Practical-2

Land Preparation and Sowing of Vegetable Crops

Exercise 2.1: Preparation of land for vegetable cultivation and sowing of vegetable crops

OBJECTIVE:

- Hands on training for the preparation of land for the cultivation of vegetable crops.

Delivery schedule: 02 periods.

Student's expectations/learning objective:

- Importance of land preparation in vegetable cultivation.
- Method of land preparation.
- Sowing methods for different vegetables.

Handouts/material/equipment's & tools required: Paper sheet and pen to note down the instructions, different tools for land preparation, farmyard manure, fertilizers, seed, bavistin, herbicide, chlorpyriphos *etc.*

Pre-learning required: Acquaintance with different tools used for field operations and their functions.

Introduction:

Vegetables are short duration crops. The field operations are specific and time bound. In order to raise a healthy and disease free crop, one has to be very specific regarding preparation of field so that the sowing is taken up timely. The fields where vegetables have to be cultivated should be well worked out to ensure their better growth and development. The chemical changes and release of plant nutrients take place in the soil and thus, it should be properly tilled from time to time. Soil preparation consists of drainage, ploughing, disking, harrowing, changing and rolling. Most of the vegetable crops have small to medium sized seeds and consequently, proper land preparation by making plots/beds is important. The optimum seed plots should have mellow soils (smooth and soft) comprised of fine sized particles, free of clods, weeds and previous crop residues. Such seed plots enable good contact between soil and seed surface which is required for uniform water absorption and proper aeration for seed germination and further plant growth.

- An adequate tillage is necessary to enable the soil to provide better growing conditions to the plants. Tillage can be done by
  - ➢ Deep working implements like ploughs and spades
  - ➢ Surface working implements like hoes, khurpis, harrows *etc.*
  - ➢ Compacting implements like rollers, beams *etc.*
- It should always be remembered that the vegetable plots should be continuously worked to keep them clean, free from weeds and insects and to ensure aeration of the soil.
- Manuring and watering are essential for the success of vegetable cultivation but it may be kept in mind that without adequate soil tillage, even abundant application of manures and water will not be of much help.

Procedure for land preparation for raising vegetable crops

- The first step is deep mouldboard ploughing. A field which is not under cultivation should be ploughed to a depth of 30 cm or more *e.g.* a field of native vegetation or pasture grasses must be ploughed deeply to grow vegetables. Deep ploughing promotes complete decomposition of plant material. If there is excessive plant residue in the field, then go for deep ploughing in the fall season. This allows sufficient time for the decomposition of plant residue prior to spring planting.

Deep chisel plough works up to 20 cm depth
Source: www.tootoo.com

- Deep ploughing or turning of the soil in the alternate years is sufficient in the fields with continuous cropping unless a large amount of crop residue has been ploughed/turned under.

Deep ploughing

- Deep chisel point ploughing done in the off years can improve the physical condition of soil by penetrating and breaking compact soil. This is desirable to prevent the formation of a compact soil layer at the depth of the plough blade otherwise it obstruct downward water percolation and normal root development. Sowing of seed directly over chisel marks permits melons, pumpkin and tomato roots to penetrate deeply into the soil profile.
- It is important to avoid ploughing or disking in water saturated soils. To test the proper moisture condition of the soil, compress the soil together in your hand and if the slice disintegrates readily then that indicates the condition to take up land preparation. Therefore, it is important to drain the wet soils before taking up land preparation operation. Taking up operations in wet soils leads to clod development. Clods do not provide well pulverized seed bed.

- After deep ploughing, disking in two directions should be done for which tandem and/or offset harrows can be used efficiently. If the field has to be furrow irrigated, make rough raised beds using bed lifters. Best height of bed is determined by soil type, intended crop and irrigation method. Raised beds 15-20 cm high ensure good drainage of excessive water, early soil warming, rapid drying of soil surface, improved soil aeration and less chances of soil borne diseases especially in case of heavy soils. Mix farmyard manure or other composts in the field during this operation for proper mixing in the soil.

Tandem harrow
Source: www.caseih.com

- Heavy soils often break up in clods and lumps with any type of harrow. By use of a heavy drag or roller, the lumps/clods may be crushed with comparative ease. The main use of the drag or roller on heavy soils is to crush the lumps, but on light soils both are often used to pack and smoothen the soil.
- If soil moisture is insufficient for planting after bed preparation, pre-plant irrigation is necessary to replenish moisture to field capacity. Once the soil sufficiently dries, the rough beds should be reworked using a rolling cultivator or a power rotovator. Do not bring soil to powder form. Rotovator mellowing improves the soil structure by breaking up clods and kill weed seedlings which may emerge as a result of the pre-plant irrigation.

Bed roller
Source: www.landpride.com

- Final seed bed preparation can be done with a bed roller or a sled type shaper. It may be done manually by using spade or hand hoe *etc.* Seed beds are similar to the foundation provided for a building. So, field preparation should be done carefully to harvest good crop. In all these operations greater grower skill comes with experience and working through trials and errors.
- Traditionally, the land preparation is done by using local plough along with leveller driven by the bullocks. For raising vegetables at small scale, spade or any other local implements/tools can be used.

Provide proper drainage:

- For providing proper drainage, furrows are made both vertical and horizontal at regular intervals. Good drainage is essential to get success in growing vegetables. Drainage not only removes the excess water but also allows the soil to warm up early in the spring, ensures proper aeration and thus favouring proper root growth and development of plants. It also ensures early harvest and more remuneration to the growers along with early planting of next crop.

Drainage-irrigation channel

Methods of seed sowing

Majority of the vegetables are grown by using seeds. The other plant materials used for propagation of vegetable crops are bulb (onion), tuber (potato), crown/suckers (asparagus, globe artichoke), root cutting (horse radish, globe artichoke) *etc.* Various methods of sowing seed/planting material are as under:

a) Broadcasting

b) Drilling

c) Dibbling

Procedure for direct sowing of different vegetable crops

- The direct seeded crops are grown on flat beds, raised beds or ridges.
- Prepare raised beds or ridges to a height of 15-20 cm.
- Separate two beds/ridges by making furrow of 30-45 cm width for providing irrigation.
- Leafy vegetables like spinach, mustard, amaranth, coriander, fenugreek *etc.* are sown by broadcasting the seeds. However, the crops sown in the rows grow better than the ones broadcasted.
- Growing of vegetables in rows is advantageous for taking up intercultural operations like hoeing-cum-weeding, fertilizer application, and irrigation along with easy harvesting.
- Apply fertilizers in the rows by mixing it thoroughly with the soil. The seeds should not come in direct contact with fertilizers.
- Treat the seed with fungicide(s) before taking up sowing to minimise the incidence of seed borne diseases.
- Sow the seeds of garden pea, French bean, okra, beet leaf, spinach, cluster bean and cow pea *etc.* directly in the rows.
- Pre-soaking of seeds of pea, French bean and okra in water for overnight before sowing gives better germination. Discard the seeds which float on water surface.
- Sowing of seeds of root vegetables is generally done on ridges but sometimes on flat beds also. Mix seeds of root vegetables or any small seeded vegetables with fine sand to regulate their sowing.
- Pre-germinated seeds of cucurbits also enhance better crop stand.

Mechanical methods of sowing

- Most of the commercial vegetable growers use machine planter to sow the seeds.

- Machines do the sowing operations much better and more rapidly than hand sowing.
- The common seed drills open the furrows, drop the seeds and cover it simultaneously *i.e.* in a single operation.
- These drills can be regulated to sow at various rates and at desired depth.
- By regulating the seed rate through mechanical methods, thinning can be reduced to the minimum.

Seed drill

Manual method of sowing

- Seed sowing by hand is commonly practised in home gardens as well as when the quantity of seed to be sown is less.
- A garden line or marker should be used to provide straight row furrows to do hand sowing.
- The furrows are made with the rake or with the corner of an ordinary hoe or with a heart shaped hoe attached with plough or teeth of a wheel hoe.

Manual seed sowing
Source: www.flickr.com

- The seed should be distributed uniformly in the furrow.
- The seeds should be covered immediately with the soil by trampling with the help of back of a hoe to prevent loss of soil moisture.

Exercise 2.1:

Prepare small area for raising vegetable crops. Keeping in mind the principles of establishing a kitchen garden, take up manual sowing at proper spacing and depth of any direct seeded vegetable crops. Write the steps in your practical note book as per data sheet.

DATA SHEET

Name of the crop	
Season	
Aspect of the garden	
Slope of the garden	
Date of pre-sown irrigation, if needed	
Plot size	
Size of drainage channel	
Tools/Implements used	
Date of sowing	
Method of sowing (Flat bed/raised bed)	
Seed rate	
Seed treatment (mention the fungicide and rate)	
Fertilizers used and quantity applied	
Spacing	
Weedicide applied and its rate	
Any other operation	
State your experience	