



Banana Research

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Characteristics of Bananas

Banana (*Musa spp.*) is one of the world's most popular and widely cultivated tropical fruits, valued for its sweetness, soft texture, and year-round availability. Native to Southeast Asia, bananas thrive in warm, humid climates and are a key staple in many diets. They are eaten fresh, cooked, or processed, and serve as an important source of carbohydrates, vitamins, and minerals. Bananas also support local economies through fresh fruit sales and value-added products.

Culinary Uses (Dishes)

- Banana cue (deep-fried caramelized bananas)
- Turon (banana spring rolls)
- Ginanggang (grilled bananas with sugar)
- Banana fritters / maruya
- Saba stew (minatamis na saging)
- Banana bread
- Banana pancakes
- Banana chips
- Steamed banana with coconut caramel
- Curry dishes using plantains



Simple Ways to Eat

- Fresh, peeled
- Sliced with peanut butter
- With yogurt or cereal
- Frozen banana "ice cream"
- Mashed bananas for snacks
- Sliced over oatmeal
- Dried banana snacks
- Banana with chocolate drizzle





Drinks

- Banana smoothie
- Banana milkshake
- Banana-coconut shake
- Banana yogurt drink
- Banana protein shake
- Turmeric-banana wellness drink
- Banana cold brew smoothie
- Banana-langka shake



Nutrients per 100 g (Approx.)

- Calories: **89 kcal**
- Carbohydrates: **22.8 g**
- Sugars: **12.2 g**
- Dietary fiber: **2.6 g**
- Protein: **1.1 g**
- Fat: **0.3 g**
- Vitamin C: **8.7 mg**
- Vitamin B6: **0.4 mg**
- Potassium: **358 mg**
- Magnesium: **27 mg**

Health Benefits

- Supports energy due to natural carbohydrates
- High in potassium for heart and muscle function
- Aids digestion with dietary fiber
- Contains vitamin B6 for metabolism and brain function
- Helps stabilize blood sugar when eaten with protein
- Supports gut health with prebiotic resistant starch (especially slightly green bananas)
- May reduce cramps and fatigue
- Antioxidants support overall cellular health

Plant Characteristics Growth Habit

- A banana “tree” is actually a **giant herbaceous plant**, not a woody tree.
- Height: **2–9 m** depending on variety (Saba and Lakatan are medium; Cavendish is tall).
- Pseudo stem: Formed from tightly packed leaf sheaths.
- Leaves: Large, broad, and long (up to 2–3 m), easily torn by wind.
- Life cycle: **9–14 months** from planting to harvest (depending on climate, soil, and cultivar).
- Flowering: Produces one large inflorescence (the “banana heart”).
- Fruiting: One bunch per pseudo stem; new shoots (“suckers”) continue the cycle.

Root Characteristics

- **Type:** Fibrous root system (no taproot).
- **Depth:** Shallow, concentrated in the **top 30–60 cm** of soil.
- **Spread:** Lateral spread up to **1.5–2 m** from the base.
- **Water demand:** High; roots dry quickly because they stay near the surface.
- **Oxygen needs:** Roots require **well-aerated**, loose soil.
- **Sensitivity:** Prone to rot in waterlogged conditions.

Growing Implications Based on Root System

1. Soil Requirements

- Needs **deep, loose, well-drained loam**.
- **Waterlogging must be avoided**—causes root and corm rot.
- Benefits from soils rich in **organic matter**.

2. Irrigation & Moisture Management

- Roots dry out quickly → **consistent moisture is essential**.
- Mulching strongly recommended to keep soil moist and cool.
- Drip or furrow irrigation works best.



3. Fertility & Nutrient Uptake

- Heavy feeders due to rapid growth.
- Responds well to **organic matter**, compost, and balanced fertilizers.
- Shallow roots mean nutrients should be applied closer to the soil surface.

4. Wind Protection

- Shallow roots + large leaves = **high wind damage risk**.
- Windbreaks or planting along natural barriers recommended.

5. Intercropping Implications

- Because of shade and root competition, intercrops must be:
 - **Low-root-competition** species
 - **Shade-tolerant**
 - Not deep-rooted trees that will overshadow bananas
- Good intercrops: peanuts, sweet potato, taro, papaya (if spacing allows).

Sunshine and Shade Demand

- **Full Sun:** Optimal. Requires **8–12 hours of direct sunlight**.
- Moderate shade tolerance: Can tolerate **up to 20–30% shade**, but fruit yield decreases.
- Too much shade → elongated pseudo stems, weak bunches, poor fruit filling.



Growing Characteristics Table

Characteristic	Description
Scientific Name	<i>Musa spp.</i>
Plant Type	Giant herbaceous perennial (not a true tree)
Height Range	2–9 m depending on variety
Root System	Fibrous, shallow (0–60 cm depth), broad lateral spread
Soil Preference	Well-drained loam, high organic matter
pH Range	5.5–7.0
Water Requirement	High, consistently moist soil
Sun Requirement	Full sun (8–12 hrs)
Shade Tolerance	Low–moderate (20–30% shade max)
Wind Tolerance	Low; windbreaks recommended
Temperature Range	26–32° C ideal
Planting Distance	2 × 2 m (high density), 3 × 3 m (standard), 4 × 4 m (Saba/plantains)
Flowering Time	6–9 months after planting
Harvest Time	9–14 months from planting
Lifespan of Mat	10–15 years (via suckers)

Short Summary

Banana (*Musa spp.*) is a fast-growing, herbaceous tropical plant with a shallow fibrous root system and large leaves. It thrives in full sunlight, warm temperatures, and fertile, well-drained soils. Because its roots stay in the top 30–60 cm of soil, bananas require constant moisture but cannot tolerate waterlogging. They are heavy feeders, wind-sensitive, and perform best with mulching and regular fertilization. Proper spacing, sucker management, and protection from strong winds are key for high yields.





Commercial Banana Varieties in Mindanao

Variety	Type / Use	Key Characteristics	Primary Use	Best Local Markets / Hubs
Cavendish	Dessert / Export	Uniform fruit, long shelf-life, large bunches	Export + nationwide retail supply	Davao Region , General Santos → Metro Manila (Divisoria, Balintawak)
Saba (Cardaba / Cardava)	Cooking / Processing	Firm, starchy, withstands handling	Banana chips, turon, boiling, frying	Davao, Northern Mindanao, Cebu , local wet markets
Lakatan	Dessert / Domestic Premium	Sweet, aromatic, preferred by Filipino consumers	Fresh domestic fruits	Davao → Metro Manila , Cebu, Baguio
Latundan (Tundan)	Dessert / Local Retail	Sweet-tangy, soft, widely available	Fresh eating, household fruit	Local markets nationwide (Luzon, Visayas, Mindanao)
Señorita	Dessert / Niche Premium	Very sweet, small, delicate	Local premium markets (fresh)	Local markets near production; limited long-distance trade
Morado / Bungulan	Dessert / Specialty	Distinct color or flavor, niche buying	Specialty fresh markets, restaurants	Regional markets in Mindanao & Visayas
Tinduk / Tindok	Cooking / Traditional	Long, curved fruit; firm texture; usually cooked; good for boiling & stews	Local culinary use (boiled, kinilaw banana dishes) & small-scale trade	Mindanao , especially rural markets; Surigao, Agusan, Bukidnon, Davao rural towns

Short Notes on Tinduk / Tindok (for context)

- A traditional Mindanao cooking banana.
- More popular in **local and rural markets** rather than major commercial hubs.
- Known for its **firm flesh**, good for **boiling, savory dishes, and local delicacies**.
- Limited commercial transport due to variable fruit size and lower commercial standardization.
- Strong in **identity markets** (areas where consumers prefer traditional or native cultivars).



Intercropping Compatibility Table

Secondary Crop	Good / Bad Compatibility	Shade Tolerance	Recommended Spacing	Notes / Comments
Banana	Good	Tolerates partial shade	2.5–3 × 2.5–3 m within tree rows	Quick-growing understory; benefits from early canopy shade; remove if tree canopy closes fully.
Mangosteen	Moderate	Prefers partial shade as young, full sun when mature	6–8 × 6–8 m	Can start under taller trees (coconut, established mango), but eventually needs light thinning.
Guyabano (Soursop)	Good	Semi-shade tolerant	4–5 × 4–5 m	Thrives under partial shade; young trees protected by coconut or banana.
Chico / Sapodilla	Moderate / Fair	Prefers full sun, tolerates light shade	6–7 × 6–7 m	Shade slows growth; best near edges or in partial light under less dense canopy.
Atis / Cherimoya	Moderate	Can tolerate light shade	4–5 × 4–5 m	Young plants do well under partial shade; remove competing understory if canopy closes.
Guavapple	Moderate	Prefers sun; tolerates light shade	4–5 × 4–5 m	Can be planted under coconut or open canopy trees with light pruning.
Orange / Valencia	Bad / Poor	Requires full sun	6–7 × 6–7 m	Shade reduces fruit yield, increases disease risk; not recommended under dense canopy.
Mango	Bad / Poor	Full sun required	8–10 × 8–10 m	Shade intolerant; understory planting not recommended.
Coconut	N/A	N/A	8–10 m between palms	Acts as the main canopy tree; other crops can grow beneath with spacing and light management.

Summary

- **Best as secondary/intercropped under canopy: Banana, Guyabano, Mangosteen (young), Atis (young).** These crops tolerate partial shade, benefit from humidity, and grow well in understory conditions.
- **Moderate compatibility: Chico, Atis, Guavapple** — manageable with spacing and careful pruning, but prolonged heavy shade slows growth.
- **Poor compatibility: Orange/Valencia, Mango** — require full sun and are highly sensitive to shading and humidity, making them unsuitable as understory crops.
- **Coconut** serves as a strong main canopy tree under which many secondary crops (especially bananas) can thrive if spacing and sunlight are managed properly.

Market Demand & Acceptance

Banana (Cavendish, Lakatan, Saba, Tinduk):

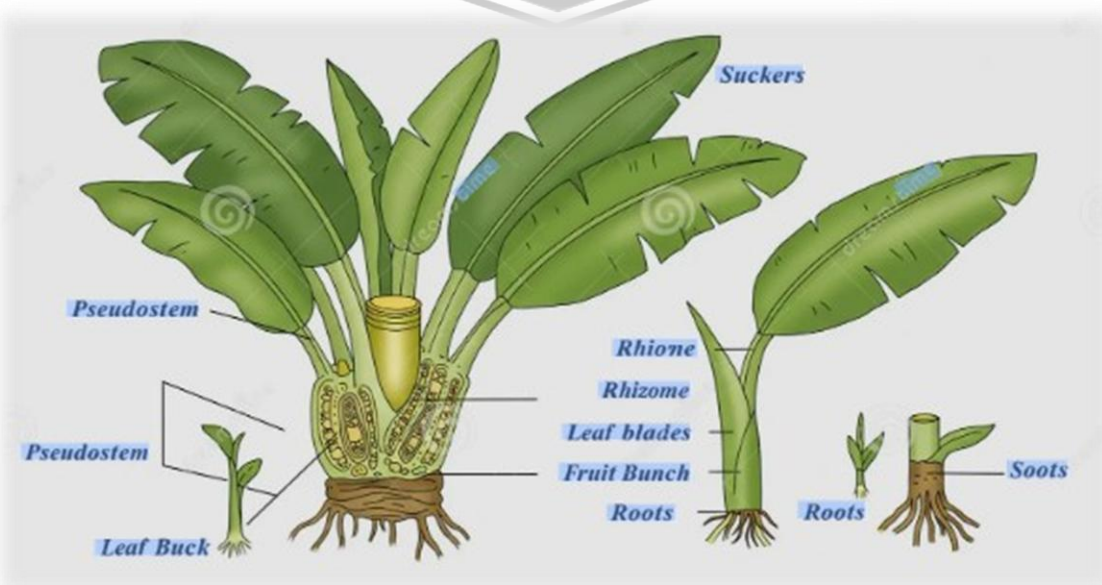
- **High demand** locally and nationally; Cavendish also targets export markets.
- Saba/Tinduk: steady domestic use for cooking, snacks, and processing (banana chips, turon).
- Lakatan: high-value fresh market, premium price in wet markets and supermarkets.
- Acceptance is strong among both households and processors.

Valencia Orange:

- Moderate to high demand in Metro Manila, Cebu, and nearby urban markets.
- Locally preferred for fresh fruit, juice production, and specialty markets.
- Sweet-tangy flavor fits both retail and processing (juice, marmalade).

Other value fruits (Mangosteen, Guyabano, Atis, Guavapple, Chico, Mango):

- Steady domestic market; niche or premium buyers for Mangosteen and Guyabano.
- Mango and Atis/Guavapple: urban and tourist-oriented markets; moderate acceptance outside urban centers.





Risks & Challenges

Weather & Climate:

- Southern Bukidnon: generally suitable, but **typhoons**, heavy rains, and occasional droughts affect yield.

Pests & Diseases:

- Banana: Panama disease, Sigatoka leaf spot, nematodes.
- Citrus: Citrus greening (HLB), fruit fly infestations.

Market Risks:

- Price fluctuations in Metro Manila and export markets (especially for Cavendish).
- Post-harvest losses due to transportation and improper storage.

Labor & Management:

- Intensive care for high-value crops (pruning, fertilizer, pest control).
- Skilled labor required for intercropping, canopy management, and harvesting.

Infrastructure:

- Road conditions may limit timely access to markets.
- Cold chain and transport logistics for export-oriented crops (Cavendish, Valencia) require investment.

Opportunities

Diversification & Intercropping:

- Combining bananas, coconuts, and semi-shade tolerant trees (Mangosteen, Guyabano, Atis) improves land-use efficiency and early cash flow.

High-Value Fruits:

- Lakatan, Mangosteen, Guyabano fetch premium prices locally and in urban markets.

Processing Industry:

- Saba/Tinduk for banana chips, turon, and baked goods.
- Valencia oranges for juice, marmalade, and fresh fruit bundles.

Agri-Tourism & Niche Marketing:

- Exotic fruit tours, farm-to-table experiences, and direct-to-consumer sales for premium fruits.

Export Potential:

- Cavendish banana continues to have strong export demand.
 - Specialty fruits (Mangosteen, Lakatan) can target diaspora markets.
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Summary for Southern Bukidnon

Southern Bukidnon offers **favorable climate and fertile soils** for bananas, Valencia oranges, and other high-value fruits. **Bananas (Cavendish, Lakatan, Saba, Tinduk)** are the backbone for both **domestic consumption and export**, while **Valencia oranges** provide moderate market demand locally and for processing.

Best strategy:

- **Coconut, banana, and Mangosteen/Guyabano intercropping** for early and sustained income.
- Plant **Valencia oranges in sunny areas with proper spacing** for maximum fruit quality.
- Focus on **disease management, post-harvest care, and proper marketing channels** to mitigate risks.

Outcome:

- Diversified, risk-managed farm with year-round revenue streams.
- Balanced mix of exportable bananas, high-value domestic fruits, and niche premium crops.

