The 10 Steps to

A GOOD SOYBEAN PRODUCTION

Ghanaian Farmers:

Follow these 10 steps and increase your soybean harvest.
**Step 1  Why grow soybean?**

**Soybean is for good health**
- Soybean provides the body with high quality protein

**Soybean enriches the soil**
- Soybean roots fix nitrogen in the soil for plants to use
- Some of this nitrogen is used by succeeding crops

**Soybean breaks the pests and disease cycle**
- Growing soybean in rotation with cereals breaks the pests and diseases cycles for both crops
Step 2  Select a good site

Soybean does well in the following ecologies:

- Guinea Savannah
- Transition
- Semi-deciduous Forest
- Coastal Savannah

Loamy soils in the Savannah and the Transition Zones have the highest yield potential.

Avoid these soils:
- Deep Sandy Soils do not hold water well
- Heavy Clayey Soils Hold too much water

Loamy soils are the best Hold water well
Step 3  Prepare the land

Clear land the traditional way

On slopy fields, plant directly into the cut vegetation to avoid soil erosion

A  Slash with cutlass.

Do not burn slashings

B  If grassy weeds are in the field, remove stumps with hoe after brushing with cutlass

Proper clearing helps good stand establishment and reduces weed problems

Choose deep, well drained loamy soil rather than sandy or shallow soil.
Step 4  Plant improved varieties

For good germination purchase seed from:

Certified Seed Growers

<table>
<thead>
<tr>
<th>Days to Maturity</th>
<th>Maturity Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 115</td>
<td>medium</td>
</tr>
<tr>
<td>Over 115</td>
<td>Late</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variety</th>
<th>Colour</th>
<th>Maturity Group</th>
<th>Yield Potential Bags/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anidoso</td>
<td>Yellow</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>Bengbie</td>
<td>Light-yellowish Green</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>Sallintuya-1</td>
<td>Yellow</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>Sallintuya-2</td>
<td>Yellow</td>
<td>late</td>
<td></td>
</tr>
</tbody>
</table>
Conduct a germination test.

A germination test before planting will help you decide on good seed

**PLANTING GUIDE**

<table>
<thead>
<tr>
<th>If you have this number of plants ...</th>
<th>Then put this number of seeds in each hole</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 or more</td>
<td>2 seeds per hole</td>
</tr>
<tr>
<td>70-84 plants</td>
<td>3 seeds per hole</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If you have this number of plants ...</th>
<th>Then put this number of seeds in each hole.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 - 70 plants</td>
<td>Get better seeds or 4 per hole</td>
</tr>
<tr>
<td>Less than 50 plants</td>
<td>Do not waste your time sowing the seeds</td>
</tr>
</tbody>
</table>
Step 5  Select the correct planting time

Soybean should be planted such that maturity coincides with the end of the rains

<table>
<thead>
<tr>
<th>MEDIUM MATURITY GROUP</th>
<th>LATE MATURITY GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Where</strong></td>
<td><strong>Where</strong></td>
</tr>
<tr>
<td>Guinea Savannah</td>
<td>Guinea Savannah</td>
</tr>
<tr>
<td>Transition</td>
<td>Transition</td>
</tr>
<tr>
<td>Forest</td>
<td>Forest</td>
</tr>
<tr>
<td>Coastal Savannah</td>
<td>Coastal Savannah</td>
</tr>
<tr>
<td><strong>When</strong></td>
<td><strong>When</strong></td>
</tr>
<tr>
<td>June</td>
<td>June</td>
</tr>
<tr>
<td>May</td>
<td>May</td>
</tr>
<tr>
<td>July-August</td>
<td>May</td>
</tr>
<tr>
<td><strong>Seed Requirement</strong></td>
<td><strong>Seed Requirement</strong></td>
</tr>
<tr>
<td>40-50 kg per ha</td>
<td>40-50 kg per ha</td>
</tr>
<tr>
<td>(100-120 margarine cups)</td>
<td>(100-120 margarine cups)</td>
</tr>
</tbody>
</table>

When drilled

5 cm spacing between plants

When Hill Planted

20 cm spacing between plants (2 plants/hill)
Step 6  Plant in rows

Lining up 3 poles ensures that the rows will be straight

Kofi has just drilled a row of soybean. He is using the sighting pole to measure the distance between rows

Ama has just hill planted a row of soybean. She is using the sighting pole to measure the distance between rows

- 5 cm: This is the space between plants
- 75 cm: This is the distance between 2 rows
- 20 cm: This is the space between plants
- 60 cm: This is the distance between 2 rows

Planting in rows makes weeding, fertilizing and harvesting easier
Step 7  Plant at proper depth

Make holes 2 - 3 cm deep.
For clayey soils which crust easily, 2 cm is recommended. For lighter soils (loamy or sandy), 3 cm is recommended.

Soybean must be sown at the proper density (spacing) to obtain high yields. Proper planting procedure produces a good canopy which reduces weed problems.
Step 8  Use fertilizer

Fertilizer types

- **COW DUNG**
  - 3 ton/acre

- **CHICKEN MANURE**
  - 4 ton/ha

- **COMPOST**
  - 5 ton/ha

Good soil

- Healthy plant
- Normal nodule growth

Very poor soil

- Add 15 - 30 kg nitrogen/ha
- 30 - 60 kg phosphorus/ha
- 15 - 30 kg potassium/ha

On poor soils, feed your soybean with fertilizer for higher yields.
Step 9  Control weeds early

Why weed early?

Early weeding prevents weeds from competing with the crop for:
- nutrients
- water
- light
- space

Too much weed competition means a poor harvest

Two hand weedings at 2-3 weeks and 4-5 weeks after planting is normally

It is important that soybean does not have competition from weeds during the first 4 weeks
Step 10  Spray soybean to control insects

IMPORTANT
Where leaf-eating caterpillars and Pod sucking bugs constitute a major problem, spray either endosulfan (Thiodan or Thionex) or dimethoate (Roxion or Perfekthion) at 2 litres/ha.

Kofi wears protective clothing while spraying.

There is one row of soybean between Kofi and the row he is spraying.

Ask the Extension Officer to explain how to use the insecticide correctly.
Kofi and Ama have a good crop of soybean

The extension officer visits Kofi and Ama regularly. Today he is admiring Kofi and Ama's successful soybean crop. The extension officer tells Kofi and Ama "I am proud of you and other farmers in Ghana who have adopted improved farming practices. In every region of Ghana progressive farmers are producing bumper crops of soybean. Our families will be prosperous and our children will be healthy".
Step 11 Harvest under dry conditions

Harvest when 95% of pods are dried (brown or grey in colour).

- **Cut at ground level**
- **Uproot by hand**
Ama threshes and winnows the soybean when the pods are dry.
Questions frequently asked by farmers

QUESTION: What are the advantages of planting Soybean on last season's cereal field?

ANSWER: This practice is called "Crop Rotation"
The advantages of this practice are:
  i. The Soybean adds Nitrogen to the soil.
  ii. Diseases, weeds, and insect infestation are reduced
  iii. Crop Rotation improves soil fertility

QUESTION: Is the quality of protein found in soybean as good as that of other high protein foods?

ANSWER:
The protein in human breastmilk is considered the highest quality of proteins in food. Whole eggs, cow's milk animal meats and fish follow in rank. Soybean comes close in value to these foods and has greater weight than in other foods.

QUESTION: Why do I have to plant in rows?

ANSWER: By planting in rows, you achieve optimum plant population. Also, it makes management (weeding, spraying, harvesting, etc.) easier.

QUESTION: Will fertilizer increase the soybean crop?

ANSWER:
Generally you do not need to use fertilizer. Good soil will provide good yields. Poor soil may need to be improved before planting with fertilizer. Add 50-30 kg nitrogen/ha, 30-60 kg phosphorus/ha and 15-30 kg potassium/ha
Let's review the 10 steps to a good soybean production

1) Select a good site
2) Prepare the land early
3) Plant improved varieties
4) Select correct planting time
5) Plant in rows
6) Plant at proper depth
7) Weed during 2-3 weeks after planting
8) Spray to control insects
9) Harvest during the dry period
10) Store in cool dry place
Let's see what Kofi and Ama invested to have a good yield.

**SEED**  
1/2 BAG

**WEEDING**  
1/4 BAG

**HARVESTING AND TRESHING**  
1/2 BAG

**HARVEST:** 5 BAGS

**BENEFIT:** 3 3/4 BAGS
# MEASUREMENTS, CONVERSION FACTORS AND COMMON EQUIVALENTS

## Measurements

<table>
<thead>
<tr>
<th>Unit</th>
<th>Conversion Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 metre (m)</td>
<td>= 3.28 feet (ft)</td>
</tr>
<tr>
<td>1 foot</td>
<td>= 0.305 metre</td>
</tr>
<tr>
<td>1 centimetre (cm)</td>
<td>= 0.394 inches (in)</td>
</tr>
<tr>
<td>1 inch</td>
<td>= 2.54 centimetres</td>
</tr>
<tr>
<td>1 hectare (ha)</td>
<td>= 10,000 square metres (m²)</td>
</tr>
<tr>
<td>1 acre</td>
<td>= 2.47 acres (ac)</td>
</tr>
<tr>
<td>1 hectare</td>
<td>= 0.405 hectare</td>
</tr>
<tr>
<td>1 kilometre (km)</td>
<td>= 0.621 mile (mi)</td>
</tr>
<tr>
<td>1 mile</td>
<td>= 1.61 kilometres</td>
</tr>
<tr>
<td>1 kilogram (kg)</td>
<td>= 2.20 pounds (lb)</td>
</tr>
<tr>
<td>1 pound</td>
<td>= 0.454 kilograms</td>
</tr>
<tr>
<td>1 kg/ha</td>
<td>= 0.89 lb/ac</td>
</tr>
<tr>
<td>1 lb/ac</td>
<td>= 0.454 kg/ac</td>
</tr>
</tbody>
</table>

## Conversion Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Conversion Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 t/ha grain</td>
<td>approx. 4 maxi bags/acre</td>
</tr>
<tr>
<td>1 bag 20:20:0 fertilizer (50 kg)</td>
<td>10 kg Nitrogen + 10 kg P2O5</td>
</tr>
<tr>
<td>1 bag 20:20:0 fertilizer (50 kg)</td>
<td>25 kg/ha N + 25 kg/ha P2O5</td>
</tr>
<tr>
<td>1 bag ammonium sulphate (50 kg)</td>
<td>10.5 kg N</td>
</tr>
<tr>
<td>1 bag/acre ammonium sulphate (10.5 kg N / acre)</td>
<td>= (26 kg/ha N)</td>
</tr>
</tbody>
</table>

## COMMON EQUIVALENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 full &quot;Ideal&quot; milk tin</td>
<td>= 180 ml</td>
</tr>
<tr>
<td>1 beer bottle</td>
<td>= 600 ml</td>
</tr>
<tr>
<td>1 mineral bottle</td>
<td>= 300 ml</td>
</tr>
<tr>
<td>1 bottle top</td>
<td>= 5 ml</td>
</tr>
<tr>
<td>1 cap from Actellic 25 EC can</td>
<td>= 10 ml</td>
</tr>
</tbody>
</table>
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