

DRY SEASON MANAGEMENT WORKSHOP

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

Fodder Production for the Dry Season

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



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Fodder Production for the Dry Season

Why produce fodder?

► Droughts



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Fodder Production for the Dry Season

Why produce fodder?

► Diminishing rangelands

	% Annual decrease
World	1.2
Africa	0.5
Botswana	0.1

Fodder Production for the Dry Season

Why produce fodder?

- ▶ Income generation
- ▶ Diversification of the economy
- ▶ Efficient use of resources
- ▶ Creation of employment

Fodder Production for the Dry Season

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Fodder Production for the Dry Season

Why produce fodder?

► Cost of some fodder imports

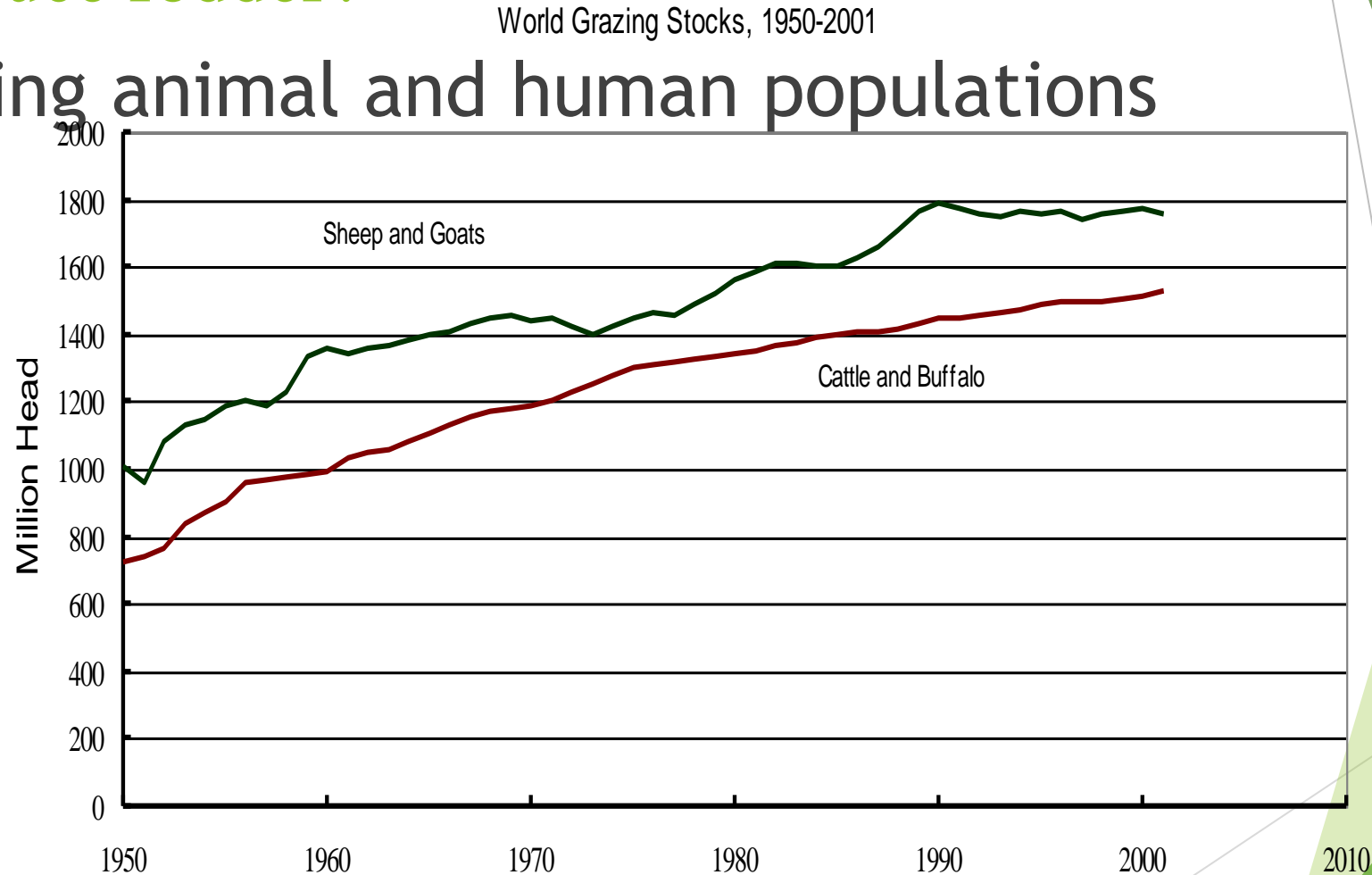
	Amount (bales)	Cost (Pula) '000	Land (Ha)
Lucerne	168 210	11 775	1250
Hay	104 000	2 600	750
Straw	62 792	1 256	500
Total	335 002	15 631	2 500

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Fodder Production for the Dry Season

Why produce fodder?

- ▶ Increasing animal and human populations



Source: FAO

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Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

Fodder crops

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



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Fodder Production for the Dry Season

Fodder crops

► Productivity and nutritive value of some **Forage Legumes**

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

Fodder Production for the Dry Season

Fodder crops

2. **Fodder cereals:** e.g. fodder maize (*Zea mais*), sorghum (*Sorghum bicolour*) and millet (*Pennisetum coracana*)



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Fodder Production for the Dry Season

Fodder crops

3. **Multi-purpose trees:** e.g. *Leucaena* (*Leucaena lucocephala*), Saltbush (*Atriplex nnumularia*), and *Moringa* (*Moringa oleifera*)







Fodder Production for the Dry Season

Fodder crops

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



Fodder Production for the Dry Season

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

Dailynews

The Paper that Informs and Educates



Friday January 15, 2010 No. 9

INSIDE
TODAY

Daily business

Plans in hand to
address electricity,
oil shortage

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Dikgang

Ba Phuduhudu
ba roma
lekoko

Tsebe 10

ISPAAD triples produce

By Mofusi Soloko

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

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

He said since 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 200 000 metric tonnes 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 arrive there a little earlier," he said, adding that the current increase in food production only constitutes 45 per



Fodder Production for the Dry Season

Common uses of fodder crops

- ▶ Regular/routine feeding in intensive production systems



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Fodder Production for the Dry Season

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

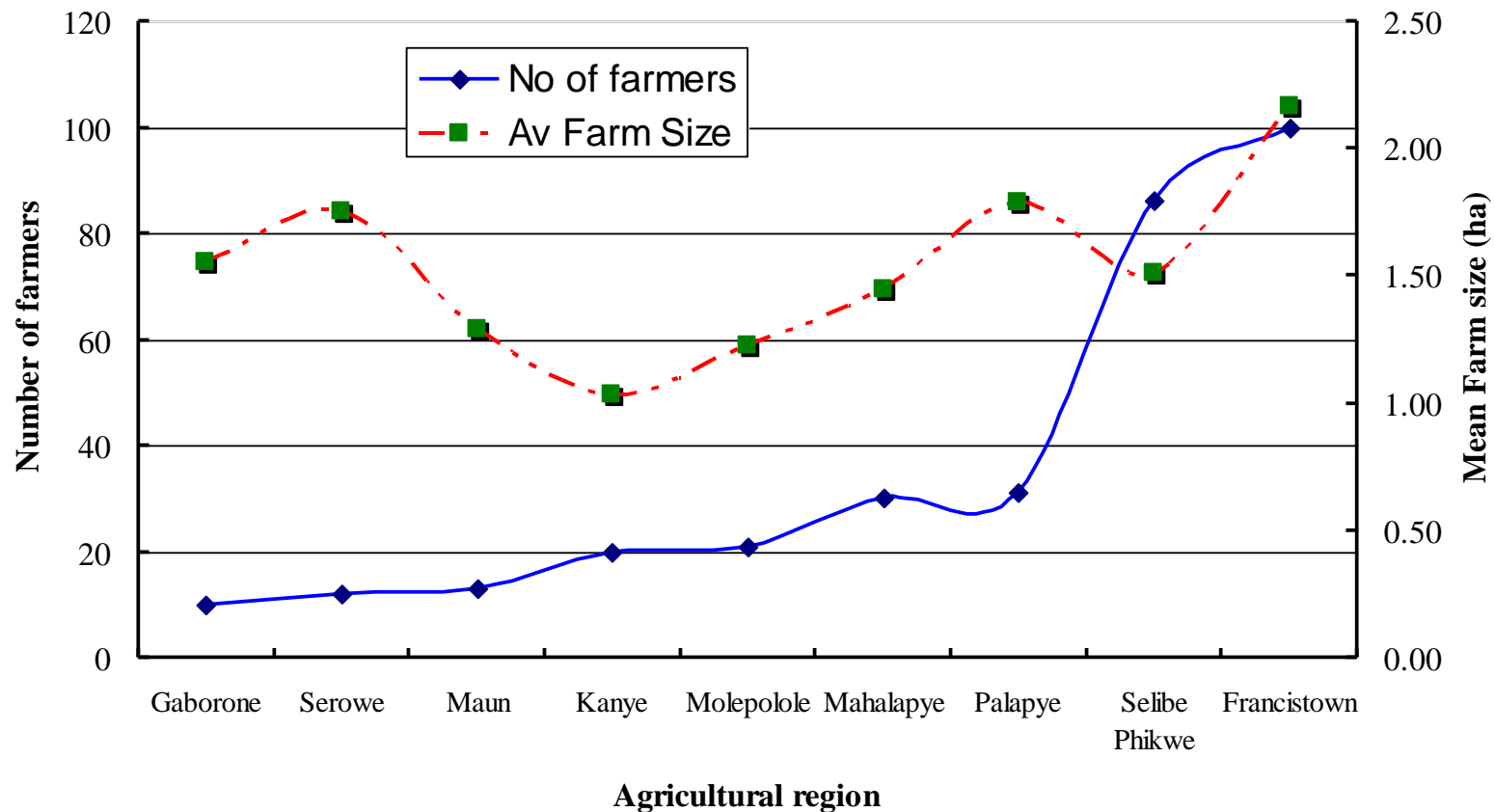
Fodder production in Botswana

- ▶ 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

Fodder Production for the Dry Season

Fodder production in Botswana

Average farm size and number of Lablab farmers by region

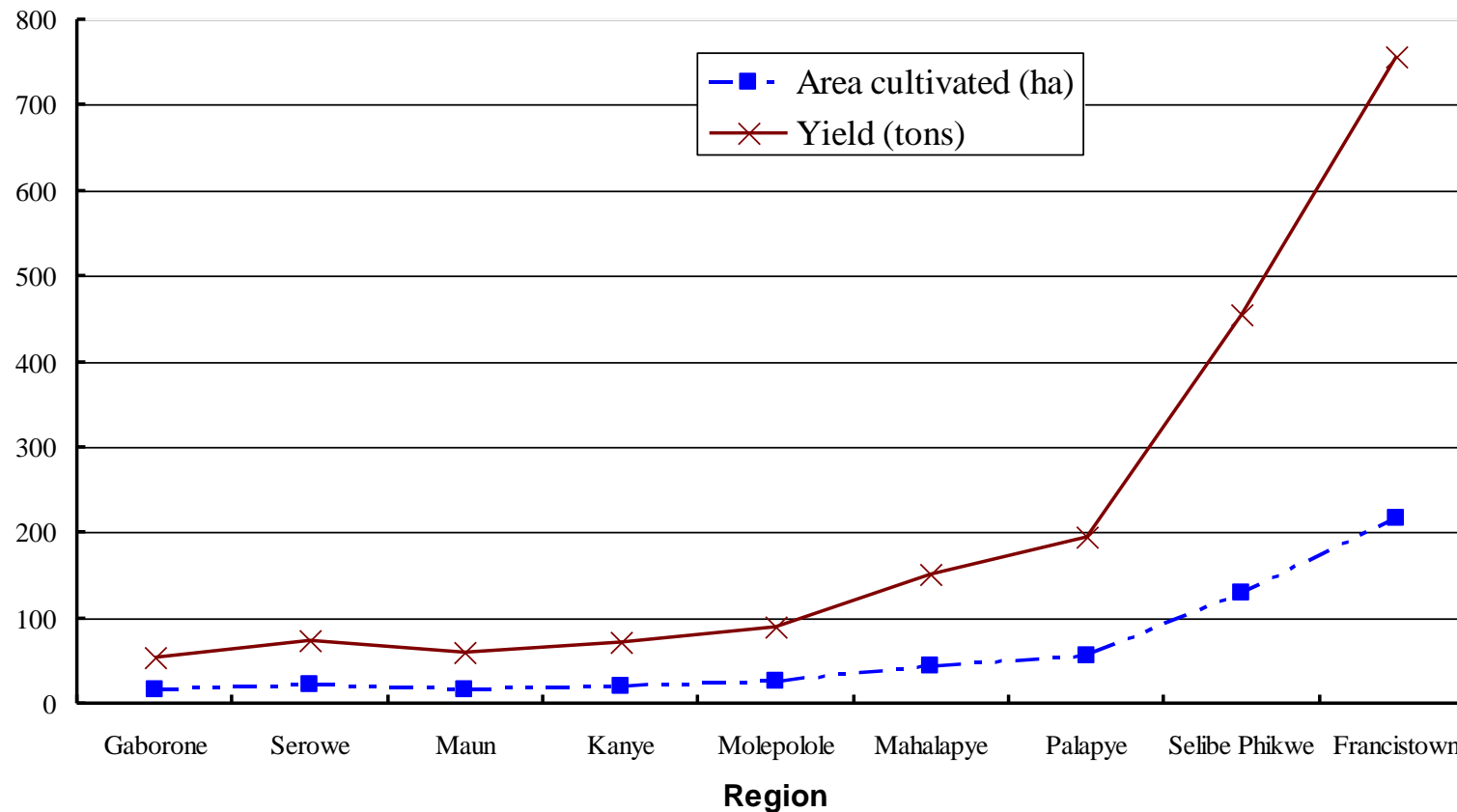


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Fodder Production for the Dry Season

Fodder production in Botswana

Area cultivated (ha) and yield (tons) of Lablab by region



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Fodder Production for the Dry Season

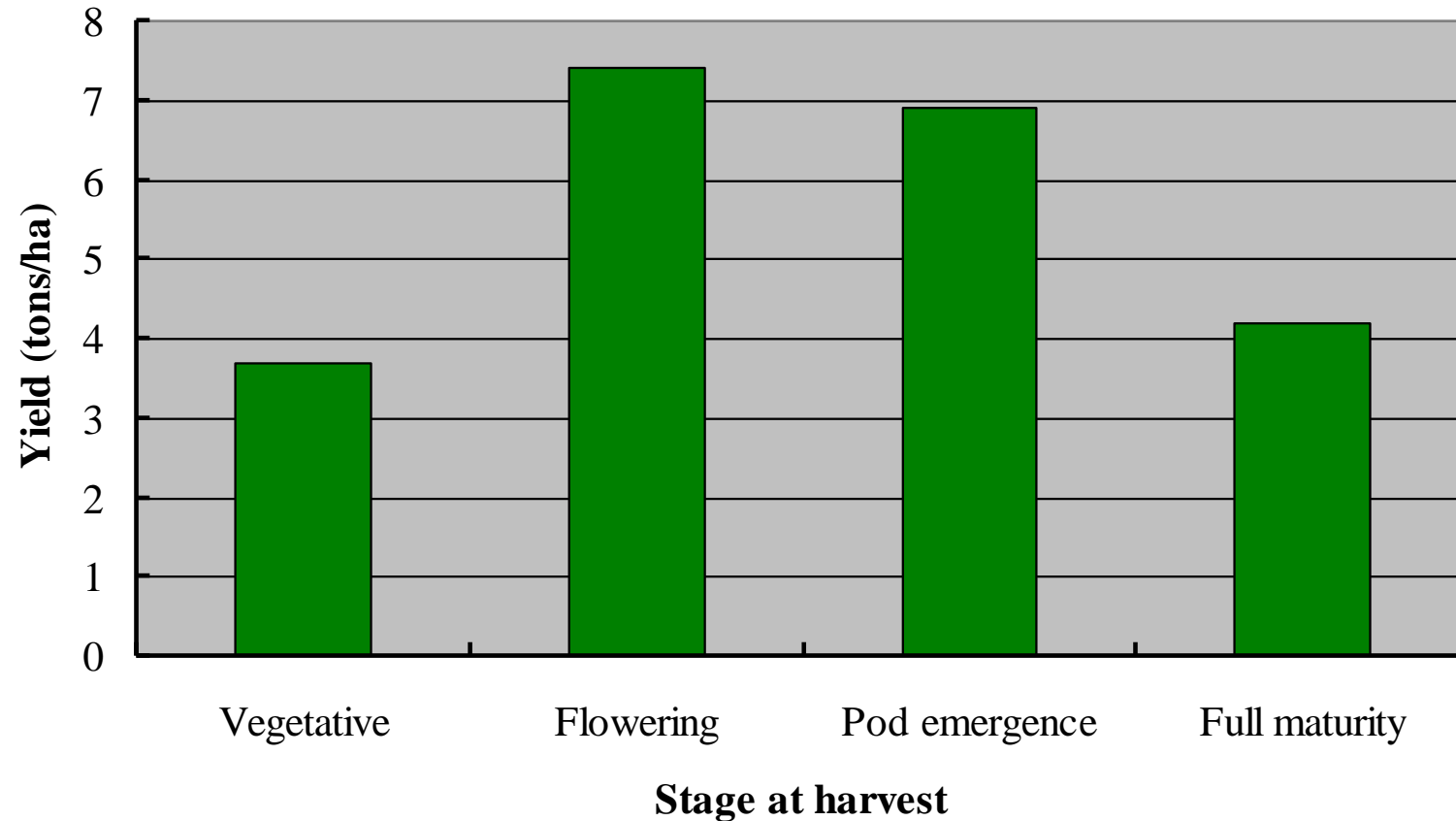
Challenges to fodder production in Botswana

- ▶ 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?

Fodder Production for the Dry Season

Challenges to fodder production in Botswana

Yields of Lablab under experimental conditions



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Fodder Production for the Dry Season

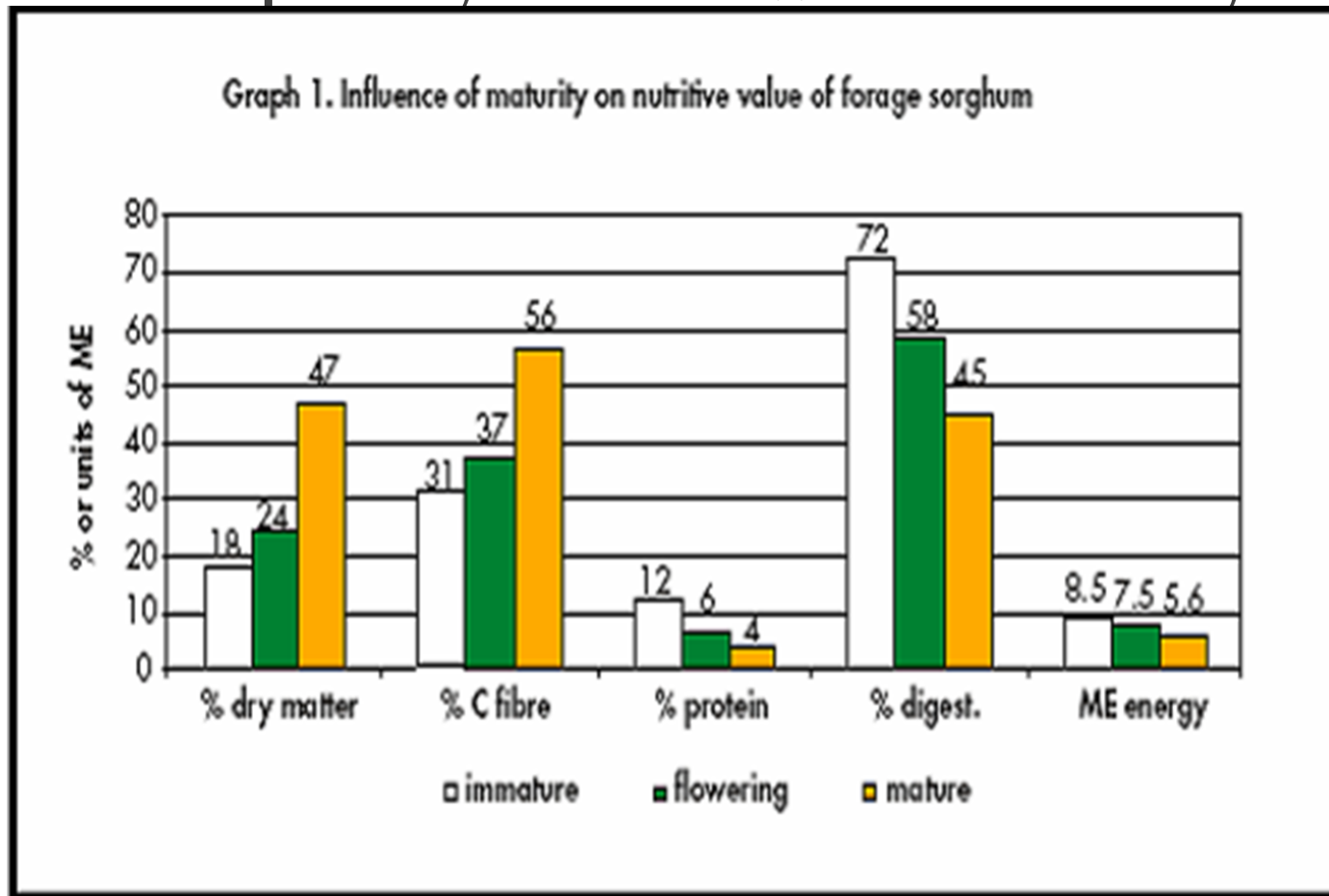
Challenges to fodder production in Botswana

- ▶ Yield of lablab in farmers' fields is about 3.5tons/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

Fodder Production for the Dry Season

Challenges to fodder production in Botswana

- Substantial quality losses with maturity



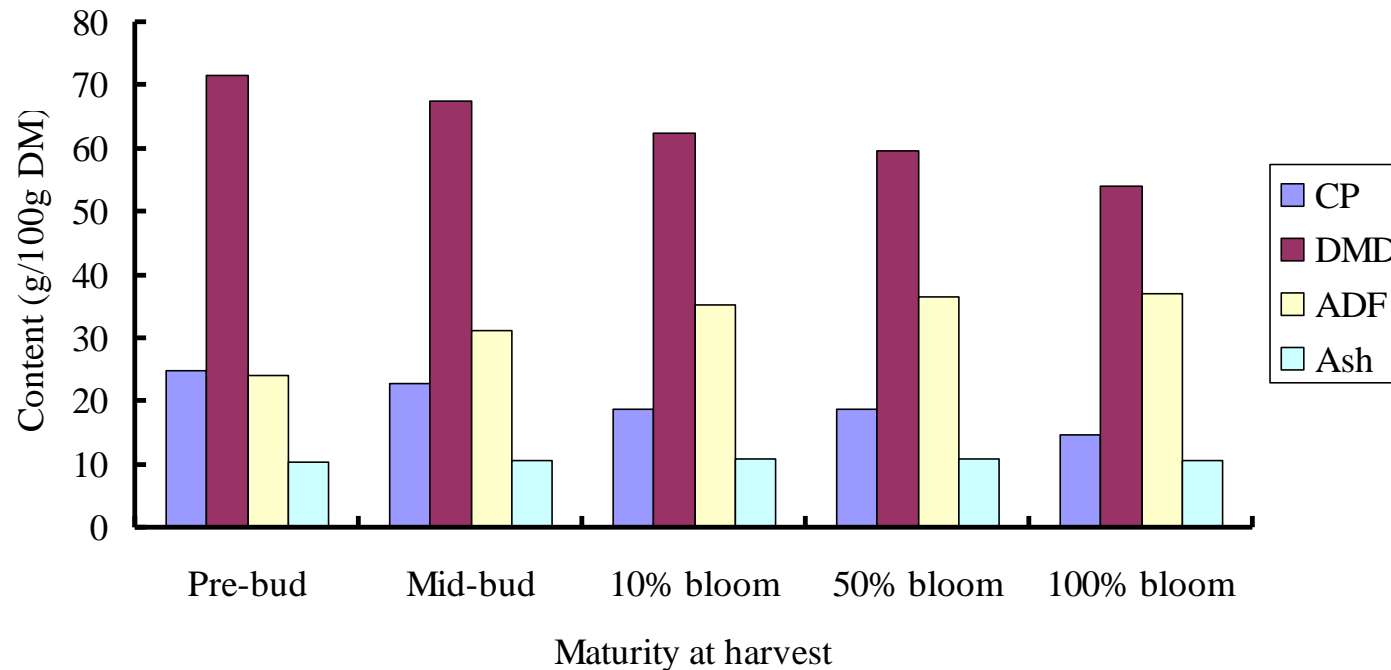
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Fodder Production for the Dry Season

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



Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

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.

Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

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



Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

Fodder Conservation is for



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Suggested strategies for increasing production and use of fodder

Are these achievable in BW?

Fodder Production for the Dry Season

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

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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.

Fodder Production for the Dry Season

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)

Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

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*

Fodder Production for the Dry Season

Effective use of marginal lands

Embracing improved systems of range use e.g.

- ▶ Controlled grazing
- ▶ Rotational grazing
- ▶ Differed grazing?
- ▶ Differed and rotational razing

Fodder Production for the Dry Season

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?





Fodder Production for the Dry Season

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.

Fodder Production for the Dry Season

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."

Fodder Production for the Dry Season

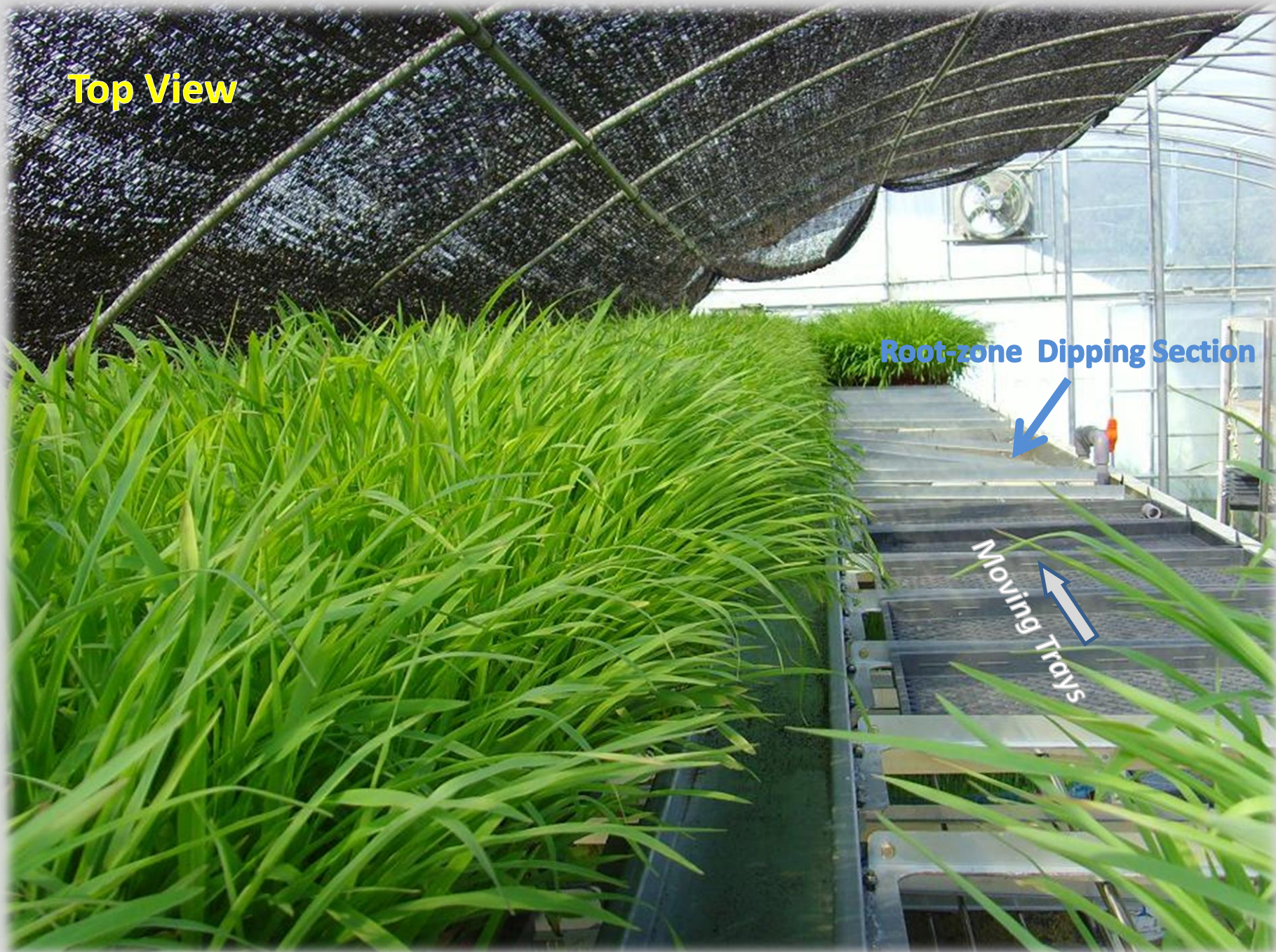
Bio-technologies in fodder production

- ▶ 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.

Top View

Root-zone Dipping Section

Moving Trays



Fodder Production for the Dry Season

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

Fodder Production for the Dry Season

THANK YOU FOR YOUR ATTENTION



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