

## PLANTS AS INDICATOR OF ENVIRONMENT

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Plants which indicate very specific conditions of environment are called plants indicators. Plants community acts as a measure of environmental conditions. It is also called as ecological indicator or phyto-indicator or bio indicator. The plant indicator is helpful in various purpose:

- To determine local soil.
- To determine optimum use of land resources for forest, pastures and agricultural crops.
- Presence of a particular mineral or metal.
- Monitoring of pollution.
- Plants indicate overgrazing.

The knowledge of relationship between plants and ecological factors and as be used as an indicator of environment. Dominant species in an area are most important indicators, as they receive the full impact of the habitat for over longer periods. Plant communities are more reliable indicators than individual plants. Large species serve as better indicators than small species.

### Types of plants indicators

Native vegetation of a particular community is the safe criterion of agriculture possibilities. Plants growing under natural environment provide information of land for crop growth. Growth of short grasses indicates that soil is fertile and is also suitable for agriculture. (Table-1)

### *Phyto indicators of climates*

Plants communities characteristic of particular area provide information on the climate of that area. Evergreen forest indicate high rain fall in winter as well as summer. Grasslands indicate heavy rains during summer season and low during winter season and xerophytic vegetation like *Opuntia sp.*, *Calotropis procera* and *Argemone maxicana* indicates a low rain fall in the throughout year.

### *Phyto indicators of overgrazing*

Many plants are over grazed which results in modification of grassland e.g. *Chenopodium*, *Polygonium*, *Amaranthus*, *Lepidium* and *Verbena*.

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### **Phytoindicator for forests**

Many shrubs, herbs and trees indicate the characteristic types of forest and can grow in an area which is not disturbed. *Narenga porphyrocoma* is a grass which binds the soil. In such soil *Shorea robusta* can be cultivated. *Viola* in western Himalayas is a suitable for plantation of *Cedrus deodara* and *Pinus wallichiana*.

### **Phyto indicator of soil moisture**

The moisture content are different in different places. *Saccharum munja*, *Acacia nilotica*, *Calotropis procera*, *Agava*, *Opuntia*, *Argemone mexicana* are such plants indicate the soil moisture are very low and *Eucalyptus* lowers the water table, *Typha*, *Phragmites* and *Vetiveria* grow in water logged soil.

### **Phyto indicators of soil chemical reaction**

*Rumex acetosa*, *Rhododendron*, *Polytrichum* and *Sphagnum* indicates the Acidic soil. Many forests like Sal and Pine are calcium loving. *Tectona grandis*, *Ixora Parviflora*, *Taxus baccata* and *Cupressus torulosa* are Calcicoles.

### **Phyto indicators of humus quantity**

*Monotropa*, *Neottia* and Mushrooms indicate the presence of humus in soil. *Srioblanthus*, and *Impatiens* indicate the presence of high humus or litter which prevents regeneration of tree species.

### **Phyto indicators of pollution**

Some plants like *Utricularia*, *Chara*, *Wolfia* indicate polluted water. Presence of diatoms in water indicate pollution by sewage. *Polygonum*, *Rheum*, *Vicia*, *Phaseola* and *Capsea* are important pollution indicators. Mosses, Lichens and some fungi are much sensitive to SO<sub>2</sub> and Halides.

### **Phyto indicators of soil water**

To know the depth of water in soil by some phyto indicators Central Arid Zone Research Institute, Jodhpur has done work of plant indicator. (Table 1)

Biological systems as indicators of the environment. There have a remarkable potential in forecasting disasters, prevention of pollution, exploration and conservation of natural resources.

### **References:**

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2. Singh, Bhupendra Kumar (1999) Ecological indicator plants. Employment news 28 Feb. to 6 March Vol. XXII No. 48.
3. Sharma P.D. (2009). Ecology and Environment 10<sup>th</sup> revised edition Rastogi Publications Meerut.

**Table : 1 Showing characteristic feature of soil indicated by plants indicators.**

Phyto indicator	Characteristics of soil
<i>Argemone maxicana</i>	Flooded soil or recently disturbed soil
<i>Andropogon scoparium</i>	Sandy loam soil
<i>Butea monosperma</i>	Heavy alkaline soil
<i>Capparis deciduas</i>	Alkaline soil
<i>Rumex acetosella</i>	Acidic grassland soil
<i>Salvadora oleoides</i>	High calcium and boron
<i>Zizyphus numularia</i>	Good for crop
<i>Shorea robusta, Cassia obtusifolia, Geranium sp.</i>	Proper aeration of soil
<i>Saccharum spontaneum</i>	Poorly drained soil
<i>Capparis spinosa, Carissa spinarum</i>	Intense soil erosion

**Table: 2 Show the depth and salinity of water in the soil**  
According to Chatergy & Bhaskar (1977).

Phyto indicator	Depth of water (meter)	Salinity of water (ppm)
<i>Acacia senegal and Anogeissus pendule</i>	12-18 m.	500-1500
<i>Acacia indica, Prosopis cineria and Salvadora oleoides</i>	12-20 m.	400-1500
<i>Capparis decidua</i>	12-20 m.	180-15000
<i>Panicum turgidum, Zizyphus complex</i>	6-18	1000-2000
<i>Prosopis cineria, Zizyphus numularia, Capparis decidua</i>	6-18	5000-10000
<i>Salvadora persica, Tamaris</i>	6	1500-3200
<i>Salvadora oleoides, Zizyphus numularia</i>	18-28	5000-10000
<i>Eupharbia cauducifolia</i>	12-18	1500-7000