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

<table>
<thead>
<tr>
<th>Forage Type</th>
<th>Quantity</th>
<th>Digestibility</th>
<th>Protein</th>
<th>Other Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPTS</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Firewood Timber Green Manure Shade</td>
</tr>
<tr>
<td>Legumes</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>---</td>
</tr>
<tr>
<td>Grasses</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Thatching (building a roof w/ dry vegetation) Weaving</td>
</tr>
</tbody>
</table>

## 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

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| White ball acacia  | *Acaciella angustissima*   | * Drought tolerant  
* Can be used as a green manure and ground covering.  
* Leaves can be used in composting  
* Used as livestock feed  
* High in protein  
* It should only be used as an additive to the feed and not the main source, since it also toxic in high doses |
| Mulberry           | *Morus sp.*                | * Leaves and stalks are fed to ruminants  
* It has 70.8% for digestible CP, 48.4 % for total digestible nutrients and 35.6 % for starch equivalent on a dry basis  
* The digestibility of mulberry leaf: in vivo (goats) 78.4-80.8% and in vitro are very high (89.2%) |
| Hairy indigo       | *Indigofera hirsuta L.*     | * Warm season legume and is used as a green manure and cover crop  
* 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 |
# Multi – Purpose Tree Species for Pasture

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<tbody>
<tr>
<td>Kakawate</td>
<td><em>Gliricidia sepium</em></td>
<td>* Used as cut and carry forage for cattle, sheep, and goats</td>
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<td>* High in protein</td>
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<tr>
<td>Madre de Agua</td>
<td><em>Trichanthera gigantea</em></td>
<td>* Contains high concentrations of water-soluble carbohydrates and starch, and low NDF</td>
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<td>* CP content ranges from 12-22%, IVDMD ranges from 45-60% and DMD ranges from 50-70%</td>
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<td>* Contains comparatively high ash and calcium concentrations at 16-20% and 2.4-3.8% of DM, respectively.</td>
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<td>* The high ash and Ca concentrations may be related to the presence of cystoliths, small mineral concretions on the leaves and stems</td>
</tr>
<tr>
<td>Flamengia; malabalatong</td>
<td><em>Flemingia macrophylla</em></td>
<td>* Contains 22.7 % crude protein (CP) and 8% tannin</td>
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<td>* Low digestibility because of high tannin and fibre content.</td>
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<td>* Low palatability to cattle, particularly in the wet season.</td>
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</table>
| Pigeon Pea  | * Cajanus cajan (L.) Millsp.                  | * Used as a protein source or supplement, due to its high concentration in CP in both seeds and leaves  
* The leaves are high in fiber, particularly ADF and lignin |
| Ipil-ipil   | * Leucaena leucocephala (Lam.) de Wit         | * Provides an excellent source of high-protein cattle fodder  
* Contains mimosine, a toxic amino acid which is metabolized to goitrogenic DHP |
| Desmanthus  | * Desmanthus virgatus                        | * It makes a good food plant for cattle, it is not as promising a feed for pigs  
* It is very tolerant of grazing |
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| Agati       | *Sesbania grandiflora* (L.) Pers. | * Crude protein content is greater than 20% and often above 25-30% DM  
* It contains less fiber  
* 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  
* The acid detergent insoluble N content was 2.1% of total N, whereas lignin content was estimated to be 4-8% of DM  
* The digestibility and degradability of dry matter and nutrients are generally high |
| Katuray     | *Sesbania sesban* (L.) Merr. | * A source of cut and carry forage  
* Used as a grazed forage  
* Leaves are a good source of protein for cattle and sheep |
# Legume Plants for Pasture

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| Calopo               | *Calopogonium mucunoides* Desv.          | * Used as cover crop  
* It provides soil protection against erosion, reduces soil temperature, improves soil fertility and controls weeds  
* can be grazed or cut and fed fresh  
* Has a low nutritive value |
| Peanut               | *Arachis hypogaea* L.                    | * Highly palatable source of nutrition in animal *feed*  
* Contain 6 to 8% moisture, 22 to 26% crude protein (CP) and 36 to 44% oil |
| Mani-manian, perennial peanut, rhizoma peanut | *Arachis glabrata*                        | * Grown for hay, silage and pasture, and as ornamental ground cover  
* Very palatable and it has greater digestibility of dry matter, fiber, and protein,  
* A suitable protein and energy supplement feed  
* It is best used as a supplemental feed to other feeds such as grass |
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| Star grass  | *Cynodon plectostachyus* (K. Schum.) Pilger | * Can be cut in order to be fed fresh or to make hay  
* 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  
* It can produce high levels of hydrogen cyanide when overstressed by defoliation, drought and heavy grazing/trampling  
* Does not have a high nutritive value, particularly during the dry season |
| Alabang X   | *Dichanthium aristatum*                  | * Suitable for grazing and cut-and-carry, and for hay before flowering  
* CP values are often low, but can be increased by N fertilization up to 12.5% CP in young foliage.  
* Well eaten by all classes of stock when leafy  
* Low in oxalate |
| Guinea grass| *Megathyrsus maximus*                     | * For pasture, cut-and-carry, silage and hay  
* Suited to grazing and cutting  
* Palatable to livestock with a good nutritional value  
* The crude protein ranges from 6-25% depending on age |
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<td>Napier grass, Elephant grass</td>
<td><em>Pennisetum purpureum</em></td>
<td>* A very important forage in the tropics due to its high productivity</td>
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<td>* Used in cut-and-carry systems (&quot;zero grazing&quot;) and fed in stalls, or made into silage or hay</td>
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<td>* 25.7% DM, 9.2% CP, 60.5% of DOM</td>
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<tr>
<td>Stylo</td>
<td><em>Stylosanthes guianensis</em></td>
<td>* Used for hay, cut-and-carry systems and pasture</td>
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<td>* Palatable to livestock when mature and can grow on relatively infertile soils</td>
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<tr>
<td></td>
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<td>* 12-20% CP, 2-60% IVDMD, 0.2-0.6% P, 0.6-1.6% Ca.</td>
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</tbody>
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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, Sriramapura, Mysore, India

http://www.fao.org/ag/agp/agpc/doc/gbase/data/Pf000045.HTM
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