Fodder Conservation
Need for conservation

- Feeding during drought or floods
- Utilizing surplus forage
- Transport of feed
Methods of Conservation

- Hay
- Haylage
- Silage
HAY PRODUCTION

- What is hay?

Hay is dried forage containing not more than 12 - 14% moisture for safe storage.
Role of hay

As a means to conserve fodder

As a means of providing better quality DM forage

As a ‘convenient’ feed
- Long periods of storage
- Easily handled
- Easy transportation and distribution
2 main constraints for hay production

1. Climate - Rainfall

2. Machinery and equipment – expensive
Tedder rake
Square hay baler
Round hay baler
COLLECTION
Problems with making hay

- Need plenty of sunshine – 3 consecutive days without rain
- Easily spoilt by moulds if not quickly dried
- Requires heavy investment in machinery
- Large storage area is required
- Can be a fire hazard
SILAGE PRODUCTION
DEFINITION OF SILAGE

- Forage conserved in lactic acid that are produced through fermentation of its water soluble carbohydrate (WSC) by anaerobic lactic acid bacteria (LAB) when it is stored in the absence of air.
Principle of Silage conservation

- Forages are conserved in an environment of low pH (4.2) and anaerobic conditions where biochemical processes and activities of decomposing aerobic bacteria and fungi are inhibited.
Materials which can be ensiled

- Grasses
- Sorghum
- Maize
- Oil palm fronds
- Crop byproducts (pineapple skin, cocoa pods)
Silage making process

- Grass cut at optimum growth stage
- Grass chopped
Silage making process

- Chopped grass filled in silo:
  - Bunker silo
  - Pit silo
  - Tower silo

- Chopped grass compressed to exclude air
- Silo is sealed airtight
- Left for at least 21 days to complete ensilation
Advantages of silage

- More palatable than hay
- Not dependent on weather
- Can be kept longer without deterioration
- Not easily inflammable
- Requires less storage area
Factors required for good silage

- Airtight – to provide anaerobic conditions
- Moisture content in forage 65-75%
- Adequate soluble carbohydrates (>3%)
- Compaction of materials to exclude air
- Not contaminated with foreign matter e.g. soil
Silage for On-farm Dairy Feeding (1983 to 1985); surface stack pile system

- DVS/ N. Z. Dairy Board at Veterinary Institute Malaysia, Kluang
Ensilaging using small concrete tower silo

7.5 tonnes capacity

DVS / GTZ - Improved Dairy Nutrition Program (1985-1986), Kelantan
Grass silage production on ranches using bunker

Beef farm in N. Sembilan (1997 & 1998)
Dairy farm in Behrang
Mechanised wrapping of small forage bales with plastic film

- Undertaken by govt. / farmer
- On ranches and grazing reserves
Since 2000, DVS dairy ranch at Air Hitam, Johore, ensiles corn fodder under Farm ISO Quality Scheme.

- Since 1994, farmers produce corn stover silage in Trengganu.

- Since 2000, DVS dairy ranch at Air Hitam, Johore, ensiles corn fodder under Farm ISO Quality Scheme.
Stacks of OPF after being cut and arranged manually along the oil palm rows.

Chipping OPF

OPF Grabber

Manual pruning

Stacking

Oil Palm Fronds (OPF) as Silage

Dried fodder products

Unloading

Silage

Chipping OPF

Dried fodder products
SILAGE QUALITY

Poor quality silage
pH > 5.0

Good quality silage
pH 3.5 – 4.2 (< 5.0)
Characteristics of Good Silage

- pH < 4.5
- Lactic acid 3 -13%
- Butyric acid < 0.2%
- Colour: yellowish to brownish green
- Odour: sweet smelling (vinegar smell)
- Wetness – no seepage
- Palatability – readily accepted by animals
- Nutritive value – almost similar to original material
Silage is not of widespread importance; most ruminants still in hands of small farmers under traditional village system.

Ensilaging activities and silage use still limited; mainly by progressive farmers, ruminant ranches and research institutions.

Silage is marketable & farmers prepared to buy.

Further R & D necessary to support efforts towards greater adoption of silage technology.