

## **SOYA BEAN FARMING**

### **Ecological Requirements**

#### **(a) Rainfall**

Soybean is moderately drought tolerant requiring a minimum of 400mm of well distributed rainfall during the vegetative growth period which lasts 3-4 months. High moisture requirement is critical at the time of germination, flowering and pod-forming stage. Short duration varieties are recommended in areas where soybean is produced under rain-fed conditions. However dry weather is necessary for ripening.

#### **(b) Temperatures**

Soybeans grow well under warm and humid conditions. For good germination soil temperatures should be above 15°C and for growth about 20-25<sup>0</sup> C.

#### **(c) Soils**

Soybeans can grow on a wide range of soils but thrive best on sand, clay loams and alluvial soil of good fertility. The soils should be well drained, fertile and rich in calcium with a pH range of 5.6-7.0.

#### **(d) Altitude**

Soybeans perform well between 0-2000 m above sea level. At altitudes higher than 2000 m asl, the late maturing varieties take as long as 180 days (6 months) but they yield more than the early maturing varieties.

### **Land Preparation**

- Plough land early to allow moisture conservation and weed control. The seedbed should be properly prepared (as for maize). Eliminate all grassy weeds especially Couch grass, Kikuyu grass etc.
- Plough in crop residues and vegetation to improve soil fertility. Break up large lumps of soil and level.
- It is recommended to have soil tested to know the acidity/alkalinity status
- Where soil is acidic, it may be necessary to use agricultural lime. Up to 5 bags (250kg)/acre is ploughed in.

### **Soya Beans Varieties**

#### **(a) Soya Bean Varieties Recommended for Various Areas**

<b>Description</b>	<b>Area</b>	<b>Varieties</b>
Warm temperature areas	Homabay Mitunguu	Duicker, EAI 3600 & Nyala
Moderate temperature areas	Bukura Kakamega Kitale Embu	SCS – 1, Duicker, Nyala & Gazelle
Cool temperature areas	Bahati (Nakuru) Baraton Njoro Menengai	Sable, SCS – 1, Nyala & Gazelle
Marginal rainfall areas	Matayos Gachoka Makueni OI Rongai	Gazelle, EAI 3600, Nyala & Gazelle

**(b) Characteristics of Selected Soybean types**

<b>Type/Characteristics</b>	<b>Perry 41</b>	<b>Black Hawk</b>	<b>Red Tanner</b>	<b>Duicker</b>
Days to flowering	61	81	65	84
Days to maturity	131	151	138	180
Plant height (cm)	48	60	70	43
Seed yield (kg/acre)	720	520	720	400

**Planting**

**(a) Seed viability and treatment**

- Soybean seed lose viability within 6-10 months f harvest depending on the variety and the environmental conditions, especially under hot and damp conditions.
- It is recommended to use certified seed
- If you are plant own seed, select seeds from a healthy crop, which should be free from mechanical damage and diseases. However, do not recycle seed for more than 3 seasons.
- Before planting, seed dress with recommended chemical e.g. Lindane, Gaucho FS350, Apron star.
- Test the seed for viability before planting. Plant 100 seeds and if more than 75% germinate, the viability is acceptable.

## (b) Spacing

- Plant at the start of the rainy season.
- Soybeans can be planted either as a pure stand or intercropped with maize, sugarcane, sorghum, tobacco, cassava etc. As an intercrop, plant two rows at the same spacing with the main crop.
- Recommended pure stand spacing is 45 x 10cm or 30 x 15cm. Late maturing varieties require a wider spacing of 40 x 20cm. The seed rate is 24 – 28kg/acre. Estimated plant density is 120,000 plants /acre.
- Seeds are planted at a depth of 3-5 cm. Plant 2 seeds per hole or drill within the row then later thin to one seedling per hole.

## (c) Fertilizer use

- At planting, apply DAP or TSP fertilizer at 50 kg per acre to supply phosphorus. Apply one soda bottle top of DAP/TSP per 30 cm (2 feet) along the furrow or place the fertilizer in the planting hole; cover with thin soil, and put in 2 seeds. Cover with top soil.
- If manure is available, make furrows slightly deeper, apply manure and fertilizer along the furrow or hole and mix with soil before placing seed.
- Where indigenous Nitrogen fixing bacteria is present use BIOFIX inoculant from MEA Ltd. Inoculate seeds under a shade and plant on the same day (within 24 hours). Cover seed with soil immediately to protect the inoculant from damage by the sun

## Crop Rotation

Soybeans improve soil structure and fertility when grown in rotation with maize, young sugarcane, tobacco, sorghum etc.

## Weed Control

Early seedbed preparation is a pre-requisite to successful weed control. There are 2 methods of weed control namely chemical and cultural.

- (a) **Chemical method:** weed killers (herbicides) can be used either before germination or planting (pre-emergent), or after germination (post-emergent).
  - (i) *Pre-emergent herbicides* e.g. Alachlor (Lasso, Pendimethalin (Stomp), Ramrod, Linuron (Afon) etc
  - (ii) *Post-emergent herbicides* e.g. Bentazon (Basagram)

## (b) Cultural method

- 2-3 hand weedings are necessary to keep the field weed free.
- Weed on time. Do the first weeding 2 weeks after planting and the second at 5–6 weeks after planting.
- Uproot diseased plants and plants that look different from the rest.

### **Harvesting**

- Timely harvesting is important to avoid shattering and loss of grains.
- Harvest when about 90% of the pods turn brown, most of the leaves have been shed and seeds in pods rattle when plants are shaken. Use a panga to cut the mature plants and leave roots in the field to add nutrients to the soil.
- In large fields, a combine harvester can be used. Combine harvesting is done when moisture content is 16-18%. This is attained 1.0 - 1.5 weeks after physiological maturity.

### **Drying and Storage**

- Dry the harvested plants on clean surface like tarpaulin, canvas, mats in sunlight for about 4 days before threshing, this reduce crop moisture content to 13% or less (which is good for safe storage).
- Soybean seed is sufficiently dry when it cracks between teeth.
- Winnow and sort to remove plant materials, broken or shivered seeds etc.
- Clean seed should be treated with Actellic 2% to protect against bruchids before putting in clean bags or metallic silos placed on wooden pallets
- Store seed in bags or silos in a cool dry, aerated place (below 75% relative humidity at low temperature)
- Seed meant for planting should not be stored for more than 6 months due to rapid loss of viability.

## **PESTS AND DISEASES OF SOYA BEANS**

Soya beans has some resistance to pests and diseases due to the presence of anti-nutritional factors. However some pests may attain economic threshold levels. The major pests and diseases are:

### **(a) Major Pests**

- African bollworms
- Cutworms
- Aphids
- Semi-looper caterpillars
- Nematodes

- Beanflies
- Storage weevils

**(b) Major Diseases**

- Soybean Mosaic Virus
- Bacterial blight
- Wildfire
- Sclerotinia
- Downey mildew
- Brown spots



