

Range Inventory

Range: Range means broad, open, unfenced areas over which grazing animals roam.

Inventory: To make a systematic list of something.

Range inventory is the process of gathering and analyzing information of physical and biological characteristic of range or rangeland. Rangeland information is obtained by observation or from public and private records. Information collected in the inventory is used as a framework to aid in the development of range classification systems. Rangeland Inventory involves collection of range data systematically, evaluation the data scientifically and produce a practical, and a workable range management plan under improved management condition. Rangeland inventory includes:

- Classification of rangeland
- Mapping of the vegetation types of the range
- Range improvement process
- Prevailing (Usual) trend, its production and utilization
- Readiness of the range for the specific purpose
- Season of the range use

Purpose of Range Inventory

- a. **Ecological classification:** To determine physical and environmental factors such as precipitation, topography, soil, vegetation
- b. **Range forage inventories:** To determining grazing capacity (domestic or wild animals) and to focus on plant species
- c. **Utilization survey:** To assessing the current grazing pressure and to determining suitability of current stocking level or management system
- d. **Condition and trend analysis:** To judge the suitability of stocking and management practices which is based on successional and community dynamics concept.
- e. **Multiple use surveys:** To determine the entire biological and physical resource based with the objective of integrating all capabilities.
- f. **Rangeland assessments:** To determining economic productivity of a range area.

Range inventory is particularly concerned with the classification of shrubs (tall and low) and herbs (forbs and graminoids), which are forage for livestock and wildlife.

Vegetation inventories: (a) To find out the absolute or relative abundance of plant species (b) Data quantified by: Numeration, volume or weight

Vegetation inventory of range samples consist of: (i) a complete listing of plant species present (ii) shrub transects to measure shrub abundance (iii) Micro-plots to estimate forage production and utilization.

Methods of Vegetation Analysis or Species Inventory Listing

The Process of identification and listing of all available species (grasses, grass-like plants, herbs, shrubs and tree of a rangeland is called species listing. It requires

- a. Local people discussion and their experience and investigator experience.
- b. Survey of the range area.
- c. Collection of sample plants.
- d. Identification of all the plant collected.
- e. You need to do species listing at first.

Format for species listing I

Local Name	English Name	Scientific Name	Symbol
Napier ghas	Napier	Pennisetum purpureum	Pepu
Setaria Ghans	Setaria	Setaria acepa	Seac
Panic Ghans	Green Panic	Penicum maximun	Pama
.....

After species listing in format I, available data need to further divided into several group based on the preference

Format for species listing II

Preference Type	Local Name	English Name	Scientific Name	Symbol
Desirable sp	Napier ghas	Napier	Pennisetum purpureum	Pepu
Intermediate sp	Setaria Ghans	Setaria	Setaria acepa	Seac
Least Desirable Sp	Panic Ghans	Green Panic	Penicum maximun	Pama
Not Desirable Sp

There may be many species of vegetation that cannot be recognized and identified that may be specific to the area under study. They should be brought to the highly specialized

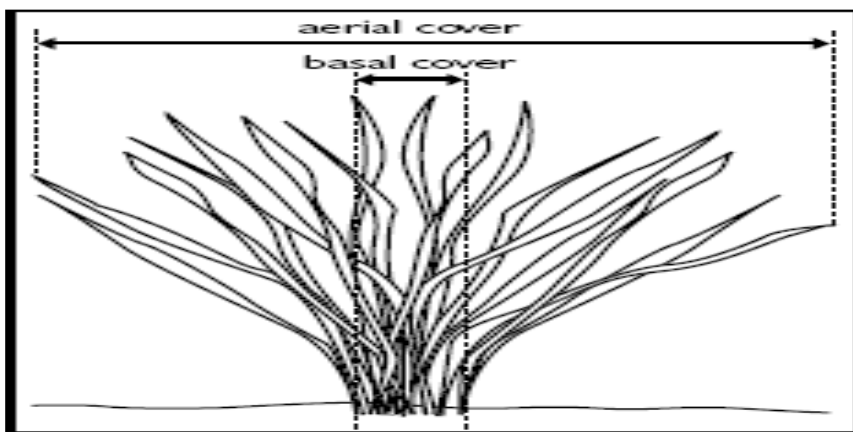
person for their identification. Consult with expert of Department of plant resources. Or by *leaf snap* and *picture this* “smart phone applications”.

General Observation

In this method overall condition of rangeland observed by visual method. It is highly subjective study of vegetation study. It may vary from observer to observer and required a lot of experience. It aims to make a quick assessment on the species of a grassland site and assess any current or potential threats. As well as providing baseline survey data, it will allow the project team to priorities sites for future conservation management.

Cover: Cover is the vertical projection of vegetation from the ground as viewed from above. Two types of cover are recognized for the study.

1. Basal cover is the area where the plant intersects the ground;
2. Aerial cover is the vegetation covering the ground surface above the ground surface. You can visualize aerial cover by considering a bird's-eye view of the vegetation. It is the indicator of the dominance of a particular species of vegetation in the rangeland and also, the biomass of the vegetation in the rangeland can be estimated. It can be expressed in fraction (portion) or percentage.

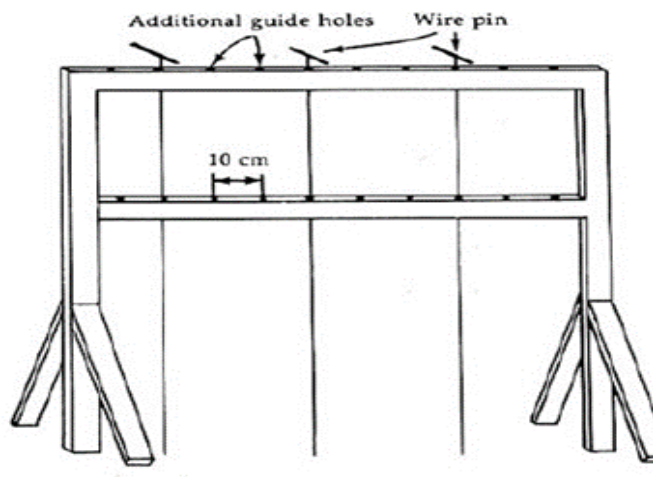


Cover can be estimated by the following method:

Visual estimation: It is the estimation of a vegetation cover in a particular area based on general visualization. So it required a lot of experience to be close to the correctness. This is also subjective method, may vary with surveyor.

In this method, several circular or rectangular quadrants are used and each of them is estimated individually to have the estimate of overall area.

Point/Frame/Hit method: It Consists of metallic frame, sliding pins at equal intervals set in vertical position by means of rigid crossbars. The length of pin varies from few inches to a foot depending upon the vegetation. Commonly, frame consists of 10 sliding pins of one ft length.



Procedure:

- Samples are visual surveyed.
- Vegetation species to be estimated are identified.
- Set frame in field randomly.
- All pins are pulled and each pin is lowered
- Hits by the pins are recorded

Cover % = $\frac{\text{Mean of all the hits (total hits on a particular vegetation species)}}{\text{Total number of pin lowered}} \times 100$

Total number of pin lowered

Disadvantage of point/hits method

- Broad leaf plants are hit more
- Blunt pins are likely to overestimate
- Wind movement biasness
- Time consuming

Line interception method: It consists of recording horizontal linear measurement of a particular species or more than a species along a line. Plant foliage that is intercepted along the line is measured and the total intercepts of the vegetation species to be estimated along the line is the percentage of the ground surface covered by that particular species.

$$\text{Cover \%} = \frac{\text{Distance Intercepted}}{\text{Total Length}} \times 100$$

Procedure

- A metallic tape of 100 ft or as required
- Sample area is surveyed.
- Plant species to be estimated and identified.
- Transacts are drawn randomly holding two ends of the tape
- It is stretched at a uniform height
- Plant foliage intercepted by the transact is recorded.

Density: It is defined as the number of individual species present in unit area. It can be expressed in fraction or percentage. It is a more precise method than the cover method. It involves the actual counting of vegetation species and involves little or no estimation. Generally, 2.5 X 2.5 m plots are used

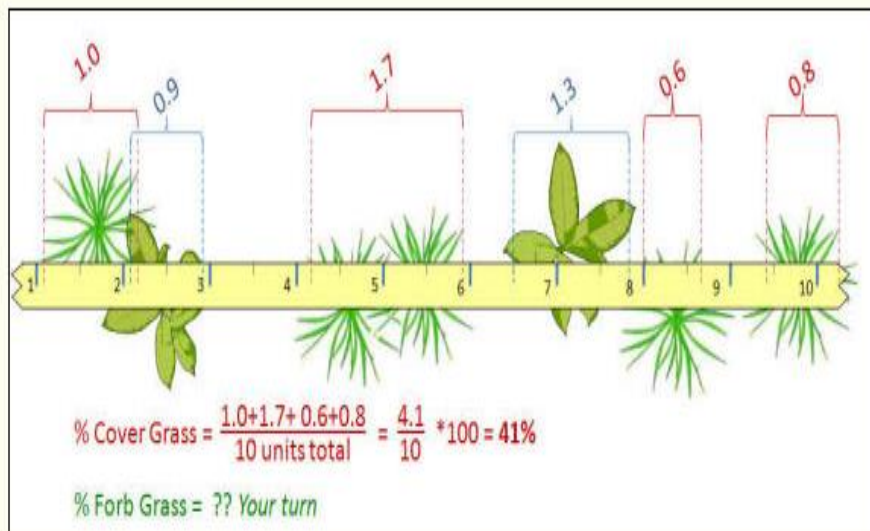
$$D. \text{ Spp} = \frac{\text{Total no. of individuals of species}}{\text{Total no. of plots sampled X area of a plot}} \times 100$$

Frequency: It is the number of occurrence of a species of vegetation in a particular area. It reflects a good indication of the spatial distribution of a vegetation species over a particular area. It can also be expressed in terms of either fraction or in percentage.

$$\text{Frequency of species} = \frac{\text{No. of plots in which species occurs}}{\text{Total no of plots sampled}} \times 100$$

Basics for Line Measurements

A common and objective way to assess cover is by laying down a transect and tallying up how much of a plant intersects the transect. This is called the **Line Intercept Method** first described by Canfield in 1941. (Canfield, R.H. 1941. Application of the line interception method in sampling range vegetation. J. Forestry 39:388-394.)



Canfield, R. (1941) Application of Line Interception Method in Sampling Range Vegetation. Journal of Forestry, 39, 388-394