PROMOTION OF SOYBEAN IN SINDH

Location; Mian Ge Da Pind **GPS Coordinates: 24º39’33.7”N 67º31’42.4”E**

INTRODUCTION

Soybean [*Glycine max* (L.) is one of the most important oilseed crops worldwide. It contains 18 to 22 percent oil and is highly desirable in the diet and have 40 to 42 percent of good quality protein. Therefore, truly claims the title of the meat/oil that grows on plants. Generally, it is used in the food industry for flour, oil, margarine, cookies, biscuit, candy, milk, vegetable cheese, lecithin and many other products. The remaining meal after oil extraction is a rich source of protein, used as feed for poultry, dairy, beef and fish industry. The United States of America has the largest area under its cultivation. In Pakistan, soybean has suffered a setback and has therefore, not been able to attain a respectable position among the oilseed crops. Its cultivation remained limited to a very small acreage and showed a declining trend.

Potential Areas:

It can be grown successfully in all over Sindh but potentially in Hyderabad, Thatta, Badin and Sanghar Districts. Area may be expanded in:

- Dobari lands which often lie idle from September / October to May.
- Cotton fallows from December to May.
- Riverine lands from November to May.
- Dry land (barani) areas during the monsoon from June to October.
- Area under fall (September) and spring (March) planted sugarcane for intercropping.

Proposed Cropping Pattern:

- Rice Soybean Rice
- Cotton Soybean Cotton
- Wheat Soybean Wheat
- Wheat-Sorghum / Millet-Fallow-Soybean-Wheat
- Intercropping soybeans with corn, sorghum, cotton, or sugarcane

Climatic requirements

The minimum and maximum soil temperatures for the germination of soybean seeds are approximately 5 to 40^{o}C. The optimum temperature for rapid vegetative growth rate is about 30^{o}C. Soybean is a short day plant (SDP) in terms of photoperiodism.

Soil

It can be grown on almost all well-drained soils; however, the crop is more productive on fertile loam soils having pH 6-7.

Seed-bed preparation:

If the land is not deeply ploughed for previous three years the plough the lands with chissel plough. Level with laser. Two to three ploughings followed by plankings and pulverize the land with rotavator.

Fertilizer:

25:50:50 (NPK) kg ha^{-1} at the time of sowing. Soyabean is leguminous crop therefore; nitrogen is fixed in nodules and is available for succeeding cop.

Seed Inoculum: The nitrogen-fixing bacteria (*Rhizobia*) that, lives on soybean roots in nodules are not native to most soils. The best way to introduce these bacteria is to inoculate the seed. Inoculants is applied @ 1250 gm per 100 kg seeds and then mixed thoroughly. The use of fungicide in case of seed treatment may interfere thus, compatible fungicides (i.e. Benlate and Dithane Z-78 (Zineb) with no toxicity to Rhizobia should be used.

Varieties: Spring: NARC-1, NARC-2, Ajmeri, FS-85, Malakand-96, Swat-84 and Kharif: Kharif-93 Faisal soybean, AARI 2021 Soybean, NARC 2021, Ajmariis etc

Planting Time:

Region	Time of planting	Suitable Varieties
South	May to June	NARC-1, NARC-2, Williams-82
Centre	June	
North	Mid June to Mid July	Ajmeri and Kharif-93

Seed Rate: Seed @ 40 kg $acre^{-1}$ planted at a depth of 3 to 5 cm with 30 to 45 cm row spacing gives optimum population of 120,000 to 130,000 plants per acre. As much as 20 to 24 plants per meter of row.

Method of Sowing: In heavy soils plant on ridges while in loose soils plant with single row cotton drill.

Irrigation: Usually 6-7 irrigations are required for spring and 2-3 irrigations for autumn crop. Important stages of irrigation are:

- Three weeks after germination
- Initiation of flowering
- Pod filling stage
- Seed development stage

Weed Management: Weeds are controlled through crop rotation, tillage operation and weeding and chemical use. No any post emergence herbicide have been developed for soyabean crop, however, pre-emergence herbicides i.e. Pendimethalin 8(Stomp), Trifluralin (Treflan) and Oxadiazon (Ronstar) can be applied after planting before the germination.

Diseases: In Pakistan only 6 major diseases have been observed and these are anthracnose, charcoal rot, purple seed stain, pod and stem blight and bacterial blight/pustule. Careful diagnosis is very important for the disease control strategies.

Disease management programme should include the following methods:

Preventive Measures

- Plant disease resistant varieties
- Plant quality and healthy seed, free of mechanical damage.
- Harvest seed soybeans as soon as they are mature.
- Avoid planting in wet and poorly drained soils to reduce chances of the development of soil borne diseases (Root rot).
- Keep the crop free from weeds because they may be the hosts to any diseases.
- Seeds should be stored at 8 to 10 percent moisture at $15^{o}C$ temperature.
- Plough down crop residues

- Crop rotation with non-leguminous crop.
- Plant early before the soil temperature rises.
- Reduce plant population, increase row width and avoid high fertility.
- Treat seed with fungicides; Captan, Dithane M-45, Benlate and Tecto @ 1.5-2 gms per 1 kg seed.
- Spray fungicides, Dithane M-45 @ 1 kg h^{a-1}, Benlate and Tecto @ 120-150 gm h^{a-1} dissolved in 250 litre of water with done after 10 to 15 days interval. This process should be repeated 2-3 times depending upon the severity of disease.

Insects and their control

Major insects are stem fly, white fly, green stink bug, cut worm and its larvae.

- For cutworm and termite apply fipronil, powder of BHC @ 7 kg per hectare or Dieldrin 20 EC @ 5-7 litres ha^{-1} mixed with irrigation water.
- For other insects especially flies, thrips and larvae spray; chlorpyriphos, pyriproxefen, Dimecron 100% @ 600 ml ha^{-1} or Methyl-Parathion 50 percent @ 800 to 1200 ml ha^{-1} Somicidin 20 EC @ 400 to 600 ml ha^{-1} dissolved in 250 litre of water, if attack is severe spray two times with an interval of 8-10 days.

Harvesting and Threshing: Soybean matures in 92 to 120 days depending upon growing season and the variety. As soon as the pods are dry enough to open easily, harvest it, thresh after drying within 7-10 days and threshed seed must be cleaned before storage or marketing.

Yield: The average farmers yield ranges from 1500 to 2500 kg ha^{-1}. Under high level management practices the yields range from 2500 to 3500 kg ha^{-1}.

Storage: Well dried seed should be stored at about 8 to 10 percent moisture content and 15^{o} C in tropical regions.

OBJECTIVES:

- To promote the cultivation of Soyabean to meet edible oil production in the country
- To acquire germplasm of Soyabean to develop varieties suitable for the coastal areas of Sindh and Baluchistan
- To establish Tissue Culture Laboratories at Coastal belt of Sindh
- To develop model farms (200 acres) where Soyabean crop may be grown with inter cropping and cropping pattern of the area.

- To develop awareness and to disseminate production technology to the growers through demonstration, print and electronic media, farmers trainings, group discussion and all extension and information centers for Oilseed sector in the country
- To support frame and implement projects for oilseed and edible oil yielding crops through research and development
- To encourage the private sector and growers involved in research and development in the oilseed sector
- To develop human resources through training and higher education
- To collect, compile and maintain statistical data in the oilseed sector

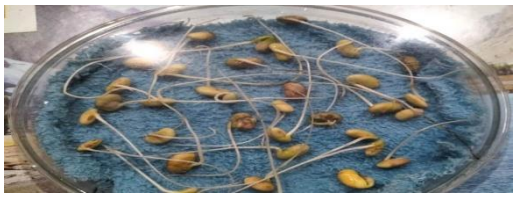
Lineup up action:

Soil Survey & Sampling:

Soil Analysis Results:

Sr. No.	Bore No.	Depth (inches)	E:C (1:2)	pH	O.M	N%	P (ppm)	K (ppm)	Textural Class
	Normal range		<4.0	6.7-7.6	>1%	>0.1	>3	>120	
01	Plot No.10	0-6	2.94	8.8	0.41	0.022	0.9	233	Silty Clay Loam
02		6-12	3.18	8.7	0.35	0.016	0.7	212	Silty Loam
03		12-18	2.04	8.8	0.35	0.015	0.6	221	Silty Loam
01	Plot No.14	0-6	1.71	8.9	0.36	0.028	0.5	232	Silty Clay Loam
02		6-12	1.21	9.0	0.35	0.019	0.7	222	Silty Loam

Total Area to be cultivated: 10 acres instead of 50 acres due to unavailability of pre basic seed from the concern authority .
Land Preparation: Deep Ploughing, laser leveling and Rotavator
Variety: NARC Rawal-1 (Pre-Basic)
Sowing time: 28th September through Drilling



Physiological Traits

1. Germination 80 to 85%
2. Plant height (cm)
3. Leaf length and width (cm)
4. No of flowers per plant after three weeks
5. Number of pods after two & three months
6. Maturity: after 100 to 120 days
7. Harvesting: 80 to 90% colors turn to yellowish
8. Seed index 1000 grain weight
9. Oil content
10. Yield per acre
11. Soil analysis after harvesting time

Sum Implements available at Mian Ge Da Pind

HARVESTOR