



**GOAT PRODUCTION
WITH EMPHASIS ON NUTRITION**

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UMK

OBJECTIVE OF THIS LECTURE

Understand current local goat industry

Understand basic nutrition of goats

Discuss practical method of feeding goats

Understand basic problems faced by local goat industry in relation to feeding and nutrition

Current statistic on Malaysian Goats

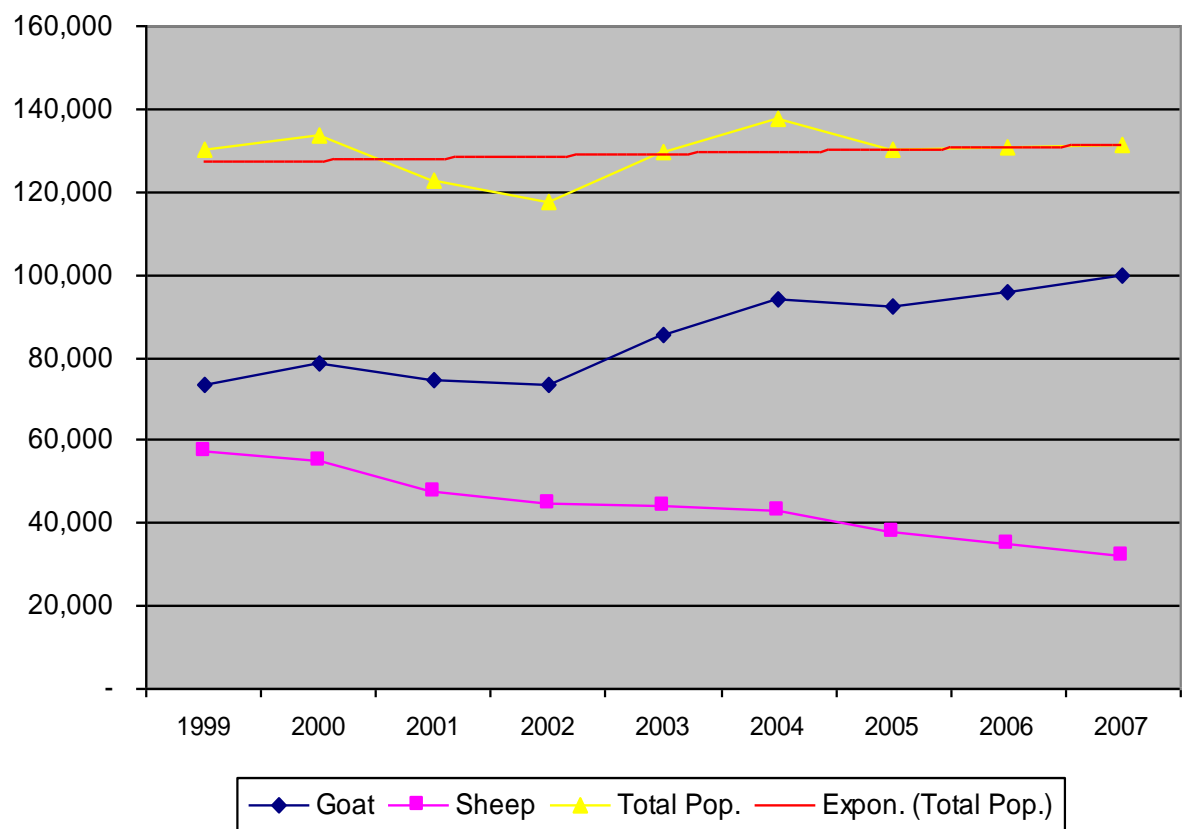
- 2005 - SSL 8%*
- Population decreased from 284,257 (1990) to 264,394 head (2004)
- Percapita consumption 0.5 to 0.8* kg
- Chevon 2005 - 18,300* Mt - RM120 M
- Local production 1,500* Mt

**Estimated figures*



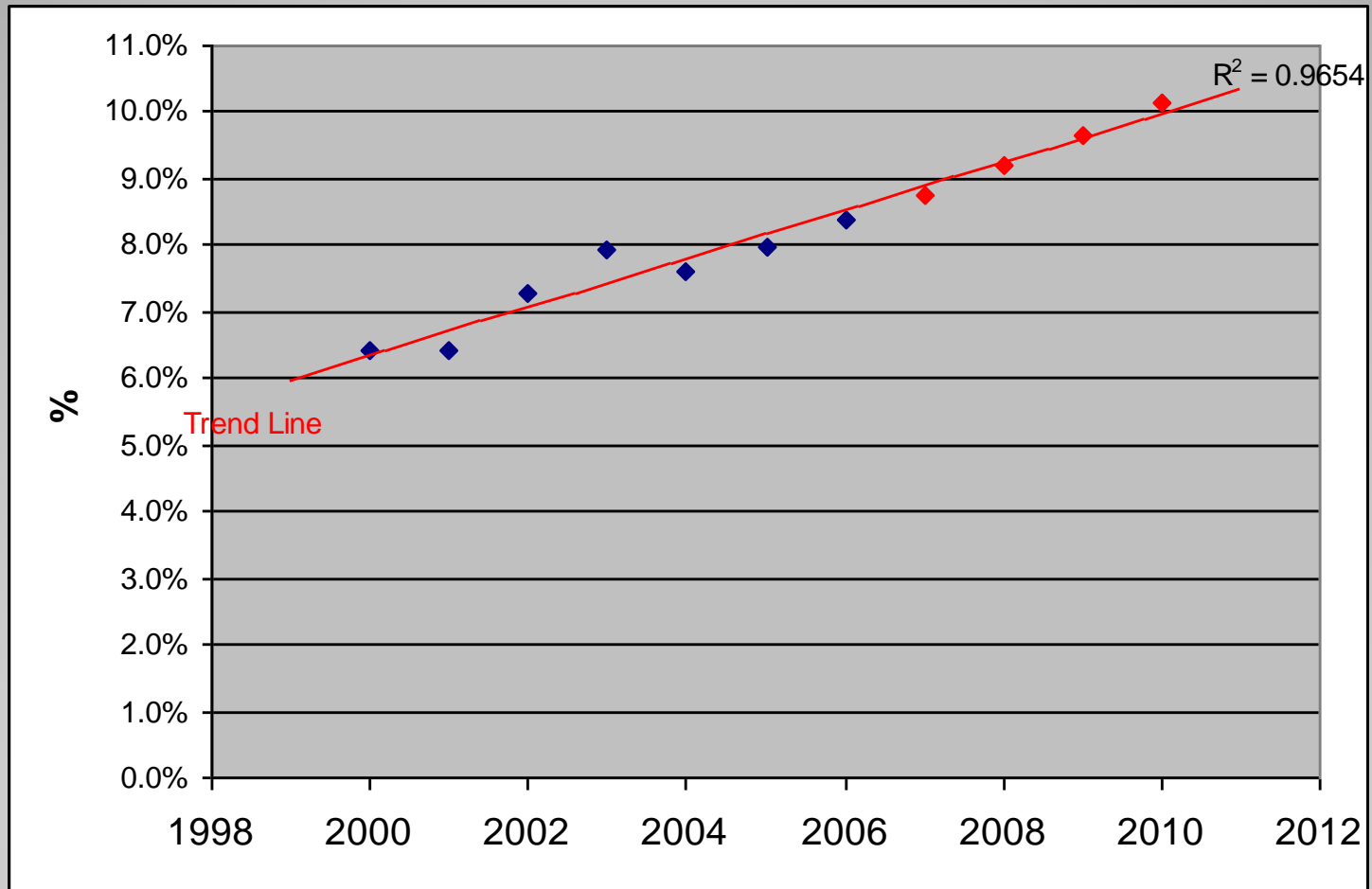
Malaysian Goat Industry Scenario

FEMALE BREEDER POPULATION



- Industrial data shows increased of breeder goat population.
- Meaning that, there is an increase on farmer interest in goat farming.

SELF SUFFICIENCY LEVEL



- SSL seems to increase 0.5% per year

STRATEGY IN MALAYSIAN GOAT INDUSTRY

1. To increase animal population

- To increase total population to 5.3 million of goats during 2015 - able to provide **35% SSL** (assumption 10% extraction rate).
- Through;
 - Improved breeding program
 - Application of appropriate breeding technology
 - Introduction of good genetics material into the system – importation of good breeder and semen and embryo
 - Increase farm efficiency

STRATEGY IN MALAYSIAN GOAT INDUSTRY

2. To increase breed & animal quality

- Breed & Animal sourcing – choice of breed
- Animal selections – during procurement & farming
- Appropriate technology application
- Planned breeding program – 3 tier breeding stratification: nucleus farm, multiplier farm and commercial farm.

STRATEGY IN MALAYSIAN GOAT INDUSTRY

3. To increase farm productivity & efficiency

- Appropriate knowledge and skills in human resource development.
- Appropriate technology application and farm mechanization.
- Emphasis on farm economics in farm management

STRATEGY IN MALAYSIAN GOAT INDUSTRY

4. Improve marketing networking
 - Establishment of supply chain – upstream & downstream activity
 - Abattoir and processing of value added product.



STRATEGY IN MALAYSIAN GOAT INDUSTRY

5. Increase industry competitiveness
 - Improvement of infrastructure of bio-security & SPS
 - Quality system practices (GAHP, HACCP, VHM)
 - Grading and accreditation system for animal breeds
 - Product differentiation & varieties



KPI to be achieved in 2015

- **35%** Self Sufficiency Level (from 9% - 2006).
- **1.56 million heads** of female breeder population in 2015.
- Production Capacity of **9,580 metric tone** per year.
- **3,500** dedicated, well trained, commercial farmers.

WHY FEEDS ARE IMPORTANT TO GOATS

Obtain complete and balance nutrients
Mainly for production purposes (meat /milk)

FACTORS INVOLVED

Stage of production
Type of feeds

Nutrient contents

Other informations related to feed resources (example ANF)

Cost of feed

DIGESTIVE SYSTEM



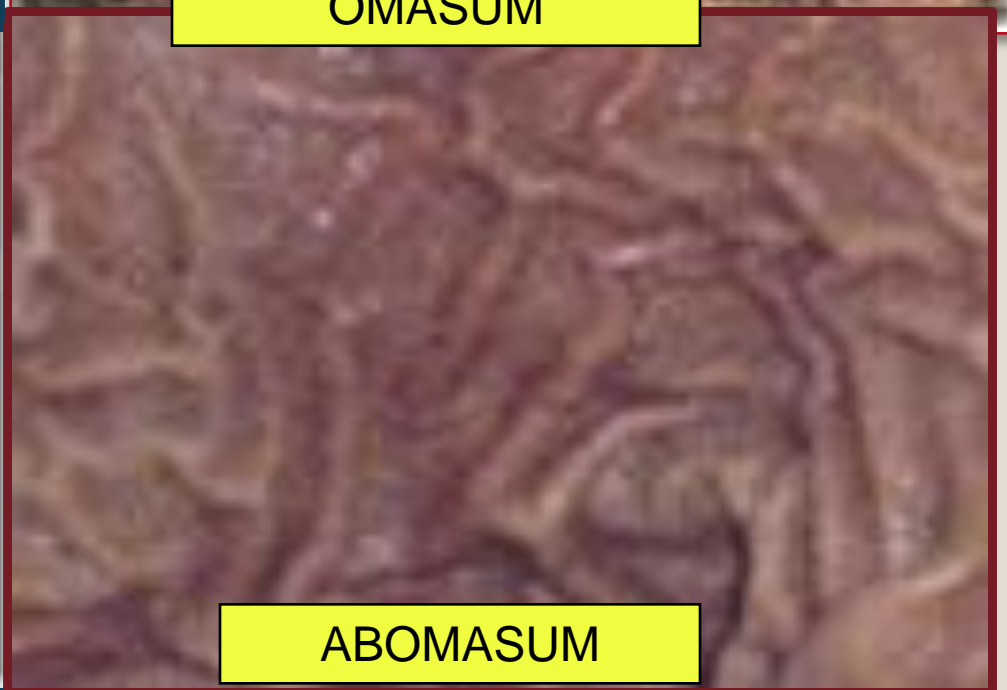
RUMEN



OMASUM

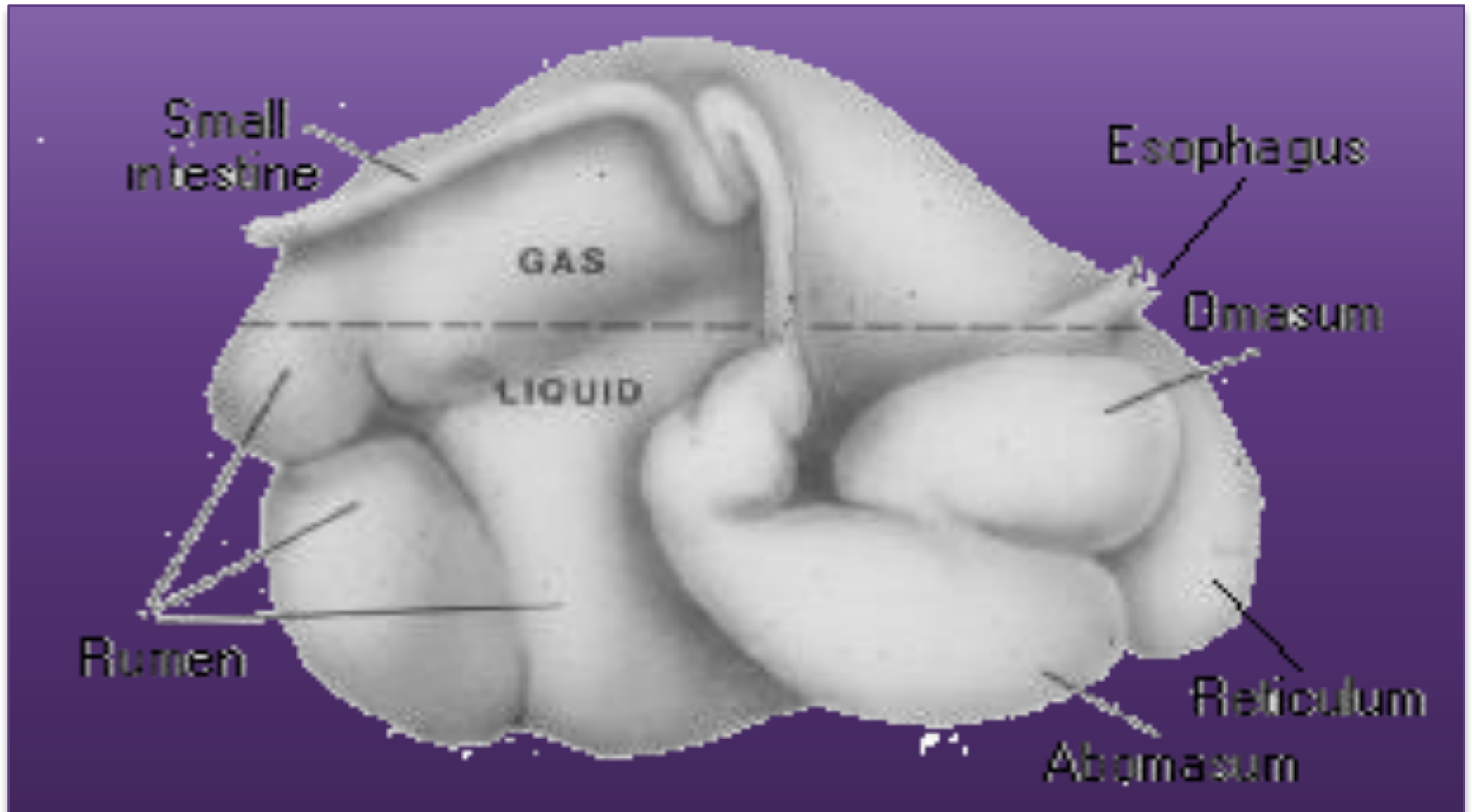


RETICULUM



ABOMASUM

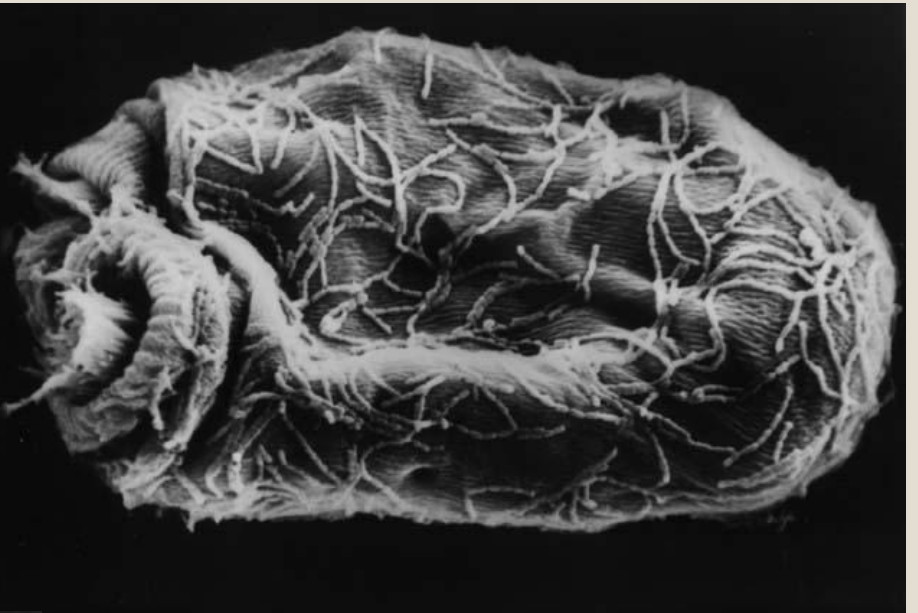
GOAT DIGESTIVE SYSTEM



Microorganisms in the Rumen

Protozoa	100,000 per gram of fluid
Bacteria	100 million per gram of fluid
Fungi	

- Functions of Microbes
 - Digesting fibre to VFA via fermentation process
 - Production of microbial protein
 - Production of vitamin K and B complex



SOURCES OF ENERGY

High

cereal grains - corn, barley, etc

By-product feeds – soyhulls, PKC, DDG, corn gluten

Moderate

Corn silage

Good quality pasture

Good quality hay

Low

Low quality hay

Low quality pasture

Straw, OPF, By-products

Sources of Calcium

High

Limestone (38%)

Bone meal (24%)

DCP (25%)

Moderate

Legumes hays and pastures (1.2-1.7)

Soybean hulls (0.55%)

Protein meals (0.2 – 0.4%)

Poor

Cereal grains (0,2-0.7)

Sources of protein

High

Protein meal (46 – 52%)

Fish meal (66%)

Urea (NPN) (288%)

Moderate

Legume hays (13 -21%)

Low

Grass hay (10-12%)

Cereal grains (8-14%)

Lowest

Poor quality hay (<10%)

Straw (3-5%)

Roughage

Should be primary source of feed intake

Maintain healthy rumen function

Less problem when goats are forage fed

NUTRIENT REQUIREMENTS DEPEND ON

Size(weight)

Age

Stage and level of production

Climate and environment

Body condition

Nutrient requirements increase with exercise and activity

Travel distance and land topography

Exercise a function of activity

NRC requirements are for goats reared in confinement

DRY MATTER INTAKE (DMI)

- Physiological stage
- Production stage
- Body size
- Appetite
- Size and feed quality
- Gut fill

- Maximize DMI
- Feed good quality grass (max: 28 days-
Napier, Guinea, kenaf etc)
- Concentrate: roughage 30:70
- Balance feed – energy, protein, mineral
and vitamin
- Clean water

How to Optimise DMI

- **3.5% from mean live weight. Example for 30 LW (kg) = $30 \times 3.5 = 1.05$ kg**
- **Roughage to concentrate: 40%: 60%**
- **Feed 2-3 X / day**
- **Mix grass with concentrate**
- **Chopping if necessary min: 1 cm – not too fine**

- **When and how to use concentrate and roughage?**
- **When and how to use PKC as a basal feed ?**
- **When and how to use urea in the feed mixture?**
- **When and how to use molasses?**
- **When and how to use the mixture of molasses and urea ?**



POME – Nutritive Value

Dry matter (DM)	91.1 %
Crude protein (CP)	11.1 %
Crude fibre (CF)	17.0 %
Ether extract (%)	12.0 %
Ash (%)	9.0 %
Nitrogen free extract (NFE)	50.5 %
Calcium (Ca)	0.70 %
Phosphorus (P)	0.50 %
Total Digestible Nutrient (TDN)	45.0 %
Metabolisable energy (ME)	6.52 (MJ/kg)



Wheat Pollard



PKC



Rice bran



Soya bean meal



**Hampas Soya
(Soyasauce waste)**



Pineapple



Soya waste



FIBRE SOURCES FOR GOATS











SILAGE

2004 1 1





TANAMAN KENAF



OPF PELET

SUGGESTED INCLUSION LEVEL

- **Maize: 20 – 40%**
- **Broken rice: 15 – 20%**
- **Cassava chips: < 20%**
- **Rice bran: 30 – 50%**
- **PKC: 50%**
- **POME: 50%**
- **Molasses: 5 – 15 %**
- **Urea: <5 %**
- **Soya bean meal: 10-20 %**
- **Fish meal: 5 – 10 %**
- **Sugarcane tops: 50%**
- **Coffee pods: 20%**
- **Sago meal: 30-50%**
- **Rice straw: 20%**

ENERGY

Corn
(20 – 30 %)

Tapioca chips
(20 – 30 %)

**Copra cake /
PKC / POME /
Rice bran**
(25 – 35%)

Molasses
(3-5%)

PROTEIN

Urea (2 – 3 %)

Soya bean meal
(5 – 10 %)

Fish meal
(5 – 10 %)

PKC

MINERAL / VITAMIN

Salt lick

UMMB

**Sodium
chloride**

DCP

Fish meal

TOTAL MIX RATION (TMR)

- **Balance feed**
- **Meeting daily requirement**
- **Feed size – affecting rumen microbes**
- **Formulations - meeting nutrient requirement**
- **Increased FCE compare to feeding forage and concentrate separately**
- **No choice – overcoming feed waste**
- **Smell of feed ingredient masked**

- Maintenance (dry period)
- Breeding
- Early pregnancy
- Mid-pregnancy
- Late –pregnancy
- Early lactation
- Late lactation
- Weaning

LIFE CYCLE FEEDING OF EWES AND DOES

PRACTICAL FEEDING RECOMMENDATIONS FOR PREGNANT AND LACTATING FEMALES

Goal – Feed proper amount and balance of nutrients

Quantity more important than quality

Make forage the main part of the diet

Balance ration

Feed supplements to provide nutrients that the forage is lacking

Feed supplement to provide a more nutrient-dense diet

Feed supplement to improve health and performance

Feed supplements to save money

CONTROL MEASURES IN FEEDING GOATS

Avoid abrupt change of the diet

Grass to concentrate must be replaced gradually

Maintain good rumen ecosystem (type and population of microbes)

New introduced feed can cause digestive problems (diarrhoea, bloat etc)

Some of the feedstuffs contain toxic components

- HCN (tapioca leaves)
- Mimosine (Leucaena leucocephala)
- Phytate (Rice bran)
- Cu (PKC)
- Theobromine (Cocoa pods)

WATER REQUIREMENT FOR GOATS

Function: Nutrient transport, excretion, controlling body temperature etc

Source : water, feeds (esp forage) and metabolic water (body metabolism).

Water loss – excretion and perspiration – must be replaced

Must be clean water

Requirement : Varies – depending on many factors

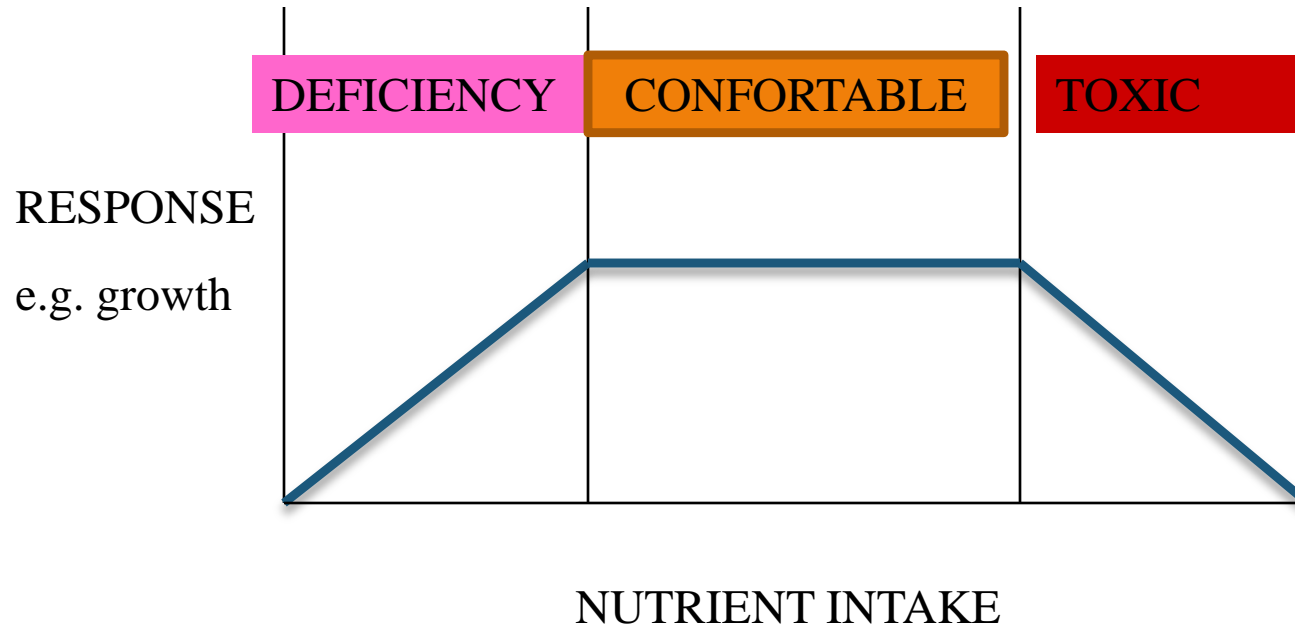
Advisable: No limit / *ad libitum*.

MINERAL REQUIREMENT

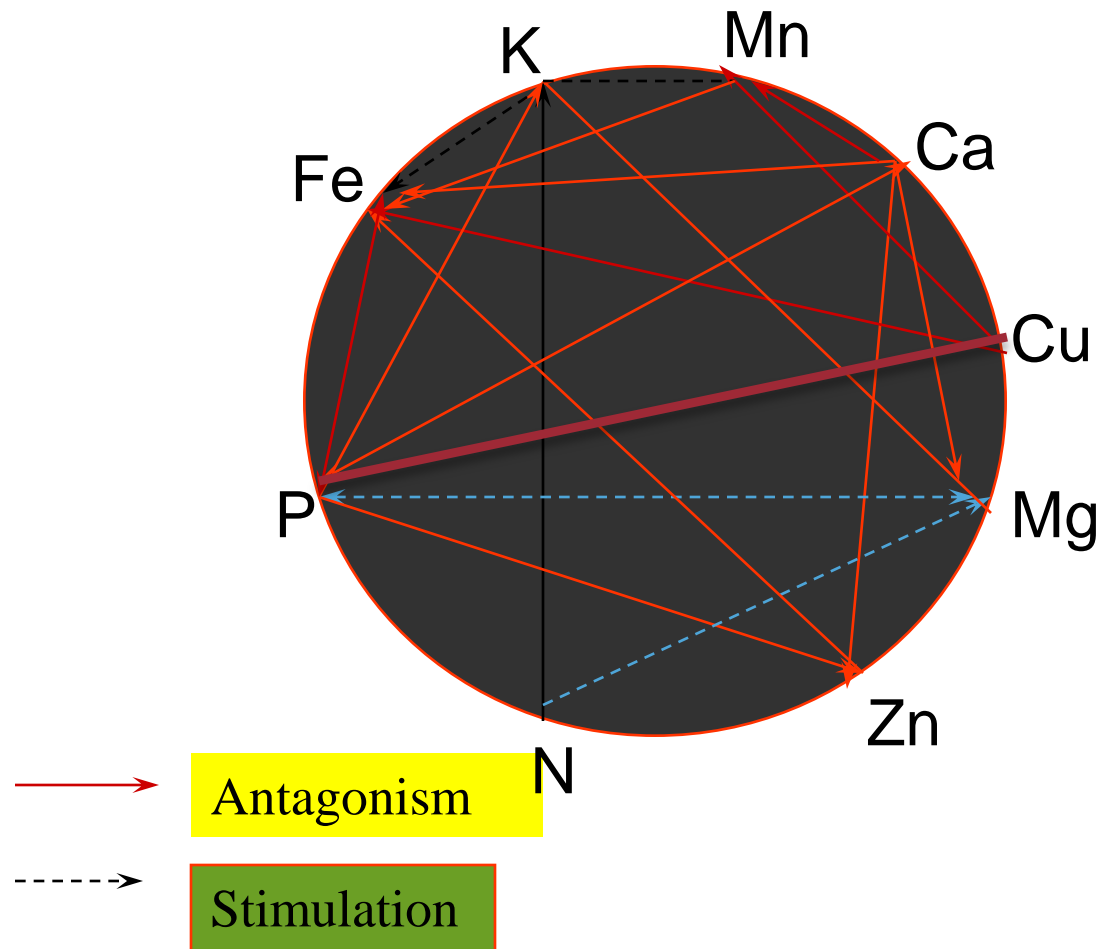
Understand functions - Ca, P, Mg

Determine mineral content in the main feed resources

Ca:P 1:1 – 7:1 (Ideal : 2:1)



Response To The Intake of Minerals



Mulder's diagram, illustrating mineral interactions in plants

Mineral Content in PKC

- **Ca** **0.21 – 0.34 %**
- **P** **0.48 – 0.71 %**
- **Mg** **0.16 – 0.33 %**
- **K** **0.76 – 0.93 %**
- **S** **0.19 – 0.23 %**
- **Cu** **20.2 – 28.9 ppm**
- **Zn** **40.5 – 50.0 ppm**
- **Se** **0.23 – 0.30 ppm**

TAG – CHECK CAREFULLY TO AVOID FEEDING PROBLEMS

Mineral	%	Sources
• Ca	16.10	◦ Dicalcium phosphate, calcium carbonate, magnesium oxide, potassium iodide, ferrous sulphate, manganese carbonate, copper sulfate, cobalt chloride and zinc oxide
• P	40.0	
• Mg	1.59	
• Fe	1.8	
• Cu	0.197	
• Co	0.072	
• Mn	0.482	
• Zn	1.01	
• I	0.076	

METABOLIC DISORDERS

- **Milk fever – old age, high producers – no appetite, staggering, blood C and P low – Mg high**
- **Ketosis – energy intake limited to meet requirement – a few days to 6 weeks after lambing for high producers –no appetite – body weight reduced – rumen activity reduced - rumen activity reduced – milk yield reduced – body smelt with ketones – ketones in blood increased**

Fatty liver syndrome

PREGNANCY TOXEMIA – low blood glucose, twin lamb disease, lambing paralysis, sleeping ewes syndrom

Symptoms (1-3 weeks before parturation) – lethargy, sluggishness, lack behind, failure to eat, neurological dysfunction, coma – death)

Risk factors

Inadequate nutrition – insufficient enetrgy density

Multiple fetuses – more high energy demand

Obesity – fat mobilization – toxic ketones bodies

Poor body condition

Lack of exercise

Stress

Environment

Severe weather conditions

TREATMENT

Oral glucose

PEG

IV glucose

PREVENTION

Adequate energy in diet

Adequate feeder space

Proper body condition

Exercise

Minimize stress