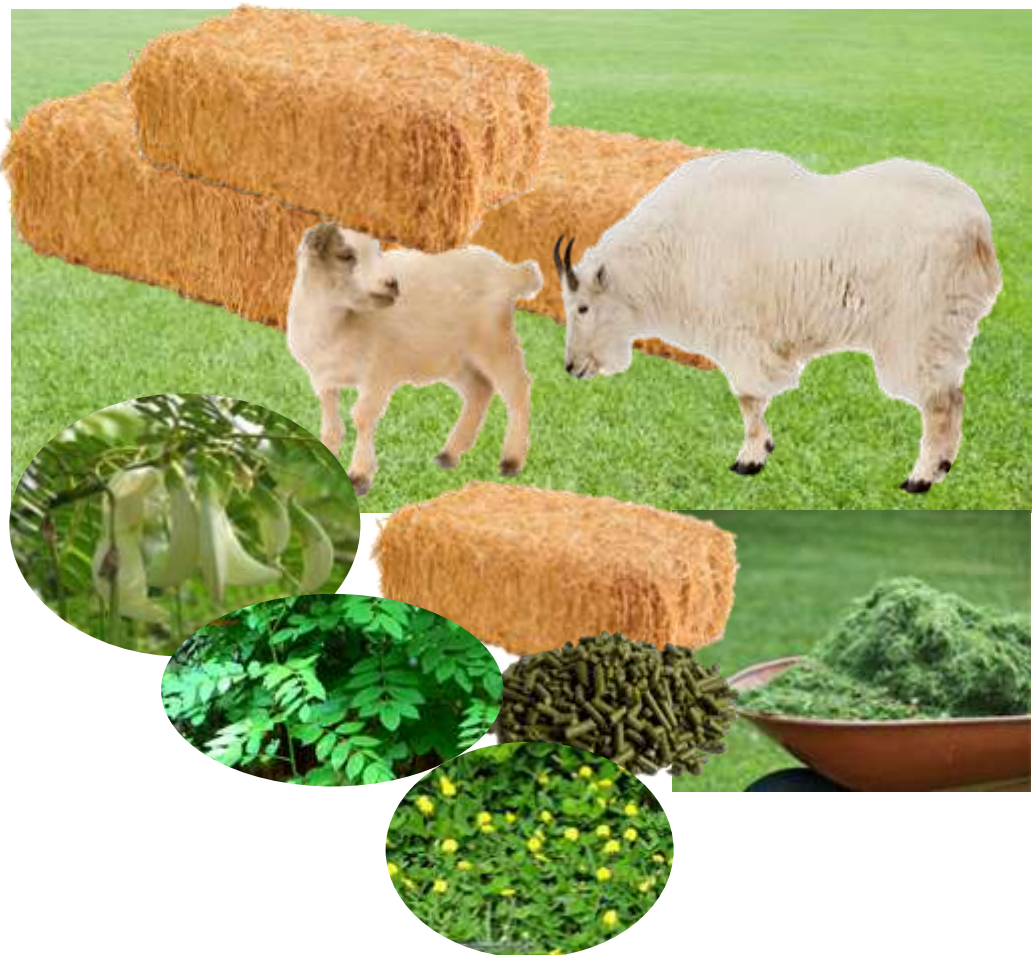


# FORAGE CROPS for SMALL RUMINANTS



## What is Forage?

Forage is composed of plant leaves and stems mostly eaten by grazing animals. It can be herbaceous legumes, grasses, shrubs or tree legumes.



## What are the Types of Forage?

### • Grasses:

- \* Serves as main feed for ruminants
- \* Produces more biomass than legumes



### • Legumes:

- \* Provides better quality feeds
- \* Provides protein, vitamins and minerals for more improved performance of animals
- \* Leguminous crop are cheap source of feeds
- \* It has lesser chance of ingesting infective larvae as compared to grazing lower growing vegetation



### • Multi – Purpose Tree Species






## Comparative Features

Forage Type	Quantity	Digestibility	Protein	Other Uses
MPTS	Low	High	High	Firewood Timber Green Manure Shade
Legumes	Medium	High	High	---
Grasses	High	Medium	Low	Thatching (building a roof w/ dry vegetation) Weaving




### Selection of Forage Species to Plant

- \* Adaptability to the environment
- \* Species that do not meet soil & climatic conditions but would need additional inputs & adjustments in management
- \* Growth habit determines adaptability to ways of integrating & using a specific forage
- \* Nutritive Value
- \* Availability of planting materials




## Multi – Purpose Tree Species for Pasture

Common Name	Scientific Name	Description
<p>White ball acacia</p> 	<p><i>Acaciella angustissima</i></p>	<ul style="list-style-type: none"> <li>* Drought tolerant</li> <li>* Can be used as a green manure and ground covering.</li> <li>* Leaves can be used in composting</li> <li>* Used as livestock feed</li> <li>* High in protein</li> <li>* It should only be used as an additive to the feed and not the main source, since it also toxic in high doses</li> </ul>
<p>Mulberry</p> 	<p><i>Morus</i> sp.</p>	<ul style="list-style-type: none"> <li>* Leaves and stalks are fed to ruminants</li> <li>* It has 70.8% for digestible CP, 48.4 % for total digestible nutrients and 35.6 % for starch equivalent on a dry basis</li> <li>* The digestibility of mulberry leaf: in vivo (goats) 78.4-80.8% and <i>in vitro</i> are very high (89.2%)</li> </ul>
<p>Hairy indigo</p> 	<p><i>Indigofera hirsuta</i> L.</p>	<ul style="list-style-type: none"> <li>* Warm season legume and is used as a green manure and cover crop</li> <li>* Contains 23.8 percent crude protein, 2.0 percent ether extract, 15.2 percent crude fibre, 46.8 percent nitrogen-free extract, 1.88 percent calcium and 0.37 percent phosphorus</li> </ul>



## Multi – Purpose Tree Species for Pasture

Common Name	Scientific Name	Description
<p>Kakawate</p> 	<p><i>Gliricidia sepium</i></p>	<ul style="list-style-type: none"> <li>* Used as cut and carry forage for cattle, sheep, and goats</li> <li>* High in protein</li> </ul>
<p>Madre de Agua</p> 	<p><i>Trichanthera gigantea</i></p>	<ul style="list-style-type: none"> <li>* Contains high concentrations of water-soluble carbohydrates and starch, and low NDF</li> <li>* CP content ranges from 12-22%, IVDMD ranges from 45-60% and DMD ranges from 50-70%</li> <li>* Contains comparatively high ash and calcium concentrations at 16-20% and 2.4-3.8% of DM, respectively.</li> <li>* The high ash and Ca concentrations may be related to the presence of cystoliths, small mineral concretions on the leaves and stems</li> </ul>
<p>Flamengia; malabalatong</p> 	<p><i>Flemingia macrophylla</i></p>	<ul style="list-style-type: none"> <li>* Contains 22.7 % crude protein (CP) and 8%tannin</li> <li>* Low digestibility because of high tannin and fibre content.</li> <li>* Low palatability to cattle, particularly in the wet season.</li> </ul>




## Multi – Purpose Tree Species for Pasture

Common Name	Scientific Name	Description
<p><b>Pigeon Pea</b></p> 	<p><i>Cajanus cajan</i> (L.) Millsp.</p>	<ul style="list-style-type: none"> <li>* Used as a protein source or supplement, due to its high concentration in CP in both seeds and leaves</li> <li>* The leaves are high in fiber, particularly ADF and lignin</li> </ul>
<p><b>Ipil-ipil</b></p> 	<p><i>Leucaena leucocephala</i> (Lam.) de Wit</p>	<ul style="list-style-type: none"> <li>* Provides an excellent source of high-protein cattle fodder</li> <li>* Contains mimosine, a toxic amino acid which is metabolized to goitrogenic DHP</li> </ul>
<p><b>Desmanthus</b></p> 	<p><i>Desmanthus virgatus</i></p>	<ul style="list-style-type: none"> <li>* It makes a good food plant for cattle, it is not as promising a feed for pigs</li> <li>* It is very tolerant of grazing</li> </ul>

## Multi – Purpose Tree Species for Pasture




Common Name	Scientific Name	Description
<b>Agati</b>	<i>Sesbania grandiflora</i> (L.) Pers.	<ul style="list-style-type: none"> <li>* Crude protein content is greater than 20% and often above 25-30% DM</li> <li>* It contains less fiber</li> <li>* The NDF content was estimated to be 29 and 37% of DM, and the ADF content to be 15.6 and 25.8% of DM</li> <li>* The acid detergent insoluble N content was 2.1% of total N, whereas lignin content was estimated to be 4-8% of DM</li> <li>* The digestibility and degradability of dry matter and nutrients are generally high</li> </ul>
		
<b>Katuray</b>	<i>Sesbania sesban</i> (L.) Merr.	<ul style="list-style-type: none"> <li>* A source of cut and carry forage</li> <li>* Used as a grazed forage</li> <li>* Leaves are a good source of protein for cattle and sheep</li> </ul>
		

## Legume Plants for Pasture



Common Name	Scientific Name	Description
<p>Calopo</p> 	<p><i>Calopogonium mucunoides</i> Desv.</p>	<ul style="list-style-type: none"> <li>* Used as cover crop</li> <li>* It provides soil protection against erosion, reduces soil temperature, improves soil fertility and controls weeds</li> <li>* can be grazed or cut and fed fresh</li> <li>* Has a low nutritive value</li> </ul>
<p>Peanut</p> 	<p><i>Arachis hypogaea</i> L.</p>	<ul style="list-style-type: none"> <li>* Highly palatable source of nutrition in animal <i>feed</i></li> <li>* Contain 6 to 8% moisture, 22 to 26% crude protein (CP) and 36 to 44% oil</li> </ul>
<p>Mani-manian, perennial peanut, rhizoma peanut</p> 	<p><i>Arachis glabrata</i></p>	<ul style="list-style-type: none"> <li>* Grown for hay, silage and pasture, and as ornamental ground cover</li> <li>* Very palatable and it has greater digestibility of dry matter, fiber, and protein,</li> <li>* A suitable protein and energy supplement feed</li> <li>* It is best used as a supplemental feed to other feeds such as grass</li> </ul>



## Grasses for Pasture

Common Name	Scientific Name	Description
Star grass 	<i>Cynodon plectostachyus</i> (K. Schum.) Pilger	<ul style="list-style-type: none"> <li>* Can be cut in order to be fed fresh or to make hay</li> <li>* Contains about 10% protein in the DM while the CP of young grass can exceed 15% of the DM, and more than 18% when N fertilizer is applied</li> <li>* It can produce high levels of hydrogen cyanide when overstressed by defoliation, drought and heavy grazing/trampling</li> <li>* Does not have a high nutritive value, particularly during the dry season</li> </ul>
Alabang X 	<i>Dichanthium aristatum</i>	<ul style="list-style-type: none"> <li>* Suitable for grazing and cut-and-carry, and for hay before flowering</li> <li>* CP values are often low, but can be increased by N fertilization up to 12.5% CP in young foliage.</li> <li>* Well eaten by all classes of stock when leafy</li> <li>* Low in oxalate</li> </ul>
Guinea grass 	<i>Megathyrsus maximus</i>	<ul style="list-style-type: none"> <li>* For pasture, cut-and-carry, silage and hay</li> <li>* Suited to grazing and cutting</li> <li>* Palatable to livestock with a good nutritional value</li> <li>* The crude protein ranges from 6-25% depending on age</li> </ul>

## Grasses for Pasture

Common Name	Scientific Name	Description
<p>Napier grass, Elephant grass</p> 	<p><i>Pennisetum purpureum</i></p>	<ul style="list-style-type: none"> <li>* A very important forage in the tropics due to its high productivity</li> <li>* Used in cut-and-carry systems ("zero grazing") and fed in stalls, or made into silage or hay</li> <li>* 25.7% DM, 9.2% CP, 60.5% of DOM</li> </ul>
<p>Stylo</p> 	<p><i>Stylosanthes guianensis</i></p>	<ul style="list-style-type: none"> <li>* Used for hay, cut-and-carry systems and pasture</li> <li>* Palatable to livestock when mature and can grow on relatively infertile soils</li> <li>* 12-20% CP, 2-60 % IVDMD , 0.2-0.6% P, 0.6-1.6% Ca.</li> </ul>

## References:

Utilization of mulberry as animal fodder in India. Retrieved July 5, 2016 from <http://www.fao.org/docrep/005/X9895E/x9895e0h.htm>) [Utilization of mulberry as animal fodder in India](#); R.K. Datta, A. Sarkar, P. Rama Mohan Rao and N.R. Singhvi; Central Sericultural Research and Training Institute, Central Silk Board, Srirampura, Mysore, India

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