

Forage crops

Forage: Vegetative plant parts (i.e leaves, flowers and stems of plants) eaten by animals, could be domesticated or wild animals.

Forage crops: are crops grown specifically to be grazed by livestock or conserved as hay or silage.

Pasture: land covered with grass and other low plants suitable for grazing animals, especially cattle or sheep.

Range: are types of natural pastures, which are areas. Very spacious areas in which plants grow naturally and which are suitable for grazing animals.

Vegetative: The vegetative cover of a specific area expresses the group of plants and plant species growing in that region, and this covering changes with change environmental conditions.

Fodder: More specific term referring to the vegetative part of cultivated forages or crops used as forages.

Feed: Is a more general term that includes also non-vegetative plant parts e.g grains, seed etc. fed to animals. Sometimes, it is difficult to differentiate between feed, forage and fodder, for example when animals consume the seed head and other part of herbaceous plants together.

Roughages: Rough forages which contain a high ratio of fiber, while the ratio of protein and vitamins may be Low.

Concentrated: Forages which containing a low percentage of fiber, while the ratio of protein and vitamins are high.

Straw: A product of forage crops, which is a dry parts of crop remnants after taking seeds.

Hay: it is harvested forage at a specific growth stage and dried to moisture percentage 15-20%.

Silage: storage in isolation from the air and transformed sugars to lactic acid and reduced PH from (6-7) to 4, stop action of bacteria and remains conservative on the nutritional value.

Soiling: refer to vegetative nutrition, cut vegetative forage is green and submit to the animals in the pasture.

Grazing: refer to feeding animals in the field without cutting.

Forages crops are classified into two basic broad groups:

(i) Herbaceous plants

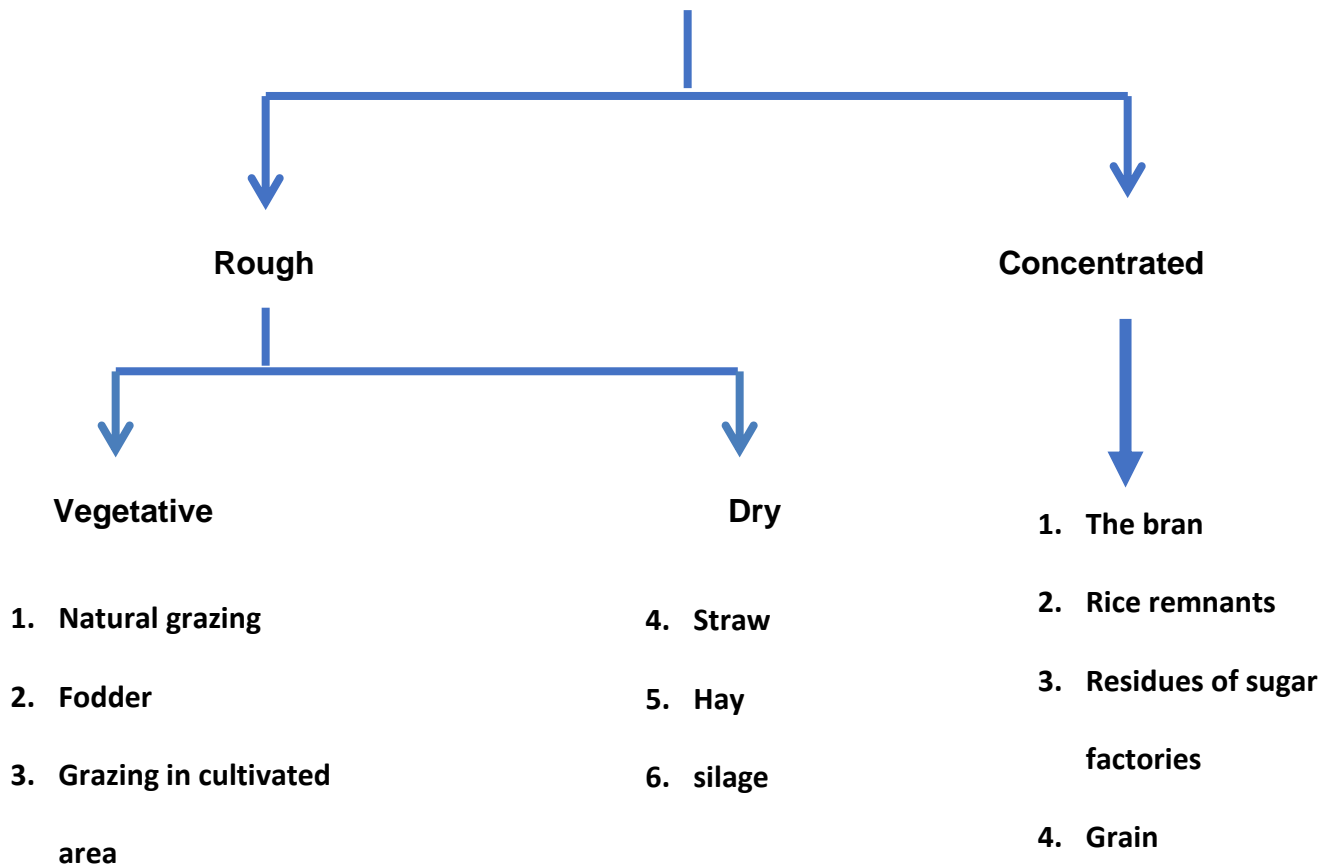
(ii) Woody plants.

While woody plants grow cumulative over many years, herbaceous species show an annual cycle of growth and decay, re-growing each year from seed, but perennial herbaceous species regrow from existing root stock.

Among the herbaceous group, two subgroups are most particular interest as sources of forage, such as:

- 1. Grasses:** These make up the bulk of plants found in many mixtures of the natural vegetation that supply animal feed. Grasses also have certain characteristics that make them very suitable as herbage plants.
- 2. Legumes:** these have a relatively high value for animal production, mainly on account of the high nitrogen content in the vegetative matter that represent the animal feed. They also play significant roles components in sustainable agricultural systems.

Forage Sources



A brief history of the cultivation of forage:

There are no facts or documents indicate to the beginning of agriculture, but there are pointers to the history of domestication (transfer organisms from wilderness state to state pet) to be modern comparison on cereal cultivation , reason for this is that Neanderthal adopted on hunting in the beginning of his life and when breeding animals adopted on natural grazing.

Agriculture is a turning point in human history where transformed it from travel, migration and search for food depending on hunting to a life of stability. First plants planted by humans and was the most capable of production are grassy crops such as wheat.

When started, population growth and increase animals number in addition to some areas suffering from extreme cold and drought in some seasons as a starting point, the idea of growing crops as forage and alfalfa is the first forage crop knew at that time.

Greeks are the first to have proficient in this field and agriculture date back to 2500 BC It is believed that alfalfa and clover. The cultivation dates of Egyptian clover return to the Greek and Roman. After that developed forage crops, and then moved to Europe and then to America, the first global conference in 1927 and was held in Germany.

Economic and agricultural importance of forage crops:

Importance of forage crops:

A. Economic Importance:

This importance comes from the following factors:

1. The presence of animals in the region or country and therefore the need to provision of forage for perpetuating and developing.
2. Provide forage plants by virtue of the nature of the land and environmental conditions.
3. Commerce and achieve a profit.
4. Needs of human to animal protein.

B. The importance and benefits of forage in agricultural side:

Forages can be the simple answer to soil erosion and decline in organic matter and fertility, a problem caused by modern cultivation. Forages can also help reduce nitrogen fertilizer costs and the energy costs associated with applying nutrients.

Many farmers are using forages for positive results on any land. The benefits in include:

- 1. Increased Soil Fertility :** Legume forages such as alfalfa are usually inoculated with rhizobia bacteria at the time of seeding in order to force the development of tiny nodules on the plant root hairs. These nodules capture nitrogen (N) from the atmosphere and make it available for plant growth and development, a process called nitrogen fixation. Because inoculated legumes are very effective at nitrogen fixation, they are able to return their stored nitrogen to the soil through root decay for subsequent grain crops to utilize.

When a legume grass stand is terminated, there will be high amounts of nitrogen for subsequent crops at the beginning of the following season, but it will be lost if it is not used. On the other hand, studies show that in a no-till system when herbicide is used for crop termination, N becomes mineralized and is released more slowly at rates that can be better utilized by plants. This type of N release is metered out over the growing season and into the next, and can improve protein levels in spring wheat.

- 2. More Organic Matter:** The extensive root systems of perennial forages add significant amounts of soil organic matter. A 3-year perennial forage crop has been shown to return more than twice the soil organic matter as annual crops such as cereals or pulse crops. Soil organic matter is the energy which fuels decomposer organisms, which in turn affect soil structure, water-holding capacity, and resistance to both compaction and erosion.
- 3. Less Crusting:** Soils higher in organic matter have fewer tendencies to crust, a problem when you are establishing many small-seeded crops and large-seeded pulses.
- 4. Better Water Infiltration and Drainage Forage:** Roots improve water infiltration, especially on clay soils. This results in improved soil drainage and water use by subsequent crops, and it can help producers get on the land earlier in spring when excess moisture is often an issue. Improved drainage is especially evident when alfalfa is terminated with herbicide, rather than tillage, because soil pores and tunnels remain intact.

- 5. Subsoil Advantages:** Studies have shown that a perennial legumes drainage effect on subsoil lasts for at least 2 years after stand termination, particularly with alfalfa. On clay soil, because of this improved drainage, alfalfa-based rotations produce higher wheat yields than those of annual grain-based rotations.
- 6. Less Tillage in Subsequent Crops:** Because of increased organic matter and better internal drainage, soil becomes more workable and requires less tillage.
- 7. Less Root Disease:** Studies on cereal crops following 3-year forage hay stands have shown that there are reduced occurrences of common root rot. Perennial forage crops break disease cycles by removing host plants from the rotation for a longer term, thus reducing the level of pathogens in the soil.
- 8. Reduced Salinity:**

Soil salinity is caused when high water tables bring salts to the soil surface. Through deep roots that improve drainage, forages help to lower the water table level and thus reduce soil salinity. Alfalfas extremely deep roots can also lower salinity levels in the rooting zone of subsequent crops.
- 9. Less Erosion:**

Crop rotations that include forages provide more soil cover. Soil has higher levels of organic matter and a more stable structure to reduce the potential for wind and water erosion.
- 10. Anti-Leaching Effects:** Perennial legume forages can extract nutrients such as N and phosphorus (P) from up to a 10-foot depth due to their deeper and more permanent root system as compared to annual crops. In particular, the deep taproot of alfalfa can utilize nitrogen that has leached past the rooting zone of annual crops – up to a depth of 3 feet the first year to 9 feet in year 4, according to recent research based on a four-year alfalfa stand.
- 11. Increased Yield and Quality in Following Grain Crops:** Forages can produce increased yields in your subsequent grain crops, and improve quality, too.

How to choose the appropriate vegetative fodder?

When choosing the appropriate fodder should take into consideration the following points:

1. **High production capability:** Can be obtained at the highest productivity through appropriate fertilization, weed control, resistance to pests and diseases, appropriate irrigation and the use of high production varieties.
2. **Distribution of production throughout the year:** Facing the process of the production of green fodder problem of availability throughout the year where compete economic crops for human nutrition.
3. **Compatibility species:** Must consider the compatibility of species, especially when planting forage mixtures.
4. **Easily create pasture:** taking into account the ways of cultivation.
5. **Crop's ability to produce seeds:** It is important to get the proper amounts of seeds to re-agriculture.
6. **The ability to bear environmental conditions:** Choose crops suitable to the conditions prevalent in the region.
7. **Length of survival:** As divided crops to annual, biennial and perennial plants and so you must choose the appropriate type to period of stay required.
8. **Forage crops do not contain the toxic compounds:** Sometimes accumulates toxic substances such as prussic acid and nitrate salts, especially in abnormal environmental conditions as in sugar crops such as corn and Johnson grass is a natural.

Forage Establishment

The way for production of success full fodder begins with field has good plants and can't get it, only by achieving the following requirements:

1. The use of good and vitality seeds and suitable varieties to the conditions of the region.
2. Prepare the appropriate seedbed.
3. Planting seeds at a suitable depth.
4. Weed control.

Good seeds qualities:

1. High germination rate.
2. Purity of seeds from the weeds seed, pests and diseases.
3. Large seed size and increased qualitative weight.

Seed bed preparation:

A quality of seedbed is the most important feature in obtaining maximum germination of forage seeds. The ideal seedbed features:

1. Surface level enough that machinery can place seed at a satisfactory depth;
2. Enough fine soil aggregates to put the germinating seed in close contact with soil and allow moisture to transfer to the seed;
3. Soil surface rough enough to prevent crusting on the surface.

Methods of seeding:

1. Broadcasts the seed.

Advantages:

- a. Reduces weeds competition.
- b. Reduces seedling death as a result of cracked soil.
- c. Increased utilization of fertilizer distributor.

Disadvantages:

- a. Difficulty distributing small amount of seeds regularly.
- b. Failure to ensure cover seeds.

2. Cultivated as drill rows.

Advantages:

- a. Control the amount of seed.
- b. Ease of weed control.
- c. Possibility of the use of mechanical harvesters.
- d. Concentration of fertilizer near the lines specially when using band seeding.

Seeding depth:

Seeding depth depends on the size and specific weight of seeds and is also affected by the availability of moisture.

Quantity of seeds (seeds amount): That is depending on some factors such as:

1. Availability of moisture.
2. Plant type.
3. Forage type.
4. Seedbed.
5. Soil fertility.

Seeding date:

Depends on the type of crop and appropriate season. Generally early planting is better than late as it is the longer growing season increased yield.

Forage harvest:

The harvest is to leave the animals for grazing or use of mechanical machines and stored according to the type of forage.