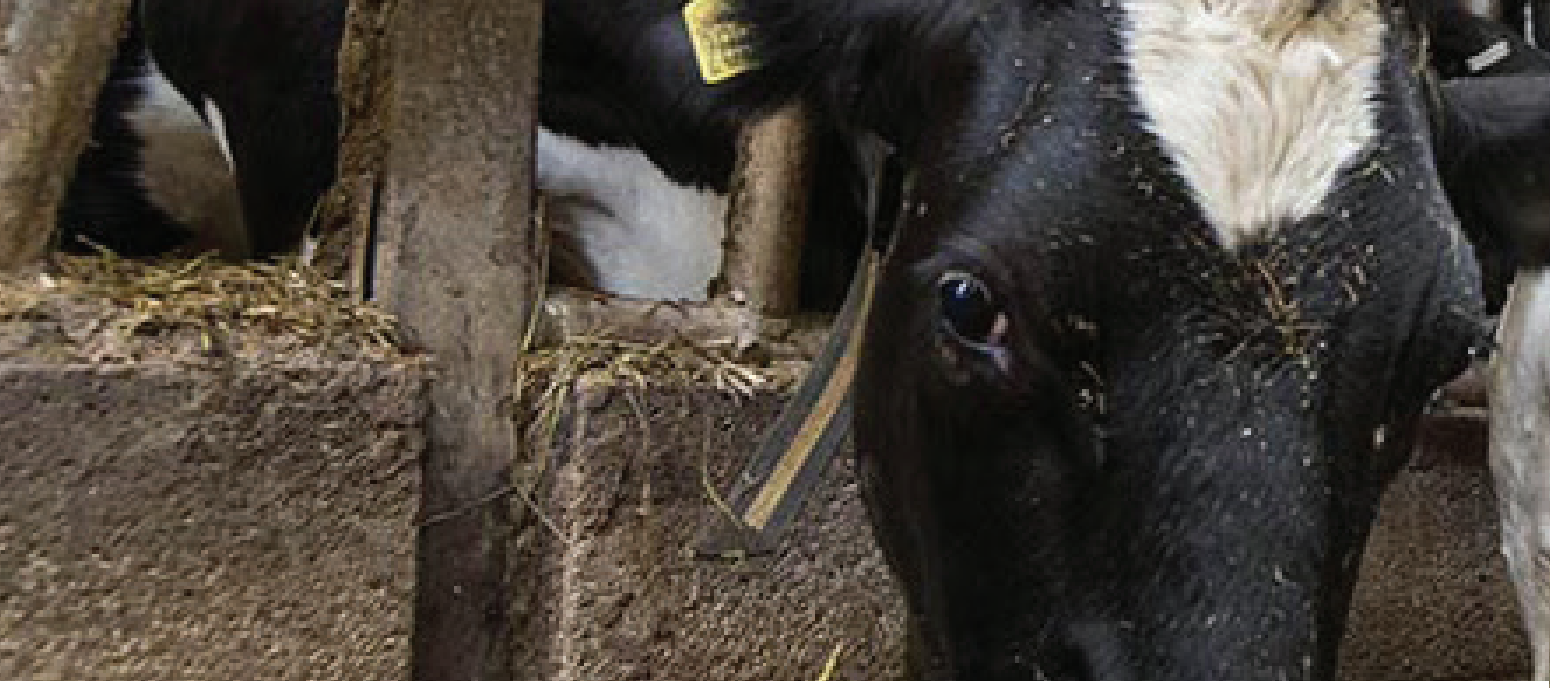
What are the major parameters used to measure the nutritive values of feeds?

TDN*: Total Digestible Nutrient (how much energy your animals can get from a feed).

DCP:** Digestible Crude Protein (how much protein your animals can get from feed).

The content of mineral elements in 100g of the feed (%).

TDN, DCP and Minerals are belong to Dry Matter (DM) component of the feed. The rest is water.



HOW MUCH DRY MATTER (DM) SHOULD A MILKING COW GET?

DM intake* = 6kg + 1% of weight of the cow + 20% of milk yield

e.g. 300 kg cow with 10 kg milk yield, feed intake is:

$$6\ \text{kg} + \frac{300\ \text{kg}}{100} + \frac{10\ \text{kg}}{5} = 11.0\ \text{kg}$$

HOW MUCH CONCENTRATE SHOULD YOU GIVE YOUR COW?

- Concentrates should be supplied to meet the nutrients (TDN and DCP) shortage of feeding grasses to the cow.
- Concentrate requirement should be calculated based on the amount of TDN, DCP and DM content available in that feed.
- Consult your Vet/LDI to know the correct amount of concentrate for your cow.

EVERY DAY, HOW MUCH FEED SHOULD YOU GIVE?

As a rule of thumb, 10% of the body weight of the cow.

18-20% of DM intake should be fiber and grasses are a rich source of fiber*.

Please don't forget to give them Mineral as indicated in the instructions!

And it is also good to give them Molasses-Urea blocks!

HAVE YOUR CRITERION!

Based on breeds of your cows and your feeding management, you should establish a minimum production level especially, at the peak (2 to 3 months after calving).

Then, if you find cows not meeting this level, you may replace them with better ones. The following levels are our criteria:

Breed	Minimum Production at the Peak (2 to 3 months after Calving):
Crossbred	8 liters per day
Jersey Type	10 liters per day
Friesian Type	12 liters per day

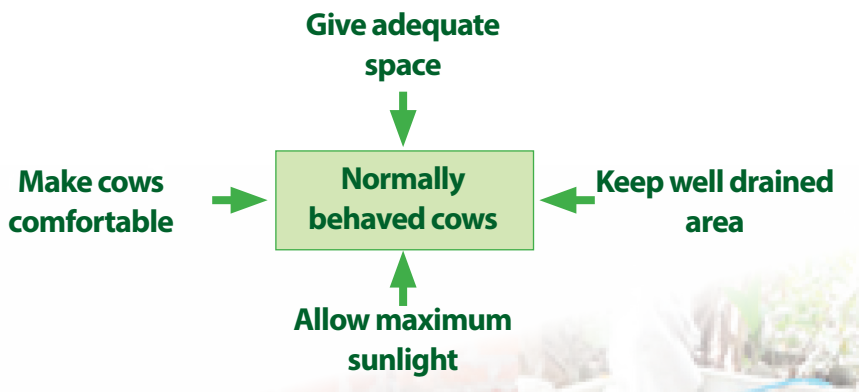
NO. 2

BUILD A SIMPLE COW SHED!

WHY SHOULD YOU BUILD A COW SHED?

To protect cows from extreme heat during dry season.

HOW SHOULD YOU BUILD A COW SHED?



HOW SHOULD YOU CLEAN YOUR COW SHED?

- Scoop the dung and dispose.
- Clean the shed with fresh water regularly.

This will prevent diseases such as laminitis and mastitis.

NO. 3

PROVIDE SHADE DURING DAYTIME!

HOW TO PROVIDE SHADE:

- Build cattle sheds with the roof high enough to prevent radiation heat onto cows (around 10-14 ft.)!
- Make room for the cows to go to shade during tethering if necessary
- Have enough trees* in the grazing areas or build temporary shade!

Too many animals underneath a limited shade are going to share their body heat.

***Remember it is better to have no shade than too little shade!**

Allow cows to go to shade during the day when necessary.

- **Why?**

  It reduces the heat stress of cows and make them comfortable.

- **Why it is important?**

  Heat stressed cows eat less and gain less weight, resulting in lower milk production.

NO. 4

FEED YOUR COWS "TOTAL MIXED RATION" (TMR)!

Feed a Total Mixed Ration (TMR) to dairy cows to increase the milk yield.

WHAT IS TMR?

A TMR is a method of feeding cows that combines feeds formulated to a specific nutrient content into a single feed mix.

WHY TMR?

- Increases milk production.
- Increases milk fat content.
- Reduces feed wastage.
- Can provide nutrient-balanced ration.
- Can feed small amounts of low quality grasses.

Always follow advices of Livestock Development Instructors / other officers of your area to formulate TMR based on the breed, weight, health conditions, etc. of animals.

WHAT COULD BE IN TMR?

- Grasses (Guinea Grass / CO-3)*
- Concentrates (Rice Bran / Dhal Husk / Beer pulp/Poonac / Cattle Feed)
- Mineral mixture

You can add or replace feed materials in this TMR with what is abandoned in your area (Ex: Coconut poonac, Beer pulp, Molasses, etc.)

A TMR will contain roughly 50 to 60% grasses and 40 to 50% concentrates.

***Grasses should be chopped into desirable size (20-30 mm)**

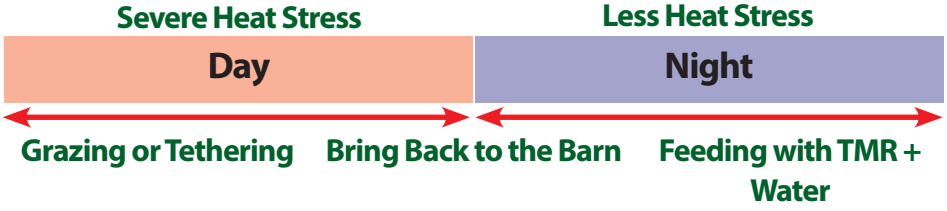
NO. 5

FEED YOUR COWS DURING NIGHT-TIME!

WHY NIGHT-FEEDING?

- Ideal method for dry and hot period of the year.
- Both feed and water intakes are high.
- High energy utilization for milk production.
- More milk yield.

Feed cows with total mixing ration (TMR) at the night

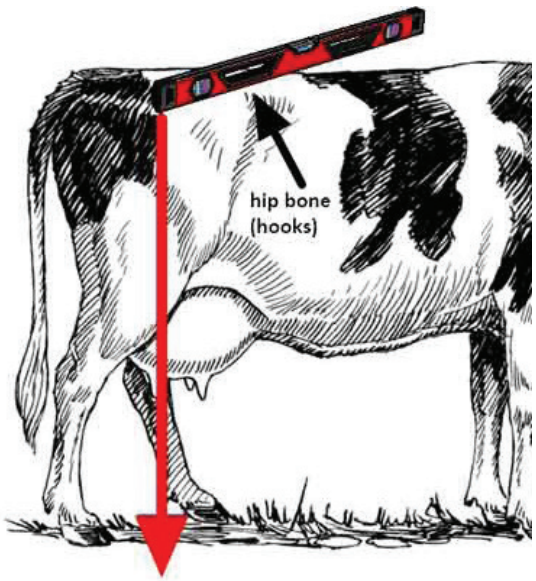


NO.
6

MEASURE WITHER HEIGHT!

WHY CHECK WITHER HEIGHT ?

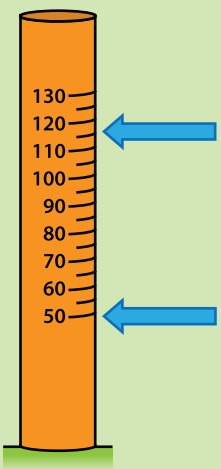
As you know, body weight is the most important figure. In practice, however, it is impossible to weigh a calf at small holder farms without a measuring tape. Thus, since the Wither Height is proportionate to body weight, you can use it as an indicator for calf growth, to decide feed requirement, decide date of mating, etc. By checking the wither height regularly, you could know if they are growing well or bad.



HOW DO YOU MEASURE?

1) USE WEIGH BAND

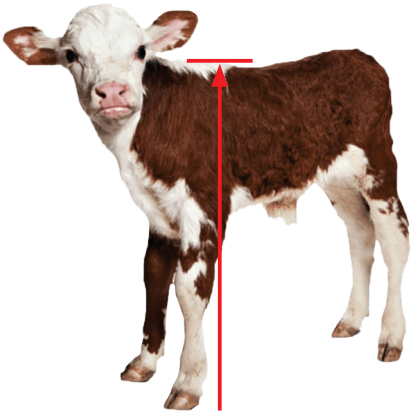
2) MARK GRADUATION



Mating Height for Frisian (120 cm)

Mating Height for Jersey (110 cm)

By simply using a ruler, you can mark on a pillar or a wall of the barn

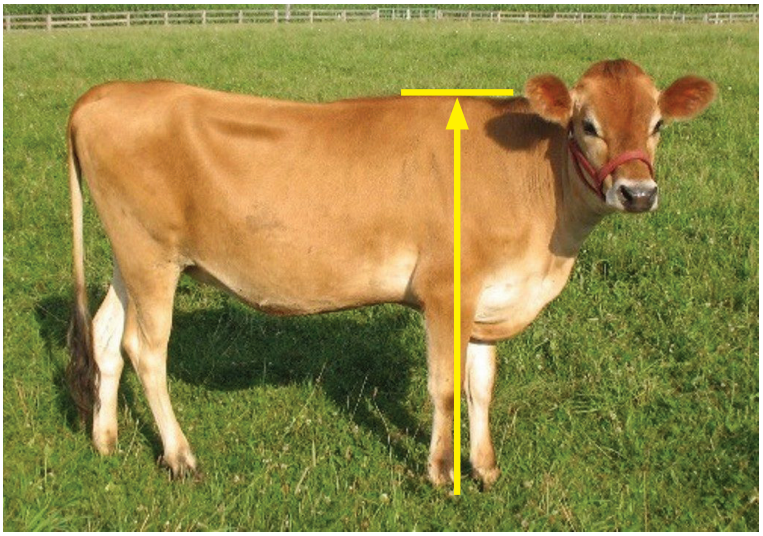


AT BIRTH:

JERSEY = 55- 60 CM

FRIESIAN = 65-70 CM

WITHER HEIGHT



AT PUBERTY

(IDEALLY DURING 45% TO 55% OF THE MATURE BODY WEIGHT):

JERSEY

110-115 CM

FRIESIAN

120-125 CM

WE RECOMMEND

• TO FIX A DATE TO CHECK THE HEIGHT

• THE FIRST DAY OF EACH MONTH WOULD BE IDEAL.

NO. 7

GROW GOOD QUALITY AND HIGH YIELDING GRASSES IN YOUR YARD!

WHY?

You can get high quality feed for your cows, especially during the dry season. Therefore, there is no drop in milk production during this period.

WHAT GRASSES SHOULD I GROW?

Get advice from the Livestock Development Instructor (LDI) or Vet to select grasses according to the soil, rainfall, etc. of your area and to get planting materials, correct method of planting and managing the grasses.

EXAMPLES OF HIGH YIELDING GRASS

1) CO-3

2) SUPER NAPIER (PAKCHONG 1)

NO.
8

USE CUT GRASS MORE EFFICIENTLY

1) BE SELECTIVE

GOOD

NOT TOO LEAFY
NOT TOO STEMMY

NOT GOOD

THESE FLOWERS
SUCK THE NUTRIENTS

MORE LEGUMINOUS*

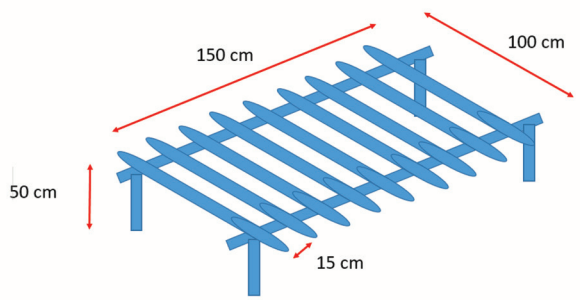
*** Attention: Availability of types of leguminous plant depends on the region. Ask your LDI/Vet for the type that is freely available in your area.**

2) WILT FOR SOME TIME

WHY SHOULD YOU WILT (WITHERING / ROUGHLY DRY)

Because fresh grass contains too much moisture, thereby decreasing the intake.

Drawing of a Wilting (withering) Rack.



- Try to spread cuttings so they wither soon
- Let them wilt for a couple of hours

3) CHOP IT ROUGHLY!

WHOLE GRASS

CHOPPED GRASS

WITHOUT CHOPPING

...

TOO MUCH WASTE

HOW CAN YOU CHOP?

CHAFF CUTTERS

KNIVES

Please don't forget NOT to give calves too much fresh grass. Because it may cause diarrhea. So, try to give them wilted (partially dry or withered) grass or hay!

The point is that a calf has to develop its rumen (1st stomach) and to do so they need a physical stimuli by grass. Hay or wilted grass are much better than fresh grass for this purpose!

NO. 9

SAVE YOUR FODDER FOR DRY SEASON (HAY AND SILAGE)!

MAKING HAY

HOW TO MAKE GOOD HAY:

Cutting Grass ➡ Drying ➡ Storing ➡ Feeding

1) CUT GRASS AT THE RIGHT TIME

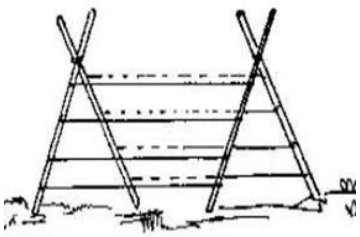
Too Early

Correct Time

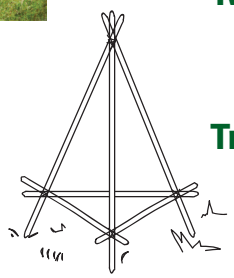
Too Late

2) WILT THEM ON THE GROUND. TURN OVER OFTEN.

3) LOAD ONTO A DRYING RACK



Rack



Tripod

4) YOUR HAY IS READY TO BE REMOVED AFTER TWO (02) SUNNY DAYS.

WHY HAY AND SILAGE?

MAKING HAY

You can turn surplus forage in the rainy season into hay and silage and save for dry season.

GOOD!

GREEN IN COLOUR.

FRESH SMELL.

NO DUST.

NOT GOOD!

BROWN IN COLOUR.

DUSTY.

HOW DO YOU KNOW WHEN HAY IS DRY ENOUGH?

Take a handful of hay from the inner layers of the drying rack. Twist the hay by hand and look at it carefully.

NOT GOOD!

- Does not break.
- Skin comes off.

Dry Longer

GOOD!

- Breaks a little.
- No moisture.

Store the hay

MAKING SILAGE

WHAT IS SILAGE?

Silage is greenish yellow colour material produced from grass or any edible plant material when there is no oxygen.

WHY SILAGE?

Cows will eat more. Increases milk production. Silage can be made during rainy season. Plants with thick stems, such as corn can be used.

WHAT CAN BE USED TO MAKE SILAGE?

Grass (Ex: Guinea grass). Corn (whole plant with cob). Leftover grass after feeding. Glyricedia/Ipil-Ipil. Straw, etc.

HOW TO MAKE SILAGE:

GOOD SILAGE:

Pale Yellow

Good Smell

Sour Taste

HOW MUCH SILAGE DOES A COW EAT?

Depends on: Palatability, Carbohydrate content & Fiber content. Amount of silage good for your cow should be decided based on the needs of the cow and the nutrient availability in the silage. Too much silage may cause acidosis*. Always consult your vet/LDI to decide.

*** metabolic disease that occurs when the pH level of cow's stomach falls below normal.**

NO.
10

GOOD TO ADD SILAGE TO YOUR TMR!

HIGHER MILK YIELD / COW

Mix Silage with TMR to Get High Milk Yield. Silage added TMR can include the following;

- Silage
- Grass
- Concentrates (Rice Bran / Dhal Husk / Beer Pulp / Cattle Feed / Poonac)
- Minerals

NO.
11

GIVE THEM ENOUGH WATER!

EVERY DAY, HOW MUCH WATER SHOULD YOU GIVE?

- Milking cows require 4 to 6 L of water per kg of dry matter intake.
- Poor water intake will reduce the dry matter intake.
- 24 hours availability of water (adlibitum) is the best option.

WATER INTAKE OF A MILKING COW:

Water intake L/day = **Dry Matter intake / day** x **4 L of water per L of milk**

SUPPLY ADDITIONAL WATER DURING THE DRY SEASON

- Water intake increases during hot weather.
- A cow with 360 Kg body weight needs 19 L of more water when the temperature increases from 27 °C to 32 °C (5 °C increase).

NO.
12

ADD UREA INTO PADDY STRAW

In Sri Lanka, paddy straw is one of the most commonly used and cost effective by-product for feedstuff among small scale dairy farmers. Unfortunately, It is nutritionally very poor. Thus, the good news is that you should make it better by using chemical substances called UREA as shown:

IF YOU PREPARE 10KG OF STRAW

10 L of Water

+

200 g of Urea

Mix Well !

No	Amount of:		
	Straw	Water	Urea
1	1 kg	1 L	20 g
2	5 kg	5 L	100 g
3	10 kg	10 L	200 g
4	20 kg	20 L	400 g
5	50 kg	50 L	1 kg
6	100 kg	100 L	2 kg

THEN, LET IT STAND FOR 30 TO 60 MINS BEFORE GIVING IT TO COWS
10 kg OF STRAW (WELL-DRAINED)

NO.
13

WASH YOUR HANDS AND CLEAN UDDER BEFORE MILKING

WHY WASH?

Because just by washing your hand with soap before milking, you can considerably decrease the incidence of Mastitis.

Use soap and lather up really well when you wash your hands. Wash between your fingers. Rinse well!

- Clean milking buckets before and after each milking with soap or detergents!
- Do not invert on the racks or dry using cloths.
- Sun dry.

KEY POINTS TO CLEAN TEATS EFFICIENTLY

- Remove first 2 to 3 streams of milk into a strip cup and check to see if milk displays normal appearance.
- Remove dirt and clean teats before milking by using clean water with teat sanitizer.
- Use a paper towel or cloth to dry teats before attaching the milking units/hand milking.
- Dip teats in disinfectant after milking.

NO MILK CLOTS

DRY TEATS USING PAPER TOWELS, KITCHEN ROLL OR TORN UP SQUARES OF OLD NEWSPAPER

TEAT DIP CUP

DISINFECTAN

NO. 14

USE A CALENDAR OR RECORD BOOK FOR RECORD KEEPING!

WHAT IS RECORD KEEPING?

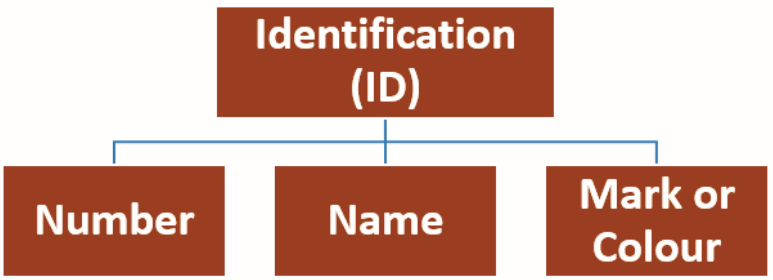
In general, "Record-keeping" means writing down relevant information on farm activities, such as, Animal ID, Production, Breeding, Income, Expenditure, etc.

WHY SHOULD WE KEEP FARM RECORDS?

- To understand how money is spent and income is earned.
- To make decisions about increasing or decreasing concentrate feeds, buying and selling of animals etc.
- To design better breeding plans.
- To find ways of reducing expenses and increasing incomes.

So you can get more useful service from Vets and LDIs since now you could show them more precise information.

1) FIRST STEP IS TO IDENTIFY YOUR COWS!



***NOTE THAT BE IT NUMBER OR NAME, IT SHOULD BE UNIQUE TO ONE ANIMAL (ONE-NAME/NUMBER TO ONE-ANIMAL METHOD).**

HOW CAN WE KEEP RECORDS?

Using a Record Book / Farm Diary

A small notebook in which to record the key facts and figures of the farm and the day-to-day activities.

Using a Calendar

Use the calendar in your home to record important dates and activities related to your cows (See below).

FOR EXAMPLE:

Mon	Tue	Wed	Thus	Fri	Set	Sun
		1	2	3 No. 2 : Calving	4	5
6 Pohori: Heat	7	8	9	10	11	12
13	14	15 Kalu: AI	16	17	18	19
20	21	22	23	24	25	26
27 Pohori: AI	28	29	30	31		

2) REMEMBER TO KEEP THESE 3 KEY POINTS

Heat	**Exact Date of Heat**
AI	**Exact Date of AI**
Calving	**Exact Date of Calving**

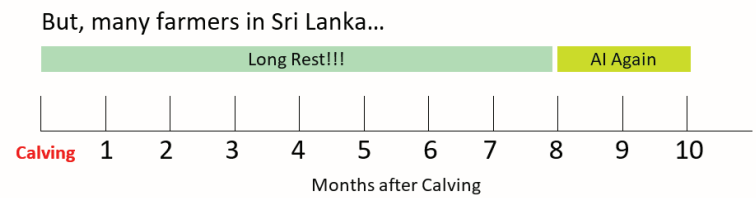
AFTER DOING THE ABOVE, PLEASE CHECK THE FOLLOWING POINTS:

- How many days does it take a cow to come into heat again after calving?
- How many AI services does a cow need to get pregnant?
- How many months does a heifer need to show the 1st heat?

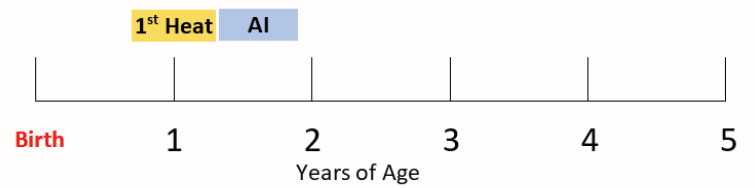
(Or to be AI -ed for the first time)

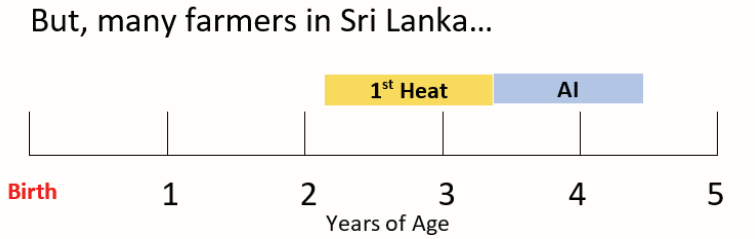
WHAT SHOULD BE THE BEST AGE OF YOUR \ COWS AT THEIR 1ST AI AND THE NEXT AI AFTER CALVING?

DAYS AFTER CALVING:



AGE FOR 1ST AI:





THEREFORE IT IS BEST TO HAVE A TARGET:

Point	Goal!
AI after Calving Number of AI	Up to 3 months Up to 4 times
1st AI for Heifers Heat cycle*	Up to 24 months (2 years) About 21days (3 weeks)

*** Period from one heat to the next heat**

FINANCIAL RECORDS TO KEEP:

What are financial records?

Document or a file used to keep account of the financial interactions, which show how money is earned and spent on farm operations.

Why financial records should be kept?

To understand how you spend money and earn income from farming activities thus, calculate profit and loss. Unprofitable activities should be either made more efficient or removed.

HOW SHOULD YOU KEEP FINANCIAL RECORDS?

A book should be maintained to enter everything of value on your farm; animals, building, machine, land etc. and any movement of money such as buying, selling, borrowing etc.*

***Consult your LDI about how to record items, when and how to analyze accounts.**

Item	Date	Income Items	Quantity/Amount	Income	Payment
1		Sales of milk Sales of compost / cow dung Sales of animals			
		Expenditure Items			
1		Cost for cattle feed Mineral mixture A. I service for cow No. / Name Payment for labour Transport cost Maintenance cost of equipment Cost for medicine Cost for ropes Cost of heifer			
Total				**Income**	**Payment**

PROFIT = TOTAL INCOME - TOTAL EXPENDITURE

FILL IN THE BOOK EVERY DAY OR AT LEAST EVERY WEEK!

KEEP RECEIPTS, INVOICES AND OTHER DOCUMENTS TOGETHER WITH A CLIP OR IN A FILE!

AND PLEASE DON'T THROW PAGES AWAY! KEEP ALL THE PAGES!!

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