

Soybean (*Glycine max*)

Soybean is an important pulse as well as oilseed crop of the State. Short duration soybean varieties like JS-2, Moti and Pusa Soybean I can be easily fitted in between two rice crops *sali* and *ahu*, i.e. the period from January to April or first week of May in a medium land situation after harvesting of HYV rice.

Varieties:

Varieties	Duration (days)	Plant type	Grain yield (q/ha)		Percentage	
			Irrigated	Rainfed	Oil	Protein
JS-2	85-90	Erect	20-22	-	20	42
Moti	85-100	-do-	-do-	11-12	20	42
Pusa Soybean-1	90-100	-do-	-do-	-	22	43

Soil:

Soybean can be grown on a wide range of soils but it grows best on fertile and well drained loamy soils. Water logging is injurious to the crop. In acid soils where pH is below 6.0, lime is to be added @ 2 t/ha at least 21 days before sowing. Liming is necessary once in three years.

Time of Sowing:

Under irrigated condition sowing is to be done in January. When the crop is grown under rainfed condition, the optimum time of sowing is middle of January to middle of February.

Land Selection:

Medium type of land is suitable for rainfed condition, where there is sufficient moisture during January and February.

Field Preparation: Well prepared seedbed with good tilth is essential for soybean.

Fertility Management:

Nutrient	Requirement (kg/ha)	Form	Fertilizer requirement	
			kg/ha	kg/bigha
N	20(10)	Urea	45(22)	6.5(3)
P ₂ O ₅	60	SSP	53.5	50
K ₂ O	40	MOP	66.6	9.0

N.B.: The figures in parentheses indicate the requirement of N where rhizobium culture inoculated seeds are sown.

The whole quantity of fertilizers are to be applied in furrow at a depth of 5-7 cm

below the seeds before sowing and covered with a layer of 3-4 cm soils and make it leveled with the field.

In case placement is not possible, the fertilizers should be evenly broadcast and incorporated in the soil.

Foliar Spray of MOP:

MOP can be sprayed at the flower bud initiation stage in between 30 and 35 days after sowing with hand sprayer for proper grain filling in pods.

Preparation of MOP solution for spraying with hand sprayer is as follows.

Quantity of MOP (kg/ha)	Quantity of water (lit/ha)	Strength of MOP solution (%)	No. of sprays
12.00	400	3	1

Application of lime:

CaCO₃ in the form of dolomitic lime @ 65.5 kg/bigha should be applied 15 days before seeding and incorporated in the soil where multiple cropping is practiced.

Seed Treatment:

Seeds are to be treated with Phytohormone + enzyme complex to enhance germination during winter. For this purpose, seeds are sprayed with small hand sprayer @ 1 ml of the chemical in 100 ml of water for 10 kg seed one day ahead of sowing.

Seed Inoculation:

Seeds are to be moistened with clean water carefully so as to avoid excessive wetting. Rhizobium culture is to be mixed with seeds @ 50 g/kg so that a thin coat of inoculum is deposited on the seed coat. Treated seeds are to be dried under shade. Inoculated seeds should not be exposed to the sun.

Seed Rate:

A seed rate of 75 kg/ha or 10 kg/bigha is required to obtain about 5 lakhs plants/ha (66,666 plants/bigha).

Method of Sowing:

Seeds are to be sown in lines 25 cm apart and 5 cm between seeds at a depth of 2-5 cm. If the soil is dry, a pre-sowing irrigation of 2-5 cm depth is needed for proper germination at least 2 days ahead of sowing. The rows are to be covered with a thin layer of paddy straw for better conservation of soil moisture.

Interculture operation:

Weed control:

Two manual weedings, one at 15 days and another at 35 days are necessary to control weeds. A light earthing up may be given at the time of the second weeding to keep the plants erect.

Chemical weed control:

Pre-emergence application of fluchloralin @ 1.0-1.5 kg/ha immediately after sowing controls weeds effectively. The grain yield is comparable to that of two hand weedings.

Irrigation:

Two irrigations one at flowering and the other at pod formation stage are needed for proper growth and pod filling.

Moisture Conservation:

Under rainfed culture, soil moisture can be conserved by application of straw mulch over the rows after sowing. In such a case, only one weeding is needed at 30-35 days after sowing.

Plant Protection:

Seeds are to be treated with carboxin @ 2 g/kg of seeds. Flubendiamide 39.3SC @ 72g a.i./ha or flubendiamide 20WG @ 50g a.i./ha can be used against defoliator pest of soybean.

Threshing:

Paddy Thresher is the best for threshing, especially for seed purpose. Threshing by power tiller is suitable for consumption purpose.

Storage for Seed Purpose:

Seed are to be dried for 5-6 days under bright sun, packed in cloth bags and kept in 250 gauge polythene bags under air tight condition. Seeds thus stored contain about 10% moisture.

Drenching:

The trypsin inhibitor present in the soybean has to be removed before any kind of use. This can be done by boiling the seeds for 20 minutes in 0.5% solution of sodium bicarbonate @ 21g/kg of seeds and then washing 2 to 3 times with plain water.

Utilization:

Besides preparation of various foods, the crushed grains can be used as feed for cattle, poultry and fish.

Soybean milk:

1. Seeds are to be soaked in water for 12 hours, changing water at least three times. Sometimes seeds are required to be soaked for 24 hours.
2. The seed coats are to be removed by hand rubbing.
3. A paste has to be made by crushing the peeled seeds.

Water is to be added at the ratio of 1: 3 and boiled while stirring with a ladle. The milk should not be over boiled; otherwise its nutritive value may be lost. Addition of a few drops of ginger juice/bay leaf will remove the beany odours. Soybean milk is useful for

maintaining intestinal disorder. It prevents summer diarrhoea. It is easily digestible and can be used as diet for old debilitated and convalescents.

Soybean can also be used for preparation of *chapatti*, *kachuri*, *malpowa*, *bhujia*, *ladu*, *chutni*, cake etc.

Soybean curd:

To prepare soya curd, soya milk is to be poured in an appropriate container while it is moderately hot.

Green Beans:

Green soybeans are widely used as much in the same way the pea is used. When the bean reaches its full size but yet green and tender, it is collected from the plant. It is usually boiled and taken as green vegetables. The green bean is also used in salads. In order to secure the best flavours, the bean should be cooked when they remain affixed in the pods. In such cases, they are to be soaked in boiling water for a few minutes when it becomes easy to shell them.