

1) Basic Information of Cluster bean (Guar)

- **Name :**

Cluster bean, commonly known as Guar, belongs to the legume family and is scientifically named *Cyamopsis tetragonoloba*. It is primarily grown for its vegetable pods, fodder, and guar gum extraction (used in food and industrial applications).

- **Best Season for growing :**

Cluster beans are a warm-season crop and thrive best during summer and rainy seasons. The ideal sowing period is from February to March for summer crops and June to July for monsoon crops. In some regions, it can also be sown in September–October for a short post-monsoon crop.

- **Best Soil Type:**

- **Soil Requirements:** Cluster beans prefer well-drained, light to medium-textured soils, such as sandy loam or loamy soils. They do well in slightly alkaline soils (pH 7-8), but they are also tolerant of saline and alkaline conditions.
- **Soil Preparation:** It is important to prepare the soil properly by adding compost or organic matter to improve fertility. Ensure proper drainage to avoid waterlogging, as cluster beans are sensitive to stagnant water.

Guar grows well in light to medium-textured soils such as sandy loam or loamy soils with good drainage. It is highly tolerant to drought and salinity and prefers a soil pH of 7.0 to 8.5. However, waterlogged or heavy clay soils are not suitable for cluster bean cultivation.

- **Time Period (Growing Duration):**

The crop duration for cluster beans varies depending on the variety and season. Generally, it takes about **90–120 days** from sowing to harvest. **Vegetable types** are usually harvested earlier (around 60–70 days), while **guar gum or seed-producing varieties** are harvested after full maturity (100–120 days)

- **Estimated Cost per Acre:**

1. **Seed:**

For one acre, around 10–12 kg of quality seeds are required. Good varieties include Pusa Navbahar (vegetable purpose), HG 563, RGC 936, and Durga Bahar (ideal for gum/industrial use). Seed cost ranges between ₹800–₹1,500 per acre depending on the variety and source.

2. **Land Preparation:**

Cluster beans require a well-prepared, loose, and weed-free soil. One deep ploughing followed by 2–3 harrowings is recommended. Approximate cost for land preparation is around ₹2,000–₹2,500 per acre.

3. **Fertilization:**

Though cluster beans are nitrogen-fixing, a starter dose of NPK is essential. Apply 20–25 kg Nitrogen, 40–50 kg Phosphorus, and 20 kg Potash per acre. FYM (Farmyard Manure) of 4–5 tons per acre improves soil fertility. Cost of fertilizers and manure: ₹2,500–₹3,500 per acre.

4. **Irrigation:**

Cluster beans are drought-tolerant but need irrigation at critical stages (flowering and pod formation). On average, 4–5 irrigations are required depending on rainfall. Cost of irrigation (diesel/power): ₹1,000–₹1,500 per acre.

5. **Planting:**

Seeds are sown directly in lines with row spacing of 30–45 cm and plant spacing of 15–20 cm. Seed treatment with Rhizobium and Trichoderma improves germination and disease resistance. Sowing labor and material: ₹1,000–₹1,200 per acre.

6. **Pest and Disease Control:**

Major pests include aphids, jassids, and pod borers, while common diseases are powdery mildew and bacterial blight. Use Neem oil, Imidacloprid, and Carbendazim or Sulfur dust for control. Spray cost (insecticide/pesticide + labor): ₹1,500–₹2,000 per acre.

7. **Labor:**

Labor is needed for sowing, weeding (2 times), spraying, harvesting, and pod cleaning. Total labor cost per acre is around ₹3,000–₹4,000, depending on availability and rates.

8. Harvesting:

For vegetable purposes, tender pods are harvested multiple times starting 50–60 days after sowing. For seed/gum production, harvesting is done once at full maturity (90–120 days). Harvesting cost: ₹1,000–₹1,500 per acre,

9. Post-Harvest Handling:

Includes drying, cleaning, and packaging. For seed types, proper sun drying and threshing is necessary. For vegetables, **packaging in jute/plastic baskets is done. Estimated cost: ₹500–₹1,000 per acre.**

• Main varieties of Cluster Beans (Gawar)

1. Pusa Navbahar

- **Purpose:** Mainly for vegetable use.
- **Origin:** Developed by IARI, New Delhi.
- **Characteristics:**
 - Semi-erect plant habit.
 - Produces long, green, tender pods (15–20 cm).
 - Good cooking quality and soft texture.
- **Maturity:** Ready for picking in 50–60 days.
- **Yield:** 80–100 quintals/acre (green pods).
- **Suitability:** Summer and kharif seasons; suitable for North India.

2. Pusa Sadabahar

- **Purpose:** Dual-purpose (vegetable and fodder).
- **Origin:** Developed by IARI.

- **Characteristics:**
 - Tall, bushy plant with dark green foliage.
 - High-quality, fiber-less pods.
 - Suitable for multiple pickings.
 - **Maturity:** 55–60 days.
 - **Yield:** 90–110 quintals/acre (pods).
 - **Adaptation:** Wide adaptability across India.
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3. HG 563

- **Purpose:** Mainly for seed/guar gum production.
 - **Origin:** Haryana Agricultural University.
 - **Characteristics:**
 - Short duration (90–100 days).
 - Medium-tall and disease-resistant.
 - Seeds have high gum content (28–30%).
 - **Yield:** 6–7 quintals/acre (dry seeds).
 - **Suitability:** Ideal for arid and semi-arid zones.
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4. RGC 936

- **Purpose:** Industrial (guar gum).
- **Origin:** Rajasthan Agricultural University.

- **Characteristics:**
 - **Drought-tolerant.**
 - **High gum-yielding seeds.**
 - **Medium-maturity duration (100–110 days).**
 - **Yield:** 5–6 quintals/acre.
 - **Region:** Popular in Rajasthan, Gujarat, Haryana.
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5. Durga Bahar

- **Purpose:** High-yielding vegetable variety.
 - **Origin:** MPKV Rahuri (Maharashtra).
 - **Characteristics:**
 - **Erect, tall plant habit.**
 - **Long, green pods (18–22 cm).**
 - **Good market preference.**
 - **Yield:** 90–100 quintals/acre (green pods).
 - **Suitability:** Summer and rainy seasons.
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6. RGC 986

- **Purpose:** Seed/gum production.
- **Characteristics:**
 - **Early maturity (95–100 days).**

- Good seed quality and tolerance to stress.
 - Yield: 5–6 quintals/acre.
 - Region: Preferred in Rajasthan and Haryana.
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7. RGC 1017

- Purpose: High-yielding industrial variety.
- Characteristics:
 - Good resistance to moisture stress.
 - Medium-maturity duration (100 days).
 - High gum content (30%+).
- Yield: Up to 7 quintals/acre under good conditions.

2) Cluster Beans (Gawar) Diseases

1. Powdery Mildew (Pathogen: *Erysiphe polygoni*)

1) Information:

Powdery mildew is a common fungal disease that affects the leaves, stems, and pods of cluster beans, especially during dry and warm weather with high humidity.

2) Symptoms:

- White, powdery fungal growth on upper surface of leaves.
- Infected leaves may curl, dry, and fall off.
- Reduced photosynthesis and stunted plant growth.
- Affects flowering and pod development, leading to yield loss.

3) Cure (Fertilizers & Fungicides):

- Spray wettable sulfur (0.2%) or Carbendazim (0.1%) at 10–15 day intervals.
- Neem oil (3%) is also effective for early stages.
- Ensure adequate potassium nutrition to improve resistance.

4) Prevention:

- Use resistant varieties such as HG 563 or RGC 936.
- Maintain proper spacing for airflow and reduce humidity.
- Remove and destroy affected plant parts.

5) Causes:

- High humidity and warm temperature.
- Overcrowding and poor air circulation.
- Excess nitrogen fertilization.

2. Rust Disease (Pathogen: *Uromyces ciceris-arietini*)

1) Information:

Rust is a fungal disease that severely impacts the leaves and stems of guar plants, especially in cooler climates or late-sown crops.

2) Symptoms:

- Small, reddish-brown pustules on both sides of leaves.
- Leaves may turn yellow and dry prematurely.
- Plant vigor is reduced, and pod formation is affected.

3) Cure (Fertilizers & Fungicides):

- Spray with Mancozeb 75 WP (0.25%) or Propiconazole 25 EC (0.1%).
- Use foliar micronutrients containing zinc and manganese to boost resistance.

4) Prevention:

- Select rust-resistant varieties like RGC 986.
- Avoid late sowing, especially in high-risk areas.
- Maintain field sanitation and crop rotation.

5) Causes:

- Cool and moist weather during the flowering stage.
- Poor drainage or excessive irrigation.
- Infected crop residues in the field.

3) Root Rot (Pathogen: *Rhizoctonia bataticola*, *Fusarium spp.*)

1) Information:

Root rot is a soil-borne fungal disease affecting the root system of cluster beans, often leading to sudden wilting and plant death, especially in waterlogged or over-irrigated fields.

2) Symptoms:

- Plants wilt suddenly even when soil is moist.
- Roots become brown, soft, and decayed.
- Lower stem turns dark brown; plant may collapse.
- Patchy death of plants in field.

3) Cure (Fertilizers & Fungicides):

- Soil drenching with Carbendazim (0.1%) or Trichoderma viride bio-fungicide.
- Apply Neem cake (200–300 kg/acre) in soil.
- Improve organic matter with compost or FYM.

4) Prevention:

- Use disease-free seeds and well-drained soil.
- Practice crop rotation with cereals (like wheat).
- Seed treatment with Thiram + Trichoderma before sowing.

5) Causes:

- Excess irrigation or poor drainage.
- High soil temperature and humidity.
- Contaminated seeds or infected crop residues.

3) Pest and Insect for Cluster Beans (Guar):

1. Aphids (*Aphis craccivora*)

1) Symptoms:

- Clusters of tiny black or greenish insects on tender shoots, undersides of leaves, and flower buds.
- Leaves curl, yellow, and become sticky (honeydew).
- Reduced flowering and pod formation.
- May transmit viral diseases.

2) Cure:

- Insecticide: Spray Imidacloprid 17.8 SL (0.3 ml/L) or Thiamethoxam 25 WG (0.25 g/L).
- Natural method: Use neem oil (3–5 ml/L) or release ladybird beetles (biocontrol).
- Ensure plants are not overfertilized with nitrogen (which attracts aphids).

2. Jassids (Leafhoppers – *Empoasca spp.*)

1) Symptoms:

- **Yellowing and curling of leaf margins.**
- **'V' shaped yellow patches at leaf tips.**
- **Plants show stunted growth and poor pod formation.**

2) Cure:

- Insecticide: Spray Acetamiprid 20 SP (0.2 g/L) or Dimethoate 30 EC (1.5 ml/L).
 - Foliar spray of micronutrients (especially Zinc and Magnesium) improves plant resilience.
 - Avoid planting near older, infested legume fields.
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3. Pod Borer (*Helicoverpa armigera*)

1) Symptoms:

- Larvae bore into green pods, feeding on seeds.
- Presence of round holes on pods.
- Droppings around entry points, damaged pods turn yellow/brown.

2) Cure:

- Insecticide: Spray Spinosad 45 SC (1 ml/L) or Emamectin benzoate 5 SG (0.4 g/L).
 - Handpick larvae in early stages.
 - Use trap crops (e.g., marigold) and pheromone traps to monitor/control.
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4. Whiteflies (*Bemisia tabaci*)

1) Symptoms:

- Tiny white insects fly out when disturbed.
- Yellowing and mottling of leaves.

- Plants look weak and sooty mold develops on honeydew.
- Transmits viral diseases like yellow mosaic.

2) Cure:

- Insecticide: Spray Buprofezin 25 SC (1.5 ml/L) or Imidacloprid 17.8 SL (0.3 ml/L).
 - Spray neem-based products (Azadirachtin 1500 ppm) every 10–12 days.
 - Avoid over-irrigation and ensure good plant spacing.
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5. Hairy Caterpillars / Leaf Feeders (*Spilosoma spp.*, *Achaea janata*)

1) Symptoms:

- Young larvae skeletonize leaves; adults consume whole leaf tissue.
- Infestation starts at margins of the field and spreads fast.

2) Cure:

- Spray Chlorantraniliprole 18.5 SC (0.4 ml/L) or Quinalphos 25 EC (2 ml/L).
- Manual collection and destruction of larvae in early morning.
- Deep summer ploughing helps destroy pupae in soil.

4) Nutrient Deficiency

1. Nitrogen Deficiency

1) Symptoms:

- Overall yellowing of older leaves.**
- Stunted growth and reduced branching.**
- Poor flowering and pod formation.**

2) Cure:

- Fertilizer:** Apply urea or ammonium sulfate @ 40–60 kg N/acre (in split doses).
 - Compost:** Use vermicompost (1–2 tons/acre) or well-decomposed FYM (farmyard manure) to improve soil nitrogen.
 - Grow guar in rotation with other legumes to enhance natural nitrogen-fixing.**
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2. Phosphorus Deficiency

1) Symptoms:

- Purplish discoloration of stems and lower leaf veins.**
- Poor root growth and delayed flowering.**
- Weak pod formation.**

2) Cure:

- Fertilizer:** Apply Single Super Phosphate (SSP) @ 100–125 kg/acre.

- Compost: Add bone meal or rock phosphate as slow-release organic phosphorus sources.
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3. Potassium Deficiency

1) Symptoms:

- Leaf edges turn yellow or scorched (marginal necrosis).
- Weak stems and increased susceptibility to pests.
- Lower pod yield and poor seed filling.

2) Cure:

- Fertilizer: Apply Muriate of Potash (MOP) @ 25–30 kg/acre.
 - Compost: Wood ash or banana peels composted into the soil are good potassium sources.
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4. Zinc Deficiency

1) Symptoms:

- Intervenital chlorosis (yellowing between veins), especially in young leaves.
- Stunted plants with smaller leaves.
- Poor flower and pod formation.

2) Cure:

- Fertilizer: Foliar spray of Zinc Sulfate (0.5%) once every 15 days during

vegetative growth.

- Compost: Apply zinc-enriched compost or mix zinc sulfate (10 kg/acre) into the soil at sowing.
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5. Iron Deficiency

1) Symptoms:

- Young leaves show yellowing with green veins (interveinal chlorosis).
- May appear similar to zinc deficiency but affects younger leaves first.

2) Cure:

- Fertilizer: Foliar spray of ferrous sulfate (0.5%) with citric acid (0.25%) to increase uptake.
 - Compost: Use compost tea or seaweed extract for micronutrient enrichment.
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6. Boron Deficiency

1) Symptoms:

- Deformed flowers, poor pod setting.
- Cracking of stems and curling of leaves.
- Tips of roots and shoots may die back.

2) Cure:

- Fertilizer: Foliar spray of Borax (0.2%) during early flowering.
 - Compost: Add boron-enriched compost or mix borax in soil @ 1–2 kg/acre (cautiously – excess is toxic).
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7. Calcium Deficiency

1) Symptoms:

- Young leaves turn crinkled or distorted.
- Tip burn in shoots or flowers.
- Reduced root growth.

2) Cure:

- Fertilizer: Apply gypsum (calcium sulfate) @ 50–100 kg/acre.
- Compost: Use crushed egg shells or dolomite lime in compost mix.