

## **INTERCULTURAL OPERATIONS IN CROP FIELDS**

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### **Concept**

All of the operations done after sowing/planting and before harvesting are called intercultural operations. These should not be too frequent, and the depth should be of the shallow. During such operations, care must be taken not to disturb the crop too much.

### **Objectives**

- To ensure proper use of natural resources
- To make the crops healthy
- To facilitate proper crop establishment
- To facilitate germination and emergence
- To maintain the desired plant population
- To control pest
- To maintain the quality of crops

### **Different types of intercultural operation**

Weeding, thinning, gap-filling; roguing, irrigation, earthing-up, mulching, etc.

### **Weeding**

#### **Weed**

Weeds are unwanted and undesirable plants which interfere with the utilization of land and resources (nutrient, light, and water) and thus adversely affect human welfare.

**Relative weed:** Plants that grown normally as a crop but sometimes by their position and cultivation objective they termed as weed is called relative weed. e.g., Jute in the rice field.

**Absolute weed:** Plants that grow in any place are treated as weed is called absolute weed. e.g., Bathua (*Chenopodium album*), Shama (*Echinochloa crus-galli*), mutha (*Cyperus rotundus*), etc.

### **Weeding**

The process by which unexpected plants are removed from the desired crop field is known as weeding.

### **Objectives**

The main objective of weeding is to keep the field free from weed or maintain weed population at bellow a critical level for a significant period for successful crop production.

### **Methods of Weeding**

- a) Mechanical methods
- b) Physical approaches
- c) Cultural methods
- d) Biological methods
- e) Chemical or herbicidal methods

### A. Mechanical Method

This method involves the use of physical energy directly or through implements, either manual, bullock drawn or power operator.

- i) **Hand weeding:** Hand weeding involves the physical removal or pulling out of weeds by hand or removal by implements (khurpi).
- ii) **Hoeing:** It involves the removal of weeds by using hand hoe.
- iii) **Tilling:** In this process plowing, harrowing, leveling, etc pre-planting tillage operations injured or destroy both top and underground parts of the perennial weeds.
- iv) **Mowing:** This method is consisted with the removal of an above-ground portion of weeds by using different types of mows.
- v) **Flooding:** Flooding is successful against weed species sensitive to a longer period of submergence under water. In this process, 15-30 cm depth water level maintained 3 to 8 weeks. Due to the shortage of oxygen supply underground part of the flood sensitive weed species reduced or destroyed. e.g., Mutha (*Cyperus rotundus*).
- vi) **Smoothing/Shading:** Smoothing is the completely exclusive of light by artificial mulch or by using crop plants to prevent all top growth or underground part (rhizome, the tuber of Mutha) of perennial weeds.

#### Advantages of mechanical control

- It is the widely practiced methods and more effective.
- It can control all kinds of weed.
- Soil loosening and thinning are also performed as well.
- No technical know-how is needed.
- It facilitates aeration of the soil.

#### Limitations of mechanical control

- It is more costly.
- It needed more time and labor.
- Crop plant (especially root) may be injured.
- Various implements are needed.
- It causes soil erosion (especially in high topographic areas).
- Risky at the places adjacent to crop roots.

### B. Biological Method

Biological weed control is the use of natural enemies (Animal, insect, mite, pathogen, etc.) to reduce weed population to an economically acceptable limit.

The organisms which are used as natural enemies to control the weeds are called bioagent.

The important bioagents which are engaged in controlling weeds are as follows –

1. Insects
2. Mites
3. Pathogens
4. Animals
  - a. Grazing animals
  - b. Fishes
  - c. Tadpole shrimp
  - d. Snail



### **Advantages of Biological Weed Control**

- Nontoxic
- Nonlaborious
- Does not hamper the soil properties, environment, and soil micro-organism
- No mechanical injury to plant
- Economic
- No pollution or degradation of the environment

### **Limitations of Biological Weed Control**

- Slow process (even years after years)
- Host specificity
- BCA is sensitive to environment and weather conditions
- Not suitable for diverse and complex weed problem
- Total control is not possible.

### **C. Chemical Method**

In this method chemical substance named weedicides or herbicides are applied to remove weeds. The chemicals which are used to control weeds are called *Herbicide*.

**Some common herbicides:** Ronstar<sup>®</sup>, Dalapon<sup>®</sup>, Propanil<sup>®</sup>, Diquat<sup>®</sup>, Balasta<sup>®</sup>, Sunrice<sup>®</sup>, Paraquat<sup>®</sup>, EPTC, Alachlor<sup>®</sup> etc.

**Some common herbicides for rice field:** Butachlor<sup>®</sup>, Amchlor<sup>®</sup>, Clear<sup>®</sup>, Rifit<sup>®</sup>, Ronstar<sup>®</sup>, Oxstar<sup>®</sup>, Corostar<sup>®</sup> etc.

### **Advantages of chemical control**

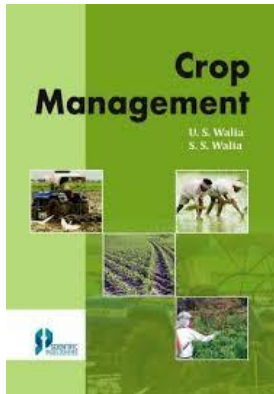
- It needed less time and labor as well as money.
- No possibility of soil erosion.
- Incorporation of weeds causes the addition of organic matter.
- Can control selected weeds.
- Can also control weeds adjacent to crop roots.
- Applicable both in wet and dry land.
- Crops are not injured.

### **Limitations of chemical control**

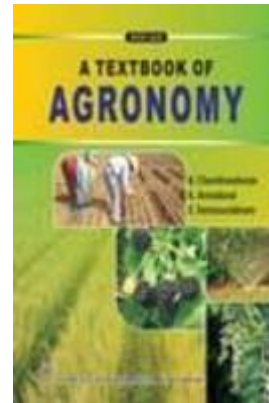
- Technical knowledge is needed.
- If herbicide application is not appropriate, it can cause damage to the crop.
- Causes adverse effect on physical, chemical and biological properties of soil as well as the environment.
- Improper selection of herbicide may cause a serious effect.
- It may cause resistance to weeds.
- Herbicides may not be available in the market.
- Special machinery is needed for herbicide application.
- Create an unemployment problem.



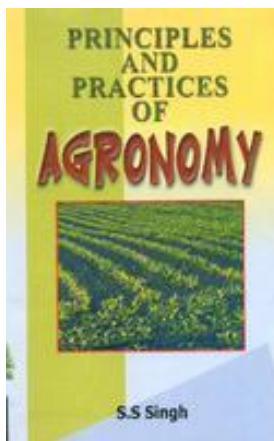
Further Readings:



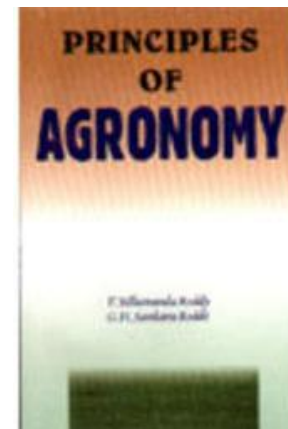
**Crop Management**  
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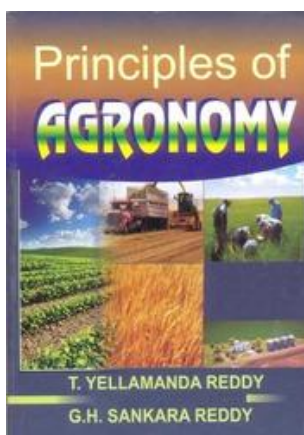
**A Textbook of Agronomy**  
B. Chandrasekaran  
K. Annaduri  
E. Somasundaram



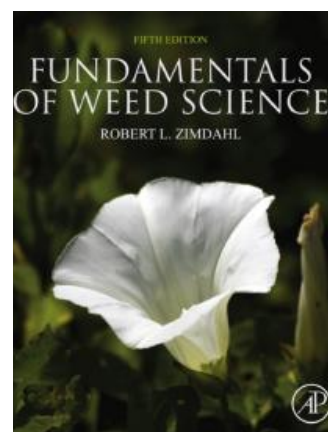
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**Principles of Agronomy**  
T. Yellamanda Reddy  
G.H. Sankara Reddy



**Fundamentals of Weed Science 5<sup>th</sup> Edition**  
Robert L. Zimdahl

