



SNS COLLEGE OF TECHNOLOGY

AN AUTONOMOUS INSTITUTION

Approved by AICTE New Delhi & Affiliated to Anna University Chennai
Accredited by NBA & Accredited by NAAC with A⁺⁺ Grade Recognized by UGC

DEPARTMENT OF AGRICULTURAL ENGINEERING

COURSE CODE & NAME: 19AGO301 & FARM MECHANISATION

III YEAR / VI SEMESTER

UNIT : I SCOPE OF MECHANISATION IN INDIA

TOPIC : 8 – Secondary tillage: objectives, implements, types, constructional features, working principles & operation





Secondary Tillage:

Tillage operations following primary tillage which are performed to create proper soil tilth for seeding and planting are secondary tillage. These are lighter and finer operations, performed on the soil after primary tillage operations. Secondary tillage consists of conditioning the soil to meet different tillage objectives .

The implements used for secondary tillage operations are called secondary tillage implements. Secondary tillage operations do not cause much soil inversion and shifting of soil from one place to other. These operations consume less power per unit area compared to primary tillage operations. Secondary tillage is stirring of soil comparatively at shallow depth.



Main objectives:-

- (i) To improve seedbed by better pulverization of soil
- (ii) To destroy weeds
- (iii) To cut the crop residue and mix vegetative matter in top soil
- (iv) To break clods making the soil tilth better for better germination of seeds
- (v) To aerate the soil. The soil should not be compacted because it will affect germination.

Machines used:-

Secondary tillage implements may be tractor drawn or bullock drawn implements. They include different types of harrow, cultivator, leveller, clod crusher and similar implements.



Harrow:

- Implement used for preparing fine seedbed
- Helps in breaking the clods
- Helps in pulverizing the soil or mixing soil thoroughly
- Aerates soil and kills weeds
- Used mostly in lighter soil conditions
- Sometimes used to cover seeds after broadcasting

Harrow is a secondary tillage implement that cuts the soil to a shallow depth for smoothing and pulverizing the soil as well as cut the weeds and mix the material with the soil. Several types of harrow used are:

- (1) Disc harrow
- (2) Spring tooth harrow
- (3) Spike tooth harrow
- (4) Blade harrow (Bakhar)
- (5) Guntaka
- (6) Triangular harrow
- (7) Bodela
- (8) Zig-Zag harrow
- (9) Bindha
- (10) Other harrows.



Disc harrow

It is a harrow, which performs the harrowing operation by means of a set, or a number of sets of rotating discs, each set being mounted on a common shaft. Disc harrow is found very suitable for hard ground, full of stalks and grasses. It cuts the lumps of soil, clods and roots. Discs are mounted on one, two or more axles which may be set at a variable angle to the line of motion. As the harrow is pulled ahead, the discs rotate on the ground. Depending upon the disc arrangements, disc harrows are divided into two classes: a) Single action and b) Double action.

Single action disc harrow

It is a harrow with two gangs placed end to end, which throw the soil in opposite directions. The discs are arranged in such a way that right side gang throws the soil towards right and left side gang throws the soil towards left.

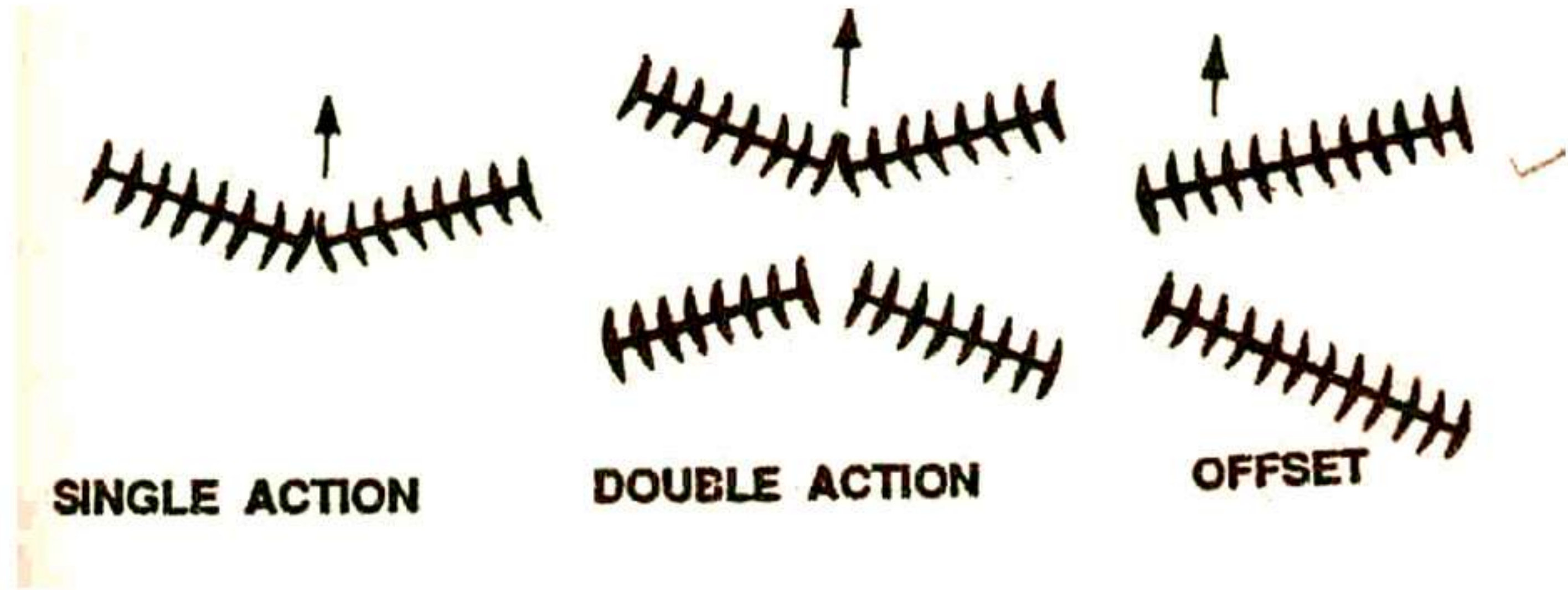


Fig.1. Types of disc harrow



Double action disc harrow

It is a disc harrow consisting of two or more gangs, in which a set of one or two gangs follow behind the set of the other one or two, arranged in such a way that the front and back gangs throw the soil in opposite directions and it generally covers the width ranging from 5 to 15 ft. Thus the entire field is worked twice in each trip. It may be of two types: a) Tandem and b) Off-set.

a) Tandem disc harrow

It is a disc harrow comprising of four gangs in which each gang can be angled in opposite direction (Fig.2).

b) Off-set disc harrow

It is a disc harrow with two gangs in tandem, capable of being off-set to either side of the centre line of pull. Two gangs are fitted one behind the other. The width covered by these types of harrows ranges from 4 to 30 ft. The soil is thrown in both directions because discs of both gangs face in opposite directions. It is very useful for orchards and gardens. It travels left or right of the tractor. The line of pull is not in the middle, that is why it is called off-set disc harrow (Fig. 2). Off-set disc harrow is based on the basic principle that side thrust against the front gang is opposed by the side thrust of the rear gang. Hence the gangs are arranged at suitable angles so that both thrusts are counter balanced with each other.



Thank You