Good Agronomic Practices (GAP) for Soybean

Digitized Content Package on Good Agronomic Practices (GAP) for Soybean

1.0 INTRODUCTION

- Soybean is a vital cash and food crop rich in protein (40%) and oil (20%), widely used in livestock feed, food processing, and industry.
- Cultivated widely in the Guinea and Sudan savannas of Nigeria.
- Soybean also improves soil fertility and suppresses the parasitic weed *Striga hermonthica* through nitrogen fixation.

2.0 SITE SELECTION

- Best in well-drained loamy soils, pH 4.5–8.5.
- Avoid shallow, gravelly, sandy, or waterlogged soils.
- Ideal zones: Northern & Southern Guinea Savannas with rainfall >700 mm.
- Early-maturing varieties can grow in drier Sudan savannas if rainfall is well-distributed.

3.0 LAND PREPARATION

Proper land preparation ensures good germination and reduces weed infestation. Clear all vegetation before preparing the seedbed manually (hoe), using animal-drawn implements, or a tractor. Planting can be done on ridges or a flat seedbed. Incorporating organic matter (from cleared vegetation, manure, compost) during preparation enhances nutrient availability.

4.0 VARIETY AND SEED SELECTION

Select soybean varieties based on maturity, yield potential, lodging resistance, drought tolerance, and resistance to pests and diseases. Early maturing varieties are recommended for low rainfall areas. Soybean seeds easily lose viability, so use seeds no older than 12 months. Purchase certified seeds from reputable sources like seed companies or producers, not the open market.

5.0 PLANTING DATES, TIME AND METHODS

Best Planting Window: June (Guinea Savanna); early July (Sudan Savanna).

Spacing:

75 cm between rows × 5 cm between plants (on ridges).

50 cm × 20 cm (on flat) to achieve 400,000–500,000 plants/ha.

Seed Rate: ~60–75 kg/ha depending on seed size.

Planting Methods**:** Use jab planter or mechanical seeders where available, depth: 3–5 cm.

6.0 SOIL HEALTH

Soybean, being a legume, can fix atmospheric nitrogen (N) through biological nitrogen fixation. However, phosphorus (P) is often the most deficient nutrient. Apply phosphorus at 30 kg P/ha (e.g., 4 bags of Single Super Phosphate - SUPA) during land preparation or before sowing. A starter dose of 10-15 kg N/ha (e.g., 2 bags NPK 15:15:15) at planting can also be beneficial. Incorporate fertilizers into the soil. Nitrogen and potassium are only needed if deficiencies are obvious from soil tests. Soybean improves soil fertility for succeeding maize and controls.

Seed inoculation with Rhizobium (NoduMax) boosts soybean yields up to 2500-3000 kg/ha by enhancing nodule formation and nitrogen fixation. To inoculate, mix 100g of NoduMax with 10kg of seeds using a gum Arabic sticker solution. Cover seeds with a cloth, keep in shade, and plant in moist furrows on the same day.

7.0 WEED MANAGEMENT

Weeds can reduce soybean yields by 30-60%.

Manual Control: Conduct the first weeding at **2 weeks after planting** and the second at **4-5 weeks after planting**. Avoid weeding immediately after rainfall.

Chemical Control: Herbicides are safe and effective. Apply pre-emergence herbicides (e.g., Butachlor, Pendimethalin) immediately after planting. Follow up with post-emergence herbicides (e.g., Flazy-vop-butyl, Raptor) at 4-6 weeks after sowing to control emerged weeds.

Parasitic Weeds (*Alectra vogelii* and *Striga gesnerioides*): These weeds cause stunted growth and wilting. Control measures include resistant varieties, proper soil fertility, and crop rotation with non-host crops.

8.0 SAFE USE AND HANDLING OF PESTICIDES

- Precautions must be followed to ensure safe use of pesticides. Even after use, the empty containers must be disposed very well by burying them.
- Instructions as stated on the label of the pesticides must be followed while only trained personnel should apply pesticides at recommended rate.
- The personnel should also wear protective clothing during application of pesticides.

11.0 PEST AND DISEASES MANAGEMENT

Common pests: Pod borers, leaf miners, stem borers, aphids, silverleaf whitefly

Common diseases: fungal (Rust, Frogeye leaf spot), bacterial (Bacterial pustule), and viral (Mosaic, Yellow mosaic, Dwarf disease) infections.

Integrated Pest Management (IPM): Implement IPM strategies that combine cultural, biological, and judicious chemical methods.

Cultural Practices: Field sanitation and rotation reduce disease carry-over.

Resistant Varieties: Plant varieties resistant or tolerant to common pests and diseases.

Chemical Control: Apply pesticides judiciously and according to recommendations only when pest populations reach economic thresholds

10.0 CROP MATURITY, HARVEST AND STORAGE

- Soybean matures within 3–4 months after planting and requires timely harvesting to check excessive yield losses. At maturity, the pod is strawcolored.
- It is recommended that soybean be harvested when about 85% of the pods have turned brown for a non-shattering variety but 80% for shattering varieties.
- Alternatively, the crop can be harvested when the seeds are at the hard-dough stage, when the seed moisture content is between 14 and 16%. Newer varieties are resistant to shattering but losses in yield may occur from other causes if harvesting is delayed.
- Harvesting can be done with a cutlass, a hoe, or sickles. Cut the mature plants at ground level. Stack them loosely on tarpaulin and allow them to dry in the open for 2 weeks before threshing.
- Do not harvest by hand pulling because this may remove the nutrient that the soybean has added to the soil.

  The seed should be stored at moisture content of 10-12% or less.