

International Conference on Animal And Dairy Science  
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Advances in Anaerobic Fermentation  
Techniques for Conservation of Forages for  
Small Holders

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# Present livestock Scenario

- Livestock sector plays a crucial role in the National Economy.
- This enterprise provides sustainable income and employment in rural sector for small holders, marginal farmers, and landless population .

## Cont.

- Demand for livestock products are increasing in the country especially for milk and meat.
- Livestock industry contribute to more than Rs 900 million annually to the national income
- Population of Livestock is increasing at @ 4% annually.

## Cont.

- On the other hand demand and supply ratio of green and dry fodder is very wide.
- Livestock population
  - Cattle 210 million
  - Buffalo 112 million
  - Sheep 62 millions
  - Goat 125 million

# Demand /supply

	Demand (in million tones)	Supply (in million tones)	Deficit( percent)
Green fodder	1097	400	63.53
Dry Fodder	609	466	23.48

# Importance of green fodder

- \* Cost of the feed and fodder constitute more than 60% of total expenditure of a productive animal.
- This expenditure can be substantially reduced if emphasis is given to cultivation of home grown high yielding varieties of leguminous and non leguminous fodder and its proper conservation and utilisation.

# Cost cutting strategy

- Another way is to reduce reliance on concentrate feeding to bare minimum.
- The cattle and buffalo with producing capacity of 4 to 5 lit of milk can be sustain only on good quality hay and green fodder dry there by reducing the the cost incur on concentrate.

# Types of forages

- Leguminous crops are Lucerne, bersem, cowpea etc.
- Non leguminous are maize, sorghum, bajra oats etc.
- Perennial grasses like Napier, hybrid Napier, gajraj , yashwant DHN 6 and many others.



# Ensuring of maximum functions of green fodder

- To Supply of uniform quality (in terms of its nutrients) of green fodder throughout the year is essential.
- Right stage of harvesting of fodder crop is utmost essential to ensure availability all the essential to the animal.
- Ensuing the conservation of nutrient ( in the forage)

# Problem areas

- How a small holder will be supply green forages to high quality
- How to conserve the limited amount of quality fodder available with him.
- The Traditional methods of silage making like pits or tower silo are labour intensive and need fodder in bulk Quantity.

# Possible Alternative

BATCH CONTAINERS  
&  
COMPOSITE SILAGE

# Anaerobic fermentation or silage in batch containers

Bamboo boxes

Plastic bags

Plastic Drums

# Anaerobic fermentation techniques ( silage) developed



# Bamboo boxes

- Bamboo Boxes /bamboo make containers
- Size -5x5x5 ft. or 7x7x7 ft
- Capacity--- 1500 to 2000 kg.
- Internal lining with polyethin of 200 micron
- Compaction manually and air tight sealing









# Bamboo Boxes



# Easy to fabricate



No. of bamboo box as per need can be prepared.

Bamboo boxes



Special design plastic bags

Size— 3.5x 3.0x 4.0 ft.

Capacity --- 600 to 800 kg.



Plastic bag silo

Physical and chemical quality as good  
as traditional type silage



Opened plastic bag silo

# Plastic Bag



Plastic bag silo near goat unit

Multiple bags can be used as per the availability of green fodder



Plastic bags silage



Plastic drums  
Capacity 120 to 160 kg of green  
fodder.



# Reusable plastic drums



# Composite Silages

- Availability of large quantity of vegetable waste can be a cheap source of nutritive feedstuff and can be conserve by anerobic fermentation mixed with main crops.
- Distillery Waste – Miaze bran / barley bran
  - Rich source of energy –
  - Highly perishable
  - But can be conserve by this technique with main crop.

# Vegetable waste as a ingredient for composite silage



Fig.1. Air drying of Vegetable Waste meant for ensiling

# Maize bran ( distillery waste)

- Rich source of carbohydrate for composite  
sia



**Maize Bran ( Distillary Waste)**

# Norms of silage making

- Optimum stage of harvesting
- Moisture percent in the crop or other ensiling material
- Size of the particles
- Proper impaction
- Anaerobic condition
- Safety of batch containers

- Thanks