



SWAZILAND DAIRY BORD
(Established in terms of the Dairy Act 28/1968)
**OPERATING AS SWAZILAND DAIRY DEVELOPMENT BOARD
TO PROVIDE DEVELOPMENTAL AND REGULATORY SERVICES
TO THE DAIRY INDUSTRY**



FODDER PRODUCTION



1. Fodder Production

It is the duty of the entrepreneur/dairy cows farmer to prepare enough fodder for their animals.

1.1 Definition of Terms

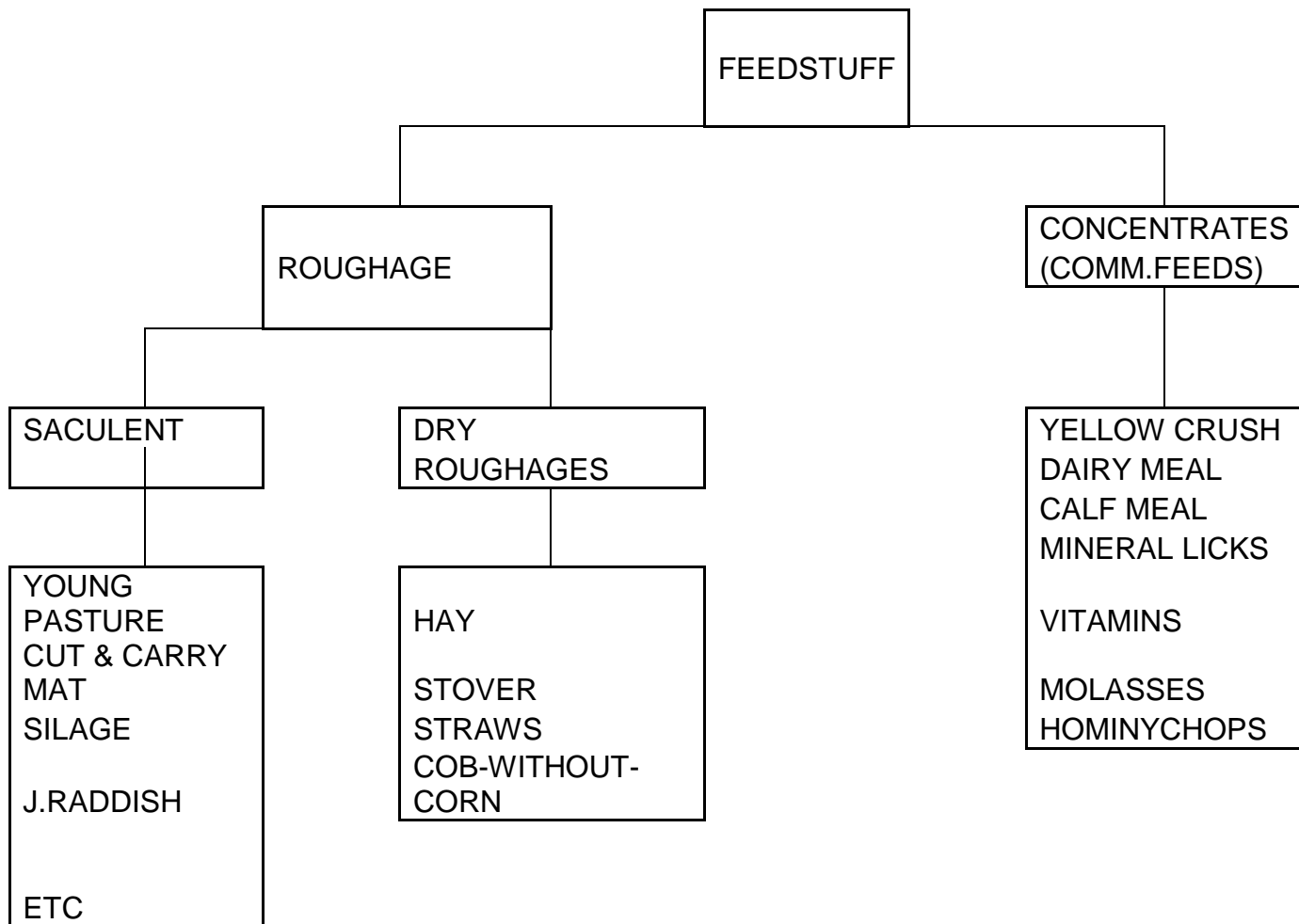
Fodder

- refers particularly, to food given to the animals including plants cut – and – carried to them, rather than that which they forage for themselves. They include hay, straws, silage, compressed and pelleted feeds, oils, mixed rations, and sprouted grains and legumes. (Media Wikipedia,2009)
- are crops that are cultivated solely /primarily for animal feed. By extension, natural grasslands and pastures are included whether cultivated or not. (F.A.O.)

2. The Role of Quality Roughage

- (i) Feed costs are known to account for 60 – 70% of total expenditure in milk production. It is, therefore, a major influence of the economics of the milk production business.
 - Usage of good quality roughage will play an important role in cutting down the costs due to usage of commercial concentrates which would otherwise be needed to make-up for poor forages and animal production additives.
 - Less concentrates are used if the basic feed is good quality.
- (ii) Fodder production ensures adequate supply of nutrients for good animal performance.
 - Animals require sufficient nutrient supply in order to fully express generic potential in milk yield, growth rate, and reproduction.
- (iii) To supply the dairy livestock nutrients through farm produced fodder is much cheaper than depending on commercial concentrate supplementation of poor veld grazing.
- (iv) Quality fodder is generally palatable to the livestock than poor nutrition one.
 - For that reason, the livestock will consume more than produce more too.
- (v) Good nutrition fodder tends to be more digestible than poor nutrition fodder.

3. Fodder Classification



4. The Roughage

- (i) **Roughage** – refers to the type of livestock feed that contains more than 18% fibre in its dry-matter, e.g., hay, grazing pasture, forage plant, silage and so on.
- (ii) **A good quality roughage** – characterized by the following qualities:
 - **Nutrition**
 - forage and pasture species differ nutritionally.
 - Generally, leguminous plants are rich in protein and minerals compared to grass. However, both have their important role in the dairy livestock feeding program.
 - **High Digestibility**
 - the younger the plant material the more digestible. Highly nutritious species tend to be more digestible than poor nutritious ones.

- **High Palatable**
 - in most cases the more nutritious the feed is in protein and energy nutrients, the more it will be appealing in taste to livestock.
- **Fresh and Aromatic smelling**
 - mouldy and poorly stored fodder can result in metabolic diseases to the livestock feeding on such feeds.

5. Fodder Planting Materials

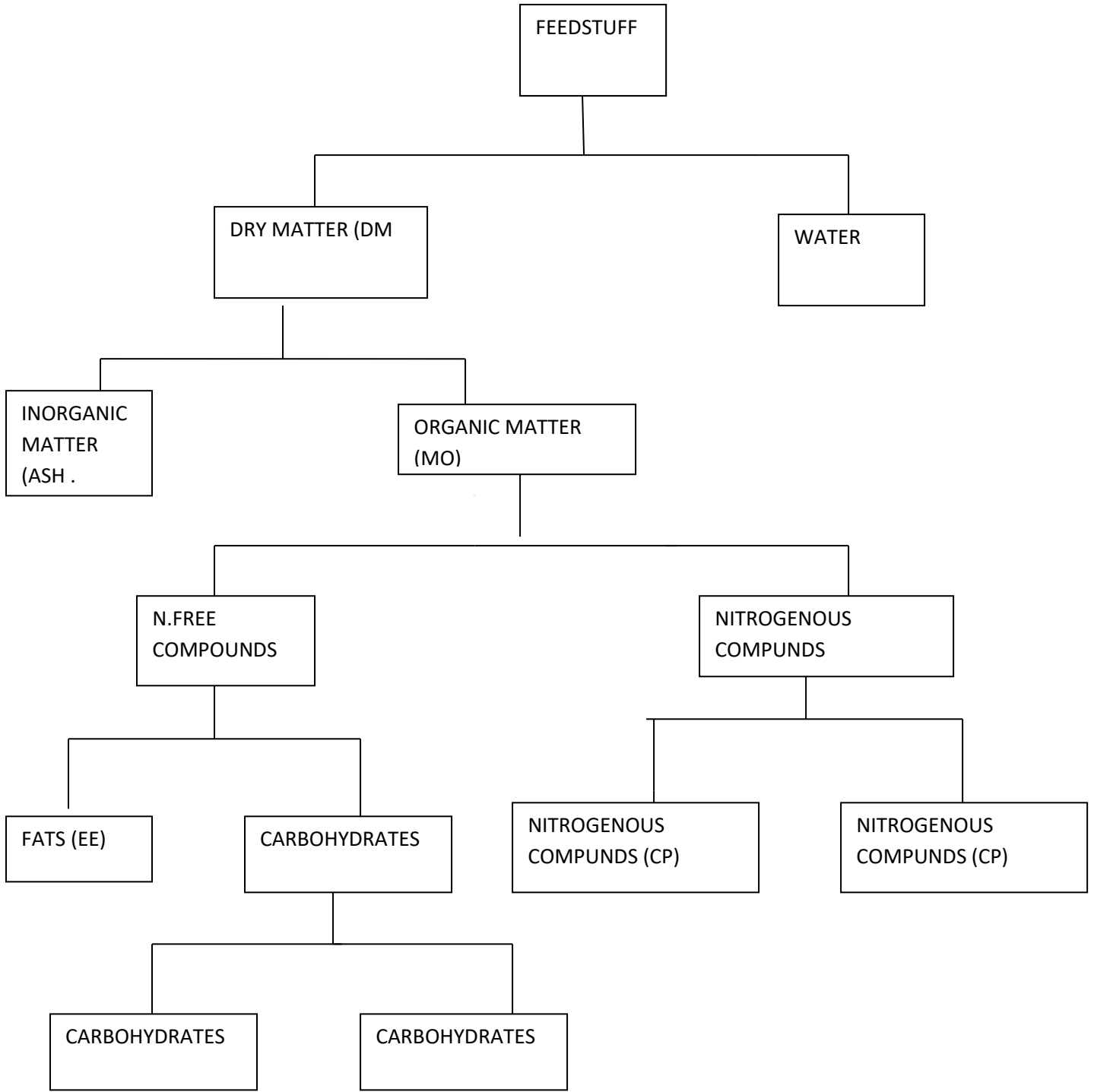
- Seed - e.g. teff, maize, Lucerne etc.
- Setts/Cuttings - Napier fodder, bana grass, etc.
- Runners - star grass, kikuyu grass, etc
- Seedlings - kikuyu, Mediterranean

6. Fodder Resources

- (i) **Grass species** - Rhodes grass, Teff grass, Love grass, lubabe, Foxtail, Kikuyu grass, Rye grass, Star grass, etc.
- (ii) **Legumes** - Lucerne, Cow peas, Desmodium, clover, Leuceana, Stilo, Siratro, etc.
- (iii) **Silage Crops** - Maize, Napier Fodder, Babala, etc.
- (iv) **Root Crops** - Japanese Reddish, Turnips, Sugar Beet
- (v) **Soilages** - Fresh lushy grass, Sorghum, Babala, Napier fodder, Lablab beans
- (vi) **Winter Pastures** - Rye grass, Oats, Jap, Radish, cocksfoot. Molasses, Bargase, Hominy chops, Potato
- (vii) **Crop Residue** - Maize tops, Cane tops, Wheatbran, Molasses, Bargase, Hominy chops, Potato vines, legume stovers, Cob without corn, maize Stover, Citrus pulp brewers grain, banana trunks. Etc
- (viii) **Forages** - Lucerne tree. Etc

7. Fodder Conservation

- (i) The importance of Fodder Conservation
To conserve fodder is to store quality roughage during the time of the year when it is plenty in supply such as in summer in order to use it in winter when its supply is scarce.
- By so doing, one is enabled to milk the dairy animals 305 days per year.
 - Dairy animals which are well fed will cycle well and be bred on time to calve yearly and keep healthier most of time.
 - Well conserved fodder lose much less nutrients than the one which is neglected in the field only to be exposed to the wet and dry weathers (in the open day- in and day –out) deteriorating nutritionally.
- (ii) **Type of Fodder Conservation:**
- **Hay** - dried young grass or leguminous plant material.
 - **Silage** - Unaerobically fermented freshly cut plant material stored in a drainable enclosed silo.
 - **Maize or Cane Tops-** dried freshly cut aerial plant materials
 - **Ammonia Treated Maize Stover-** or straws.
 - **Foggage** - Standing hay.



8. Alien Plants

- Lantana camara - bukhwebeletana or menhlwelikati.
- Fan Plant - Lihlindzafuku
- Black berry plant - emagungumence elugagane
- Chromalina odorate - sandanezwe
- Intfuma
- Indodengaziwa

9. Cautious Feed Stuffs

- Feedgrade Urea - poisoning
- Poultry droppings - bacterial contamination
- Lushy Leguminous Foliage - Bloat
- Molasses (cane) - diarrhoea
- Maize grain - Bloat

TABLE 1: COMPOSITION OF TYPES OF FEED

TYPE OF FEED	CRUDE PROTEIN %	DIGESTIBLE PROTEIN %	FIBER %	TDN %
Cowpea hay (poor)	10	7	38	45
cowpea hay (good)	19	15	16	61
Pearl millet silkage (poor)	8	5	29	57
Pearl millet silkage (good)	12	8	28	58
Pearl millet grazing	7	3	37	52
Blood meal	72	57		60
Buckwheat (grain)	10	7	14	68
Buckwheat (husks)	3	0	43	41
Buckwheat (straw)	4	1	36	38
Columbus grass hay	10	4	32	53
Eragrostis curvula hay	6	4	45	55
Eragrostis curvula hay (fertilized)	12	7	40	55
Eragrostis curvula grazing	11	7	38	61
Common reed (young plant)	11	8	36	54
Common reed (leaves)	17	14	29	62
Common reed (mature plant)	7	4	38	48
Barley green fodder	12	9	26	66
Barley hay	8	2	28	50
Barley seed	10	7	7	78
Hominy chop	10	7	6	75
Grain sorghum ears	8	6	10	70
Grain sorghum hay (with ears)	7	3	23	50
Grain sorghum silage	8	3	24	42
Grain sorghum malt	30	23	8	70
Grain sorghum seed	10	7	3	80
Groundnut hay (poor)	6	3	28	56
Groundnut hay (good)	13	8	16	63
Groundnut cake meal	45	39	5	80
Groundnuts (plants and husks)	13	9	19	71
HPK 40 (high protein) concentrates	40	34	8	72
HPK 60	60	53	6	63
Out green fodder	14	9	21	70
Out hay	5	3	28	58

Oat seed	9	7	10	68
Oat straw	4	2	37	50
Fowl droppings	14-30	0	0	500
Indian rye grass	16	0	0	60
Cotton seed husks	4	0	45	44
Cotton seed oil cake meal	41	32	13	76
Camel thorn husks	12	7	27	54
Carcas meal	45	39	2	65
Kikuyu hay	13	11	36	50
Kikuyu grazing	11	8	28	65
Wheat green fodder (young)	18	13	39	80
Wheat green fodder (+-5 months)	13	11	3	80
Wheaten Seed	15	14	10	67
Wheaten straw	4	2	36	45
Lindsey 77F	6	3	29	45
Lupine seed	42	40	16	85
Lurcene (green)	24	17	21	70
Lurcene leaves	21	17	18	60
Lurcene hay (poor)	12	7	40	45
Lucerne hay (good)	19	14	23	56
Lurcene stems	10	6	41	45

TABLE 2 - COMPOSITION OF TYPES OF FEED

TYPE OF FEED	CRUDE PROTEIN %	DIGESTIBLE PROTEIN %	FIBRE %	TDN %	KG
Molasses (reed)	4	0	0	54	8,1
Ground snapped corn	7	5	11	69	10,3
Maize hay 9without cobs)	13	8	26	58	8,7
Maize germ meal	13	9	9	78	11,7
Maize husks	3	0	35	53	7,9
Maize silage (good)	10	6	27	65	9,7
Maize meal	9	7	2	84	12,5
Maize plants with cobs	6	4	25	63	9,4
Maize plants (dried)	13	8	30	56	8,4
Maize plants (stoked)	7	2	27	45	6,7
Maize bran	12	6	9	65	9,7
Maize cobs (ripe)	4	1	36	40	6,0
Maize cobs (good)	6	2	28	50	7,5
Elephant-grass silage	6	5	35	56	8,4
Pollard	17	12	7	67	10,0
Prosopis husk types	12	0	14	0	0
Prosup (NPN)	220	0	0	0	0
Rye green fodder	12	9	24	60	9,0
Rye seed	13	10	3	76	11,4
Red grass hay (poor)	4	1	38	50	7,5
Red grass hay (good)	7	4	30	56	8,4
Citrus meal	5	3	14	75	11,2
Sweet grass hay (poor)	3	0	38	45	6,7
Sweet grass hay (good)	9	4	35	56	8,4
Sweet Sioux	9	5	36	48	7,2
Sweet Sudan	7	3	34	50	7,5
Soy bean hay (poor)	8	4	31	52	7,8
Soy bean hay (good)	17	12	22	64	9,6
Soy bean oil cake meal	44	37	6	78	11,6
Soy bean seed	38	34	5	88	13,1
Sunflower husks	2	0	45	40	6,0

Sunflower oil cake meal	38	33	14	76	11,4
Sunflower heads	11	8	20	74	11,0
Sunflower seed	17	14	29	80	11,9
Dairy meal (15% protein)	15	11	8	74	11,0
Dairy meal (17% protein)	17	12	8	72	10,8
Teff hay (poor)	6	4	34	50	7,5
Teff hay (good)	9	6	30	54	8,1
Pickly pear leaves	2	1	14	56	8,4
Urea (NPN)	280	7	0	0	0
Vlid hay (poor)	3	0	41	36	5,4
Veld hay (good)	9	5	29	59	8,8
Veld grazing (poor)	3	0	36	45	6,7
Veld grazing (good)	10	5	26	57	8,5
Fish meal	64	58	0	72	10,8
Voermol molasses meal	5	2	10	60	9,0
Willow tree leaves	9	6	28	60	9,0

9.1 Conservation Fodder Quality Estimation

It is also important that a dairy farmer has an idea on how to estimate the amount of roughage conserved in relation to what his or her dairy herd will require.

9.2 Dairy Herd Requirement

HERD CLASSES	HEAD NUMBERS	CLASS LIVERSOCK LIVESTOCK LU	HERD LU
Mature Cows	3	1.0	3.0
Heifers	2	0.8	1.6
Calves	3	0.5	1.5
Bull	<u>1</u>	<u>1.2</u>	<u>1.2</u>
TOTALS	9	-	7.3

Assuming that a mature dairy cow has an average live weight (lw) of 400kg and that the herd is entirely jersey breed. A daily dry-mater requirement of the cow being one livestock unit (1 LU) is equivalent to 3% of its live-weight.

Thus $400\text{kg} \times 3/100 = 12\text{kg dm/LU/day}$

Therefore, the daily dry-mater requirement for the dairy herd can be estimated to be $7.3 \text{ LU} \times 12\text{kg} = 87.6\text{kg}$

For a dry period of 150 days extending from June to October the herd would require:
 $87.6\text{kg dm} \times 150 \text{ dys} = 13\,140\text{kg dm dys}$

HAY BALES

13 140kg dm converted to hay would be:
 $100/80 \times 13\,140\text{kg dm} = 16\,425\text{kg}$

Further converted to 250kg hay bales this would be:
 $16\,425\text{kg} / 250\text{kg} = 657 \text{ bales}$

9.3 Land Size for Hay

Assuming the dairy farmer produced her/his own Rhodes grass hay and that the latter species of grass would yield 11 tonnes of dry-mater per hectare per year, the amount of land needed to produce enough Rhodes hay to support the dairy herd for the five winter months would be:

$13\,140\text{kg dm} / 11\,000\text{kg dm / ha} = 1.19\text{ha}$

9.4 Maize Silage

Assuming the farmer wished to conserve yellow maize silage to feed the herd along with hay in the winter time, the amount of silage she/he would produce too could be determinable.

For instance, one hectare (ha) of maize stand can yield 20 tone dry mater of silage. If the dairy herd would be fed in order to provide half the amount of required dry mater by maize silage and the other half with hay each day, the amount of silage adequate to support the herd for the whole winter can be calculated as follows:

$$13\ 140\text{kg dm}/2 = 6\ 570\text{kg dm}$$

Such an amount of silage can be produced from a size of land as:

$$6\ 570\text{kg dm} / 20\ 000\text{kg dm} / \text{ha} = 0.32\ \text{ha}$$

The actual amount of maize silage is:

$$100/35 \times 6570\ \text{kg dm} = 18\ 771.4\text{kg as fed}$$

And the daily ration offered to the herd is:

$$18\ 771.4\text{kg} / 150\ \text{dys} = 125.14\text{kg as fed}$$

Per LU it would be: $125.14\text{kg} / 7.3 = 17.14\text{kg as fed (6kg dm)}$