Producing Fodder for use during the dry season

Moagi Letso
Fodder Production for the Dry Season

Fodder crops
► Crops or plants or parts thereof grown specifically for use as animal feed

Fodder Production
► The agronomic or cultivation practices and processes in the growing and preservation of forage crops
► Fodder is an important feed resource for livestock
► Crop residues are second only to natural pasture in importance as a feed resource
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Feed resources

- Natural pasture
- Established pastures
- Preserved forages
- Crop residues
- Agro-industrial by-products
- Supplements/Concentrates
- Additives and modified resources
Fodder Production for the Dry Season

Why produce fodder?

- Intensive production systems
Fodder Production for the Dry Season

Why produce fodder?

- Droughts
## Fodder Production for the Dry Season

### Why produce fodder?

- **Diminishing rangelands**

<table>
<thead>
<tr>
<th></th>
<th>% Annual decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>1.2</td>
</tr>
<tr>
<td>Africa</td>
<td>0.5</td>
</tr>
<tr>
<td>Botswana</td>
<td>0.1</td>
</tr>
</tbody>
</table>
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Why produce fodder?

- Income generation
- Diversification of the economy
- Efficient use of resources
- Creation of employment
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Why produce fodder?

- Income generation
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Why produce fodder?

Cost of some fodder imports

<table>
<thead>
<tr>
<th></th>
<th>Amount (bales)</th>
<th>Cost (Pula) ‘000</th>
<th>Land (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucerne</td>
<td>168 210</td>
<td>11 775</td>
<td>1250</td>
</tr>
<tr>
<td>Hay</td>
<td>104 000</td>
<td>2 600</td>
<td>750</td>
</tr>
<tr>
<td>Straw</td>
<td>62 792</td>
<td>1 256</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>335 002</strong></td>
<td><strong>15 631</strong></td>
<td><strong>2 500</strong></td>
</tr>
</tbody>
</table>
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Why produce fodder?

- Increasing animal and human populations

World Grazing Stocks, 1950-2001

Source: FAO

Million Head

Cattle and Buffalo
Sheep and Goats

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Nutrients required by livestock

- Energy
  - Carbohydrates
  - Fats
- Proteins
- Minerals
  - Macro e.g. calcium, phosphorus and sodium
  - Micro e.g. selenium, zinc and cobalt
- Vitamins (Fat and water soluble)
- Water
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Fodder crops

- **Legumes:** e.g. Lucerne (*Medicago sativa*), Lablab (*Lablab purpureus*) and Cow peas (*Vigna unguiculata*)
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Fodder crops

- Productivity and nutritive value of some *Forage Legumes*

<table>
<thead>
<tr>
<th></th>
<th>Production (ton DM/ha/yr)</th>
<th>CP (g /kg DM)</th>
<th>CF (g /kg DM)</th>
<th>Ca (g /kg DM)</th>
<th>P (g /kg DM)</th>
<th>Tannins (mg /g DM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pigeon pea</td>
<td>15-18</td>
<td>200</td>
<td>262</td>
<td>8.7</td>
<td>8.2</td>
<td>13.4</td>
</tr>
<tr>
<td>Lucerne</td>
<td>5-75</td>
<td>120-220</td>
<td>200-300</td>
<td>1.1-1.7</td>
<td>0.1-0.3</td>
<td>0.13</td>
</tr>
<tr>
<td>Lablab</td>
<td>1.5-7.5</td>
<td>100-220</td>
<td>400-600</td>
<td>1.68</td>
<td>0.13</td>
<td>40</td>
</tr>
</tbody>
</table>
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Fodder crops

2. **Fodder cereals:** e.g. fodder maize (*Zea mais*), sorghum (*Sorghum bicolor*) and millet (*Pennisetum coracana*)
Fodder Production for the Dry Season

Fodder crops

3. **Multi-purpose trees**: e.g. Leucaena (*Leucaena leucocephala*), Saltbush (*Atriplex numularia*), and Moringa (*Moringa oleifera*)
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Fodder crops

4. **Grasses:** e.g. Napier or Elephant grass (*Pennisetum purpureum*)
   Rhodes grass (*Chloris gayana*) Buffel grass (*Cenchrus ciliaris*)
Fodder Production for the Dry Season

Fodder crops

4. **Grasses:** e.g. Napier or Elephant grass (*Pennisetum purpureum*)
   Rhodes grass (*Chloris gayana*) Buffel grass (*Cenchrus ciliaris*)
Crop residues

- are second only to pasture in their importance as forage for livestock in the tropics
- Characterised by low digestibility, low crude protein and low mineral components (Leng et al., 1999)
- Have other uses besides animal feeding
ISPAAD triples produce

By Mochael Bozoka

KANYE - Since the inception of ISPAAD, the production of basic food has increased three folds.

"In 2008 we produced 30,000 metric tons of basic food. But in the year 2009 that number soared to 90,000 metric tons," the Minister of Agriculture, Mr Christian De Graaff told JINPA on Wednesday.

He maintained ISPAAD came into being the production of basic food has been on a steady increase.

The minister however indicated that the increase does not make the country self-sufficient in food production as 300,000 metric tons of food produce are needed for the country to attain self-sufficiency.

"Government has decided that we have to be self-sufficient by 2016, but I want to achieve these a little earlier," he said, adding that the current increase in food production only constitutes 43 per
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Common uses of fodder crops

- Regular/routine feeding in intensive production systems
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Common uses of fodder crops

- Finishing young stock
- Filling a seasonal feed gap
- Growing out adult stock
- Source of income (directly through sales)
Fodder Production for the Dry Season

Fodder production in Botswana

- Attitudes are gradually changing. *A o ka kgona go jesa selo se se kana ka kgomo?*
- More farmers are seeing the need for producing fodder for their livestock.
- Lablab is the major forage legume grown in Botswana
- Grown by farmers in mixed farming systems
- Grown under rain-fed conditions like other field crops in Botswana
- It improves soil fertility by fixing N
- Research has released lablab for production

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Fodder production in Botswana

Average farm size and number of Lablab farmers by region

Agricultural region

Gaborone  Serowe  Maun  Kanye  Molepolole  Mahalapye  Palapye  Selibe Phikwe  Francistown

Number of farmers

Mean Farm size (ha)

No of farmers

Av Farm Size

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Fodder production in Botswana

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Challenges to fodder production in Botswana

- Environmental conditions
  - Low and erratic rainfall
  - Poor soil fertility
  - Pests and diseases
- Unresponsive policy environment
- Difficulties in accessing inputs
- Lack of equipment, information and skills
- Others?
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Challenges to fodder production in Botswana

Yields of Lablab under experimental conditions

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Challenges to fodder production in Botswana

- Yield of lablab in farmers’ fields is about 3.5 tons/ha
- They harvest it at full maturity
- The best stage for harvesting often coincides with the peak of the rainy season
- Substantial DM and quality losses in the field
Challenges to fodder production in Botswana

- Substantial quality losses with maturity

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Challenges to fodder production in Botswana

Substantial quality losses with maturity

CP, DMD, ADF and Ash content of Medicago sativa at various stages of growth

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Fodder Conservation

The primary aim of forage / fodder conservation is to transfer surplus forage production from peak production in the grazing season to the period of deficit.

Fodder conservation the processes and practices that are made in order to ensure that fodder is available for livestock at times when natural pasture is deficient.
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Fodder Conservation

Feedstuff can be preserved in several ways.

1. The moisture content can be reduced to a level which will prevent bacteria and fungi growth as in artificial drying and haymaking.

2. Substances can be added which will inhibit bacterial or fungal growth e.g. acids, alkali, bactericides, fungicides - as in Silage making.
Fodder Production for the Dry Season

Fodder Conservation

Feedstuff can be preserved in several ways

3. An acidic medium may be created to inhibit bacterial and fungal growth as in silage making.

4. Forage or product can be kept at low temperatures (freezing) to inhibit bacteria or fungi growth. This is however, very costly hence it is only used for experimental purposes.
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Fodder Conservation

- For all the four principles or techniques, the objective is to create a product which:
  1. closely resembles the original herbage in feeding value
  2. has suffered minimal losses (in quantity and quality)
  3. is acceptable to the animal.

- Methods of fodder conservation
  1. Hay making
  2. Standing hay
  3. Silage making
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Fodder Conservation

- Objectives of the methods of fodder conservation

1. In **Hay making** the objective is to reduce the moisture content of the herbage to less than 25% so that bacterial and fungal growth is suppressed

2. In **Silage making** the objective is to create a stable acidic anaerobic environment in which no spoilage microbes can proliferate
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Fodder Conservation

- Length of feeding time anticipated
- Losses during conservation
- Total livestock units (LU) to be fed
- Dry matter intake of each LU
- Yield of the Fodder crop
- Method of use
- Capacity of storage facilities
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Factors that affect the choice of fodder crops

- Suitability to the local environment
- General characteristics of the species
- High feed value
- Method of use
- Availability of seeds/planting material
- Managerial skills of the farmer
- Productivity of the plant i.e. DM yield per unit area
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Fodder Conservation is for

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Suggested strategies for increasing production and use of fodder

Are these achievable in BW?
Increasing Fodder Production

- Plans to increase the yield of fodder crops per unit area.
- Promote fodder production in mixed farming systems.
- Effective use of waste lands, degraded, marginal and sub marginal lands for the development of pastures and agro forestry systems.
- Prudent utilization of available resources such as crop residues, non-conventional feeds and fodders.
- Influencing policy for increased of feed and fodder resources
Fodder Production for the Dry Season
Increasing the yield of fodder crops per unit area

- Identifying improved fodder varieties on the basis of
  - High production potential
  - Better quality traits
  - Adaptability to different agro-climatic zones
  - Suitability to different farming situations
- Using government, Agric. University farms and progressive farmers for production of quality seeds for distribution.
- Developing a system for assessing farmers needs and arranging timely supply of quality seed.
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Increasing the yield of fodder crops per unit area

- Growing improved varieties of forage crops.
- Developing intensive fodder production systems with efficient utilization of land and other farm inputs for maximum forage production.
  - Intensifying forage crop sequences and/or intercropping systems for increasing herbage yield (e.g. 2 or 3 harvests in a season for silage)
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Promotion of fodder production in mixed farming systems.

- Integrating fodder in mixed, inter or rotation crops with existing food or commercial crops.
- Adopting grass and tree based systems like lay and alley farming for dry land areas and draught prone areas.
- Intercropping of legume fodders with grain crops.
- Producing fodder in tank beds in summer.
- Attempting forage production in problematic soils.
Fodder Production for the Dry Season
Promotion of fodder production in mixed farming systems.

- Cultivation of short duration fodder crops during years of drought.
- Increased production of crops which provide forage as by products e.g. sorghum, cowpea, maize and millet, sweet potatoes
- Grow suitable fodder crops in fruit orchards for fodder as well as enriching the soil fertility.
  - E.g. Mango, citrus, guava orchards – Rhodes, Stylo, Siratro.
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Effective use of marginal lands

- Research and attempt forage production in problematic soils.
- Close the grazing lands from for a period.
- Clearing off undesirable bushes /trees e.g. *Prosopis spp* and promoting desirable indigenous ones e.g. *Grewia spp*
- Adopting soil and water conservation practices
- Preparation of land and application of manure/fertilizers
- Introduction of improved perennial grasses e.g. *Cenchrus ciliaris*
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Effective use of marginal lands

Embracing improved systems of range use e.g.

- Controlled grazing
- Rotational grazing
- Differed grazing?
- Differed and rotational razing
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Prudent Utilization of available feed resources

► Suitable storage of crop residues (protection from solar radiation and rain reduces losses and improves usefulness by 10-15%).
► Hammer-milling dry green fodder before feeding decreases leftovers (increases feed consumption).
► Harvesting the green fodders at optimum stage to retain maximum nutrient.
► Conservation (silage or hay making) of fodders during lush season
► Shrewd usage of crop residues at farm level.
Whither to?
Feed processing is particularly important when the level of feeding is increased for maximum production. Zero grazed animals are selective and more inclined to:

- select the more palatable ingredients
- refuse/waste feed if the physical texture is not to their liking.
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Prudent Utilization of available feed resources

- Formulation of complete rations for efficient utilization of nutrients
- Development of low cost feeding strategies by utilizing locally available feed resources.
- Strategic supplementation of specific deficit nutrients
- Feeding of complete ensiled ration.
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Influencing policy for increased of feed and fodder resources

- Utilization of the ICTs to disseminate education about recent developments and techniques of producing fodder.
- Research funding to investigate replacement of imported feed components with indigenous ones.
- Replace the present practices of exporting raw materials (and jobs?).
- Organize feed/fodder producers for effective bargaining
- Promote planting of fodder trees as an important component under the social forestry systems
"I can loan you money for a boat or a snowmobile, but not for cattle feed."
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Bio-technologies in fodder production

► Development of simple, economically viable and sustainable technology for increasing the nutritive value of low quality feeds.

► Urea treatment of cereal straw
  ► 4% urea, 50L water/100Kg, 7-21 d incubation

► Use of urea – molasses – mineral blocks.
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Conclusions

- The adoption of sustainable fodder production strategies can improve the availability of feed and fodder resources.
- Effective utilization of fodder in livestock feeding can improve milk and meat production.
- This has the potential to meet the animal protein requirements and create employment for the growing human population.
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THANK YOU FOR YOUR ATTENTION

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