



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

SEED GUIDE

RECOMMENDED COMMERCIAL
MAIZE, RICE AND SOYBEAN
VARIETIES AVAILABLE FOR
NORTHERN GHANA



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FOREWORD

The Feed the Future Ghana Agricultural Technology Transfer project, implemented by IFDC in northern Ghana, aims to strengthen seed sector development and agricultural productivity, particularly that of maize, rice and soybeans. The growth of the formal seed sector will play an important role in technology transfer and must be based on a market driven approach, in which farmers recognise and demand quality seed of improved varieties. Ghana has a long and distinguished history of crop variety development and registration, and yet the use of improved seed by farmers remains low. Part of the reason for low farmer uptake of improved varieties is the lack of knowledge of the availability and characteristics of improved varieties. Likewise, agro-dealers and seed producers need to know the key features of crop varieties in order to advise farmers on which seed to purchase.

This brochure has been produced as a first attempt to describe and present the best available maize, rice and soybean varieties. Since this is the first publication of such a farmer-oriented brochure, we acknowledge that there may be some deficiencies in style and content, and therefore we appreciate any feedback that will help to improve the publication for future use. In the meantime, we are pleased to present this brochure as a guide to the best available maize, rice and soybean varieties in northern Ghana.

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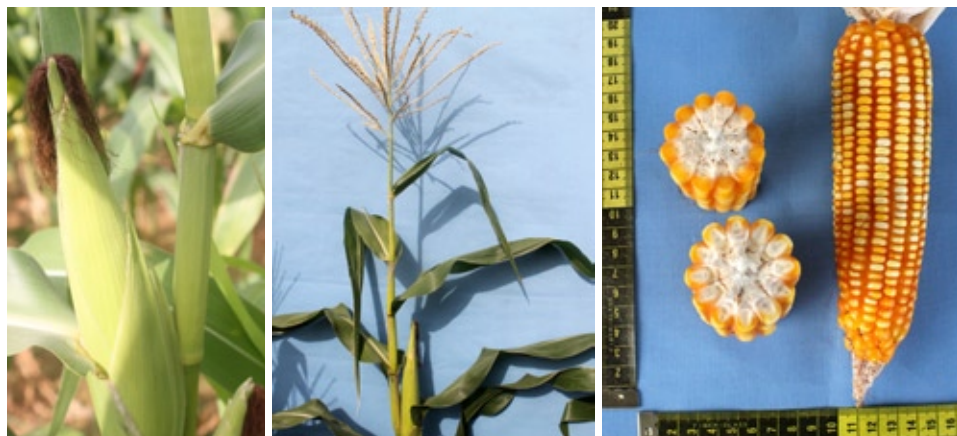
ACRONYMS

OPV.....	Open-Pollinated Variety
QPM.....	Quality Protein Maize
Ha.....	Hectare
t/ha.....	Tons (metric) per Hectare
DAE.....	Days after Emergence
CSIR.....	Council for Scientific and Industrial Research
CRI.....	Crop Research Institute
SARI.....	Savanna Agricultural Research Institute
MSV.....	Maize Streak Virus
N.....	Nitrogen
P.....	Phosphorus
K.....	Potassium
DAP.....	Diammonium phosphate
MOFA.....	Ministry of Food and Agriculture

MAIZE



Variety	Type of Maize	Grain Color	Grain Texture	Grain Type	Yield Range (t/ha)	Maturity (DAE)
Bihilifa	OPV	Yellow	Semi-flint	Normal	4–5	110 days
Ewul-Boyu	OPV	White	Flint/Dent	Normal	5–6	90 days
Mamaba	Hybrid	White	Flint	Normal	6–7	110 days
Obatanpa	OPV	White	Dent	QPM	4–5	110 days
Okomasa	OPV	White	Dent	Normal	5–6	120 days
Sika Aburoo	Hybrid	White	Flint/Dent	Normal	5–6	105-110
Sanzal Sima	OPV	White	Flint/Dent	Normal	5–6	110 days
Wang-Dataa	OPV	White	Flint	Normal	4–5	90 days

**NAME OF VARIETY****BIHILIFA**

Attributes: Moderately drought tolerant, MSV tolerant

Name of breeders CSIR-SARI and CRI

Year of release 2012

Type of variety OPV

Time of flowering 45-50 days after emergence

Time to maturity 110 days after emergence

Silk colour Cream purple

Tassel shape Open and Alternate

Plant height 170 cm

Cob length Medium

Cob tip coverage Medium

Disease resistance – Common Rust Resistant

Disease resistance – Maize streak virus Resistant

Ability to withstand lodging Good

Yield potential 4-5 t/ha

Grain colour Yellow

Grain type Normal maize

Grain texture Semi-flint

Seed size Medium

**NAME OF VARIETY****EWUL-BOYU**

Attributes: Early maturing, MSV resistant

Name of breeders

CSIR-SARI and CRI

Year of release

2012

Type of variety

OPV

Time of flowering

57-59 days after emergence

Time to maturity

90 days after emergence

Silk colour

Cream Purple

Tassel shape

Open and Alternate

Plant height

157 cm

Cob length

Medium

Cob tip coverage

Medium

Disease resistance — Common Rust

Resistant

Disease resistance — MSV

Resistant

Ability to withstand lodging

Good

Yield potential

5-6 t/ha

Grain colour

White

Grain type

Normal maize

Grain texture

Flint/dent

Seed size

Medium

**NAME OF VARIETY****MAMABA**

Attributes: High yielding, MSV resistant, drought tolerant

Name of breeders CSIR–SARI and CRI

Year of release 1997

Type of variety Three-way hybrid

Time of flowering 50/51 days after emergence

Time to maturity 110 days after emergence

Silk colour Purple

Tassel shape Compact and alternate

Plant height 171 cm

Ear height 101 cm

Cob length Medium (18–19 cm)

Cob tip coverage Medium

Disease resistance—Common Rust Resistant

Disease resistance—MSV Resistant

Ability to withstand lodging Good

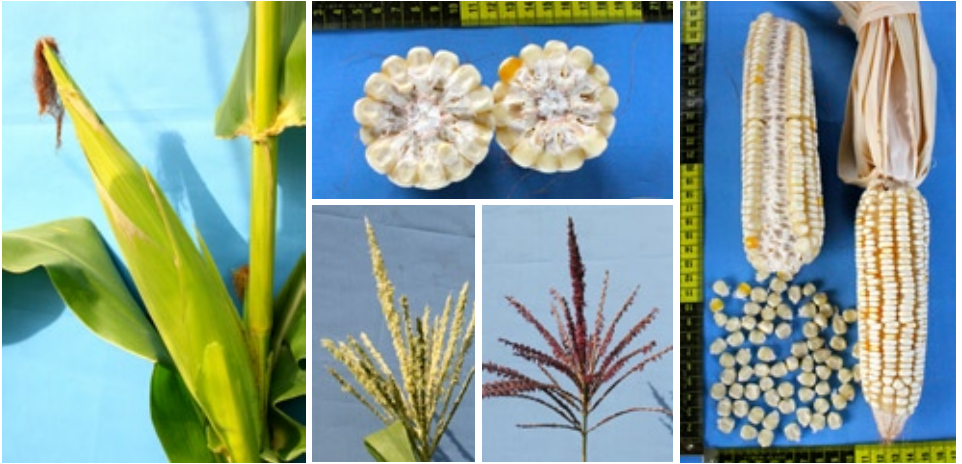
Yield potential 6–7 t/ ha

Grain colour White

Grain type Normal maize

Grain texture Flint

Seed size Medium

**NAME OF VARIETY****OBATANPA**

Attributes: Quality protein maize, MSV resistant

Name of breeders

CSIR-SARI and CRI

Year of release

1992

Type of variety

OPV

Time of flowering

52-55 days after emergence

Time to maturity

110 days after emergence

Silk colour

Cream purple

Tassel shape

Open and alternate

Plant height

175 cm

Ear height

80 cm

Cob length

Medium (15-16 cm)

Cob tip coverage

Medium

Disease resistance—Common Rust

Resistant

Disease resistance—MSV

Resistant

Ability to withstand lodging

Very good

Yield potential

4–5 t/ha

Grain colour

White

Grain type

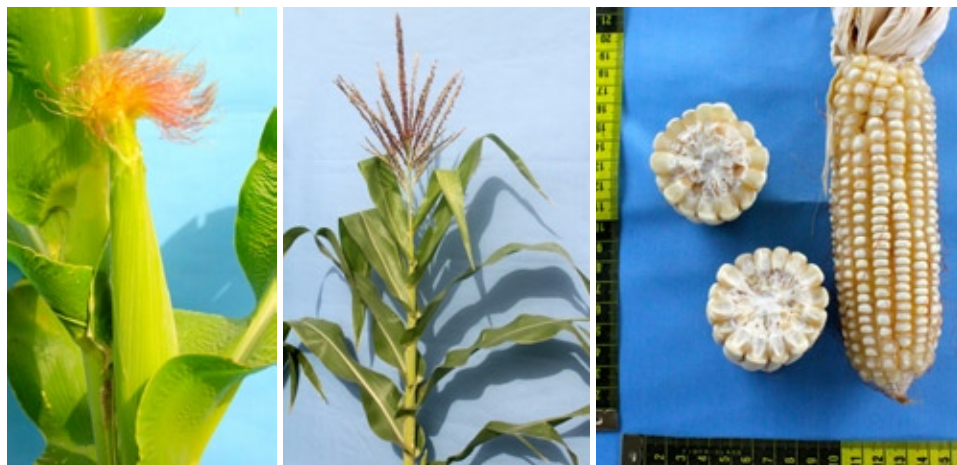
Quality Protein Maize

Grain texture

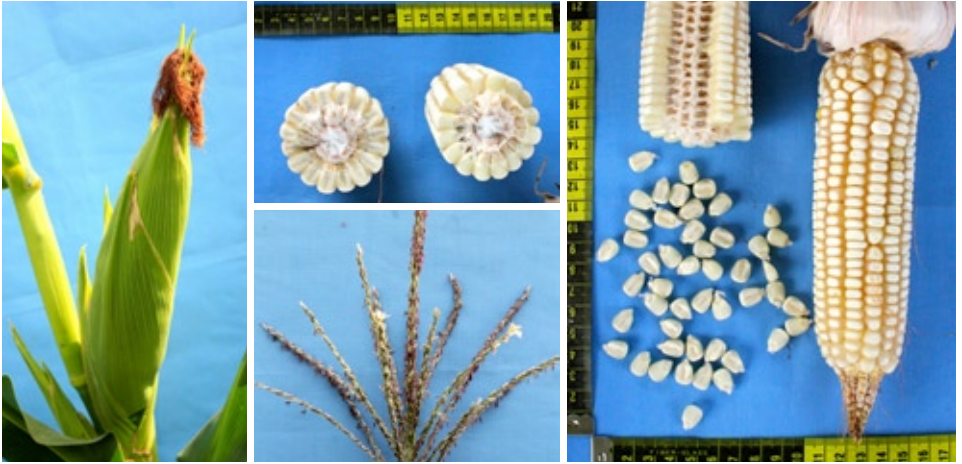
Dent

Seed size

Large



NAME OF VARIETY	OKOMASA
Name of breeders	CSIR-SARI and CRI
Year of release	1988
Type of variety	OPV
Time of flowering	57-59 days after emergence
Time to maturity	120 days after emergence
Silk colour	Cream purple
Tassel shape	Open and alternate
Plant height	198 cm
Ear height	105 cm
Cob length	Medium (16 cm)
Cob tip coverage	Medium
Disease resistance — Common Rust	Resistant
Disease resistance — MSV	Resistant
Ability to withstand lodging	Good
Yield potential	5-6 t/ha
Grain colour	White
Grain type	Normal
Grain texture	Dent
Seed size	Large

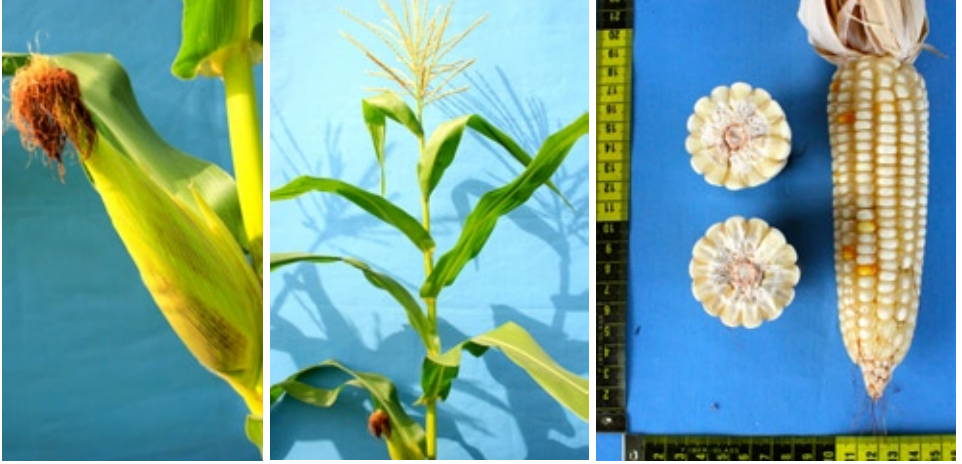


NAME OF VARIETY	SIKA ABUROO (PAN53)
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Name of breeders	CSIR-SARI and CRI (PANNAR)
Year of release	2015
Type of variety	Three-way hybrid
Time of flowering	56-57 days after emergence
Time to maturity	105-110 days after emergence
Silk colour	Purple with cream base
Tassel shape	Open and Alternate
Plant height	229 cm
Ear height	102 cm
Cob length	Medium
Cob tip coverage	Medium
Disease resistance – Common Rust	Tolerant
Disease resistance – MSV	Tolerant
Ability to withstand lodging	Good
Yield potential	5-6 t/ha
Grain colour	White
Grain type	Normal maize
Grain texture	Flint/dent
Seed size	Large



NAME OF VARIETY	SANZAL SIMA
Name of breeders	CSIR–SARI and CRI
Year of release	2012
Type of variety	OPV
Time of flowering	55-56 days after emergence
Time to maturity	110 days after emergence
Silk colour	Cream purple
Tassel shape	Open and Alternate
Plant height	176 cm
Ear height	Medium
Cob length	Medium
Cob tip coverage	Medium
Disease resistance – Common Rust	Resistant
Disease resistance – MSV	Resistant
Ability to withstand lodging	Good
Yield potential	5-6 t/ha
Grain colour	White
Grain type	Normal maize
Grain texture	Flint/dent
Seed size	Medium

**NAME OF VARIETY****WANG-DATAA**

Attributes: Early maturing, drought and Striga tolerant

Name of breeders CSIR–SARI and CRI

Year of release 2012

Type of variety OPV

Time of flowering 52-54 days after emergence

Time to maturity 90 days after emergence

Silk colour Cream purple

Tassel shape Open and alternate

Plant height 144 cm

Ear height Medium

Cob length Medium

Cob tip coverage Medium

Disease resistance – Common Rust Resistant

Disease resistance – MSV Resistant

Ability to withstand lodging Very good

Yield potential 4-5 t/ha

Grain colour White

Grain type Normal

Grain texture Flint

Seed size Medium

GOOD AGRICULTURAL PRACTICES (GAPs) FOR MAIZE PRODUCTION

- **Land selection:** select a fertile land with a loamy to light clay texture. The soil should be deep and have good water retention capacity, but it should also be good at drainage. Soils prone to waterlogging should be avoided.
- **Land preparation:** Where conventional tillage is practiced, plough and, if possible, harrow the land at the onset of the rains, prior to planting. In places when conservation agriculture is practiced, weeds must be cleared either manually or with herbicides prior to planting.
- **Organic matter:** If available, apply manure and/or compost to the field at least two weeks prior to land preparation. The manure and/or compost can be mixed with the soil during land preparation. If manure/compost is not adequate to cover the entire land, micro-dosing should be done, whereby a handful of manure is placed near the spot of planting. A handful of well-decomposed manure or compost gives an equivalent of 2.5 t/ha.
- **Variety selection and seed:** Select a suitable variety and use certified seed from a reputable agro-input dealer. Certified seed is of good quality and has a germination rate of more than 90 percent. Store the seed in a safe, dry and cool place before sowing.
- **Sowing seed:** Sow with the first good rains, when the soil is moist. Use a seeding rate of about 25 kg/ha. For OPV maize, use inter-row spacing of 80 cm and inter-plant (intra-row) spacing of 20 cm, planting one seed per hill. For hybrid maize, use inter-row spacing of 80 cm and inter-plant spacing of 25 cm, planting one seed per hill. Sow seeds at a depth of 4 to 6 cm deep and firm the soil overlying the seeds.
- **Basal fertilizer:** Apply 100 kg of NPK fertilizer (2 bags) per acre of land. In areas where the soil is rich in potassium, DAP fertilizer can be used in place of NPK fertilizer. It is best to apply the basal fertilizer at planting or at most up to one week (7 days) after emergence. All fertilizer should be incorporated into the soil to avoid volatilization and erosion losses. Bury fertilizer about 5 cm away from the seedling and at a depth of about 7 cm deep.

- **Weed control:** Early weed control is very critical in maize to minimize weed competition, particularly during the first four weeks after emergence. If applicable, pre-emergence herbicide must be applied to field at planting and/or when weeds appear. A post emergence herbicide can be sprayed to the field before the 4th week after maize seedling emergence. The field must be clear of weeds before the canopy closes. Once the crop has developed a good canopy, weed control will be easier. It is a good practice to always clear all weeds/bush surrounding the fields as such bushes harbor pests, particularly rodents.
- **Top dressing:** For early and medium maturing OPV maize varieties, apply nitrogen fertilizer as topdressing at five weeks after seedling emergence. For late maturing OPV maize varieties, the nitrogen fertilizer should be applied at six weeks after seedling emergence. The nitrogen fertilizer sources can be urea or ammonium sulphate. For urea, apply 50 kg (1 bag) per acre, and for ammonium sulphate, apply 100 kg (2 bags) per acre. For hybrid maize, apply 100 kg (2 bags) of urea or 200 kg (4 bags) of ammonium sulphate at five weeks after emergence as top dressing. It is preferable to bury the N fertilizers 7 cm away from the plant and 7 cm deep.
- **Pest control:** Scout fields regularly for pests, especially rodents and stem borers at the vegetative stage, and control the pests appropriately using only recommended and approved agro-chemicals. When using agro-chemicals, be sure to follow all safety precautions inscribed on the labels and recommendations from the Extension Services Department.
- **Harvest:** Harvest the crop at physiological maturity when the crop changes from green to brown. At this point, the kernels on the cob become hard and dry, and a black layer forms at the base of the maize grain. Be careful to minimise grain loss during harvest, threshing and transport. Thresh, winnow and store the grain in protected storage facilities.

RICE



* Days after emergence (DAE)

Variety	Ecology	Days to Flower*	Days to Maturity*	Aroma	Yield (t/ha)	Plant Height (cm)
AGRA Rice	Lowland, Irrigated	72	110-115	Strong	5-6	116
Digang	Hydromorphic, Lowland	73	115	Absent	4-5	132
Gbewaa (Jasmine 85)	Lowland, Irrigated	72	110-115	Strong	5-6	116
GRI8	Lowland, Irrigated	92	132	Absent	6-7	116
Katanga	Deep Lowland	96	130-140	Absent	6-8	132
Nabogu	Lowland, Irrigated	82	120-130	Absent	6-7	140



NAME OF VARIETY	AGRA RICE
Breeder	CSIR-SARI and CRI
Year of release	2009
Ecology	Lowland and irrigated
Anthocyanin coloration of auricles	Absent
Time to flowering	72 days after emergence
Time to maturity	100-115 days after emergence (Intermediate)
Plant height	116 cm
Yield potential	5-6 t/ha
Grain length (unhulled)	8.8 mm
Grain width (unhulled)	2.2 mm
Grain length: width ratio	4.0:1
Thousand grain weight	27 g
Hulled grain: color	White
Hulled grain: aroma	Strong



NAME OF VARIETY	DIGANG
Breeder	CSIR-SARI
Year of release	2003
Ecology	Lowland and irrigated
Anthocyanin coloration of auricles	Absent
Time to flowering	73 days after emergence
Time to maturity	115 days after emergence (Intermediate)
Plant height	132 cm
Yield potential	4-5 t/ha
Grain length (unhulled)	8.8 mm
Grain width (unhulled)	2.0 mm
Grain length:width ratio	4.4:1
Thousand grain weight	25-26 g
Hulled grain: color	White
Hulled grain: aroma	Absent to very weak



NAME OF VARIETY	GBEWAA (JASMINE 85)
Breeder	CSIR-SARI
Year of release	2009
Ecology	Lowland and irrigated
Anthocyanin coloration of auricles	Absent
Time to flowering	72 days after emergence
Time to maturity	110-115 days after emergence (Intermediate)
Plant height	116 cm
Yield potential	5-6 t/ha
Grain length (unhulled)	8.8 mm
Grain width (unhulled)	2.2 mm
Grain length:width ratio	4.0:1
Thousand grain weight	27 g
Hulled grain: color	White
Hulled grain: aroma	Strong



NAME OF VARIETY	GRI8
Breeder	MOFA
Year of release	1983
Ecology	Lowland and irrigated
Anthocyanin coloration of auricles	Absent
Time to flowering	92 days
Time to maturity	132 days after emergence (Late)
Plant height	116 cm
Yield potential	6-7 t/ha
Grain length (unhulled)	8.0 mm
Grain width (unhulled)	2.0 mm
Grain length:width ratio	4.0:1
Thousand grain weight	27-28 g
Hulled grain: color	White
Hulled grain: aroma	Absent to very weak



NAME OF VARIETY	KATANGA
Breeder	CSIR-SARI
Year of release	2009
Ecology	Deep Lowland
Anthocyanin coloration of auricles	Absent
Time to flowering	96 days after emergence
Time to maturity	130-140 days after emergence (Late)
Plant height	132 cm
Yield potential	6-8 t/ha
Grain length (unhulled)	8.8 mm
Grain width (unhulled)	2.0 mm
Grain length:width ratio	4.4:1
Thousand grain weight	22-23 g
Hulled grain: color	White
Hulled grain: aroma	Absent to very weak



NAME OF VARIETY	NABOGU
Breeder	CSIR-SARI
Year of release	2009
Ecology	Lowland and irrigated
Anthocyanin coloration of auricles	Present
Time to flowering	82 days after emergence
Time to maturity	120-130 days after emergence (Late)
Plant height	140 cm
Yield potential	6-7 t/ha
Grain length (unhulled)	8.8 mm
Grain width (unhulled)	2.0 mm
Grain length:width ratio	4.4:1
Thousand grain weight	22-23 g
Hulled grain: color	White
Hulled grain: aroma	Absent to very weak

GAPs for Rice Productivity

- **Land selection:** select land that is fertile with good water retention capacity, preferably soil with clayey texture but having relatively good drainage.
- **Land preparation:** Plough and harrow the land before the rainy season and rotovate the soil about one week prior to transplanting or dibbling. For good water management and subsequent cultural practices, the land must be properly levelled with a good tilth ready for planting. With conservation tillage, ensure that weeds are killed before planting.
- **Variety selection and seed:** Select a suitable variety and use certified seed. Certified seed is of good quality and has a germination rate of more than 80 percent. Store the seed in a safe, dry and cool place before sowing.
- **Sowing seed:** It is preferable that the seeds are nursed and transplanted. Seeds should be pre-germinated before sown at the nursery. Proper care and all recommended nursery practices must be followed. Sometime between 14 to 21 days, the seedlings should be transplanted to the field. Transplanted rice should be placed at 20 cm by 20 cm spacing. About 20 kg seeds per hectare is required for nursing. For lowland rice production, the nurseries should be established at the time of first good rains when the soils are fully charged with water. Where transplanting is not practiced, aim at sowing 100 seeds per square meter with dibbling, 150 seeds per square meter with drilling and 200 seeds per square meter with broadcasting. When drilling, use a row spacing of 20 cm. Sow seed 2-4 cm deep. For the dibbling method, use a seeding rate of 25 kg/ha, 35 kg/ha when drilling and 40 kg/ha with broadcasting.
- **Basal fertilizer:** Apply 100 kg of NPK fertilizer (2 bags) per acre of land. The basal fertilizer should be applied when the soil is very moist or slightly wet, and it can be applied by broadcasting. The basal fertilizer for transplanted rice production must be done at the time of transplanting or up to three days after transplanting. Where the rice is planted directly to the field, basal fertilizer must be applied up to three days after emergence.

- **Weed control:** Early weed control is very important in rice to ensure minimal competition from weeds in the first six weeks. Once the crop has developed a good canopy, weed control will be easier. It is a good practice to always clear all weeds/bush surrounding the fields as such bushes harbor pests, particularly rodents.
- **Top dress:** Urea deep placement (UDP) technology is the most efficient fertilizer use practice in rice production. With this technology, 45 kg of 1.8-g briquetted urea is deep placed per acre of land. The briquettes are deep placed at 7 to 14 days after transplanting at a depth of 7 cm to 10 cm. One briquette is placed in the center of four rice plants.
- **Pest control:** Scout fields regularly for pests, particularly stalk borers, and control appropriately. When using agro-chemicals, be sure to follow all safety precautions inscribed on the labels and recommendations from the Extension Services Department. Bird damage is a major pest issue for rice production, therefore efforts must be done to scare birds from entering the fields.
- **Harvest:** When the grains on the panicle change color from green to brown and the kernels are hard and dry, the crop may be harvested. Be careful to minimise grain loss during harvest, threshing and transport. Thresh, winnow and store the grain in protected storage facilities.

SOYBEAN



Variety	Days to Flower	Maturity (DAE)	Plant Height (cm)	Yield Range (t/ha)	Pod Height (cm)	Pod Shattering
Afayak	40-45	110-115	40-45	2.0-3.0	3-6	<5%
Jenguma	45-48	110-115	50-55	2.0-3.0	3-6	<5%
Songda	43-48	110-120	40-50	1.5-2.5	3-6	>50%
Soung-Pungun	35-40	80-85	45-50	1.5-2.5	4-6	<5%



NAME OF VARIETY	AFAYAK
Breeder	CSIR-SARI
Year of release	2012
Type of variety	Inbred line
Days to flowering	40-45 days after emergence
Days to maturity	110-115 days after emergence
Growth habit	Largely determinate
Pubescence	Pubescent on stems, pods, leaves
Plant height	40-45 cm
Pod clearance from ground	3-6 cm
Distribution of pods on plant	Mainly along main stem
Disease resistance: Cercospora leaf spots	Tolerant
Disease resistance: Bacterial pustule	Tolerant
Pod shattering	Less than 5%
Ability to withstand lodging	excellent
Yield potential	2-3 t/ha
Grain colour	Golden yellow
Hilum colour	Light pink
Grain shape	Fairly spherical
Thousand grain weight	120-130 g

**NAME OF VARIETY****JENGUMA**

Name of breeder	CSIR-SARI
Year of release	2003
Type of variety	Inbred line
Days to flowering	45-48 days after emergence
Days to maturity	110-115 days after emergence
Growth habit	Largely determinate
Pubescence	Pubescent on stems, pods, leaves
Plant height	50-55 cm
Pod clearance from ground	3-6 cm
Distribution of pods on plant	Along main stem
Disease resistance: Cercospora leaf spots	Tolerant
Pod shattering	Less than 5%
Disease resistance: Bacterial pustule	Tolerant
Ability to withstand lodging	Excellent
Yield potential	2-3 t/ha
Grain colour	Cream
Hilum colour	Light pink
Grain shape	Fairly spherical
Thousand grain weight	130-140 g



NAME OF VARIETY	SONGDA
Name of breeder	CSIR-SARI
Year of release	2012
Type of variety	Inbred line
Days to flowering	43-48 days after emergence
Days to maturity	110-120 days after emergence
Growth habit	Largely determinate
Pubescence	Light grey
Plant height	45-50 cm
Pod clearance from ground	3-6 cm
Distribution of pods on plant	Mainly along main stem
Disease resistance: Cercospora leaf spots	Tolerant
Pod shattering	Over 50%
Disease resistance: Bacterial pustule	Tolerant
Ability to withstand lodging	Excellent
Yield potential	1.5-2.5 t/ha
Grain colour	Creamy
Hilum colour	Light pink
Grain shape	Fairly spherical
Thousand grain weight	120-130 g

**NAME OF VARIETY****SOUNG-PUNGUN**

Name of breeder	CSIR-SARI
Year of release	2012
Type of variety	Inbred line
Days to flowering	35-40 days after emergence
Days to maturity	80-85 days after emergence
Growth habit	Largely determinate
Pubescence	Brown
Plant height	Brown
Pod clearance from ground	45-50 cm
Distribution of pods on plant	4-6 cm
Disease resistance: Cercospora leaf spots	Along main stem until the tip
Pod shattering	Less than 5%
Disease resistance: Bacterial pustule	Tolerant
Ability to withstand lodging	Excellent
Yield potential	1.5-2.5 t/ha
Grain colour	Golden yellow
Hilum colour	Light pink
Grain shape	Fairly spherical
Thousand grain weight	175-180 g

GAPs for Soybean Productivity

- **Land selection:** select land that is fertile with good water retention capacity and deep soil. Soils with loamy texture and a relatively high organic matter content are preferable. Avoid acid soils, if possible. Otherwise acid soils must be limed before planting for good growth and development of the crop. Soils that form a hard crust on the surface when drying after rain impede emergence of soybeans.
- **Land preparation:** Plough and harrow the land before the rainy season, and aim to have a good tilth ready for planting. With conservation tillage, ensure that weeds are killed with appropriate herbicide before planting.
- **Variety selection and seed:** Select a suitable variety and use certified seed. Certified seed is of good quality and has a germination rate of more than 90 percent. Store the seed in a safe, dry and cool place before sowing. Soybean seed is sensitive to damage from mishandling, high air temperatures and moisture.
- **Sowing seed:** It is good practice to apply *Rhizobium* inoculant with the seed before planting. This assists the plant to develop nodules for nitrogen fixation. Obtain *Rhizobium* inoculant from a reputable supplier, and keep it cool and in the dark until use. At the time of sowing, moisten the seeds and mix 10 g of *Rhizobium* inoculant per 1 kg of seeds and sow the seeds into moist soil. Sow seed when the soils are fully charged with water. Use a seeding rate of 50 to 60 kg/ha. Aim at obtaining 30 seedlings per square meter. When drilling, use a row spacing of 65 cm and space the seed 5 cm apart in the row with one seedling per stand. If planting manually, a spacing of 65 cm by 10 cm with two seedlings per hill is recommended. Sow seeds 2-4 cm deep. Soybean seedlings are very delicate when emerging from the soil so, when planting, soil in the planting hole must not be firmed.
- **Basal fertilizer:** If soybeans are sown in rotation with maize on fertile soils, no basal fertilizer is usually required. However, a modest application of phosphate fertilizer e.g., TSP, is required for proper root development and for nodulation. A phosphate application rate of 30 kg P per acre (which is equivalent to approximately 60 kg TSP/acre) is adequate for soybean production.

- **Weed control:** Early weed control is very important in soybeans to ensure minimal competition from weeds in the first 6 weeks. Once the crop has developed a good canopy, weed control will be easier. Keep the crop weed-free through to maturity. It is a good practice to always clear all weeds/bush surrounding the fields as such bushes harbor pests, particularly rodents.
- **Pest control:** Scout fields regularly for pests and look out for symptoms of diseases. When any abnormalities of the plant development is found, particularly with regard to leaf curling, consult the local extension agents as early as possible for identification of the problem and recommendations. When using agro-chemicals, be sure to follow all safety precautions inscribed on the labels and recommendations from the Extension Services Department.
- **Harvest:** When the pods on the plant change color from green to brown and the seeds are hard and dry, the crop may be harvested. Do not delay harvest for long so as to avoid loss of beans through shattering, particularly with those varieties that are highly susceptible to shattering (e.g., Songda). Be careful to minimise bean loss during harvest, threshing and transport. Thresh, winnow and store the beans in protected storage facilities.

SEED OR GRAIN?

How do you tell the difference? Know that all seeds are grain, but not all grains are seeds. Seeds and grain differ in many respects.

As a dealer or farmer wanting to know if you have seed or grain, you need to follow three steps: 1) do a physical inspection referred to as the P.A.P.S check. 2) do a germination test and 3) seek advice.

The physical inspection or the **P.A.P.S check**:

- **P** checks the product's **purity**. Are there weed seeds, rocks or other foreign material present?
- **A** checks the product's **appearance**. Are there visible insect damages? Broken seeds/grains? Mouldy? Signs of early germination? Uniform colour throughout?
- **P** checks the **packaging**. Is it neatly packaged with brand name, seed variety, weight and expiry date?
- **S** checks **seed treatment**. High quality seeds are usually treated with pesticides. Does the product have signs of chemical treatment?



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