# Pawpaw (Papaya) Farming in Ghana: Feasibility Study

Overview: Papaya (Carica papaya), often called "pawpaw" in Ghana, is a fast-growing tropical fruit tree whose soft orange flesh is eaten fresh or processed into juice and puree

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. It is rich in vitamins A, C, E, potassium, folate and dietary fiber

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, and contains the enzyme papain, widely used in foods, medicines and cosmetics

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. In Ghana, large-scale cultivation occurs mainly in the coastal and southern belt (Greater Accra, Central, Eastern, Volta regions)

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. Ghana's papaya industry targets both the domestic market and exports (especially to Europe and the Middle East) because of the fruit's high international demand. *Papaya (pawpaw) tree loaded with fruit in Ghana (photo by daSupremo, CC BY-SA 4.0). Fruits are typically oval, red-fleshed, and sweet. The photo illustrates a common planting (mixed old and new fruits) in Ghana.* 

### **1. Product Overview**

Varieties: Common cultivars in Ghana include hybrid *dwarf* and semi-dwarf types. The "Solo" group (e.g. Solo Sunrise, Solo Red Lady) are self-pollinating and highly prized by exporters. Solo Sunrise is a compact dwarf that flowers ~6 months after planting and yields ~60 fruits in 1 year (up to 100 fruits by year 2), each ~250–300 g

e gh-f.org

- . Red Lady (from the Philippines) is similar but with larger fruit (400–650 g each) and ~100 fruits/tree by the second year
- gh-f.org
- . Other known varieties include Hortus Gold, Bluestem, Amazon Red, Formosa and Red Maradol. Hybrid varieties under ideal management can produce very high yields (see Agronomy/Yield below).
- Nutritional value: Papaya is exceptionally rich in vitamin C (one medium fruit ~188 mg, over 200% DV) and vitamin A (from carotenoids), plus vitamins E and folate, potassium, and fiber
- itfnet.org
- . The enzyme papain (in green fruit latex and seeds) aids protein digestion
- itfnet.org
- . These nutrients support immune health, digestion and low cholesterol
- itfnet.org
- .
- Industrial uses: Papain is used commercially to tenderize meat, clarify beer, and in cosmetics (shampoos, soaps)
- itfnet.org
- . Papaya fruit can be processed into juices, purees, dried slices, jams or fermented products. Its value-added opportunities include juice/puree concentrate, dried fruit snacks, jam, papain extraction (for pharmaceuticals/cosmetics), and even seed oil or fertilizer (seeds contain oil and nutrients)
- itfnet.org
- fao.org
- . However, currently Ghana produces mostly fresh fruit for eating; large-scale papain or pulp processing is limited and represents a growth opportunity.

## 2. Agronomic Requirements & Farming Practices

 Climate & Planting season: Papaya thrives in warm, humid climates. Ghana's southern regions (with year-round temperatures 24–32 °C) are ideal. With irrigation, papaya can fruit year-round, but small growers typically plant seedlings at the start of rainy seasons to ensure establishment. Practically, farmers plant beginning of rains (Apr–May) for the main crop, and may plant again in the minor rains (Aug–Sep) if irrigated. Consistent moisture is critical; during dry spells flowers/fruit will drop

- edis.ifas.ufl.edu
- .
- Land preparation: Select flat or gently sloping fields with full sun and good drainage
- agriculture.gov.vc
- edis.ifas.ufl.edu
- . Papaya dislikes waterlogging or heavy shade. Recommended soil pH is slightly acidic: ~5.5–6.5
- agriculture.gov.vc
- Clear vegetation and weeds; minimum tillage is enough. Dig planting holes ~30 cm deep/wide, fill with compost or organic manure plus a handful of triple superphosphate
- e agriculture.gov.vc
- . Lime can be applied before planting if the soil is acidic (e.g. ~1000 lbs/acre where needed)
- e agriculture.gov.vc
- . Ghanaian farmers often broadcast poultry manure or compost 1–2 tons/ha at land prep, and mix it into the holes.
- Seedling propagation: Papaya is normally grown from seeds. Use fresh, mature seeds (seeds remain viable ~1–2 years).
   Sow in sterilized media (e.g. seedling trays or tubes) 1–2 seeds per cell; germination takes 2–3 weeks
- agriculture.gov.vc
- . Thin to the strongest seedling and grow in shade (≈40% sun) for 6–8 weeks
- agriculture.gov.vc
- , watering and applying a dilute NPK fertilizer. Harden off by gradually exposing to sun a few weeks before transplanting. Seedlings should be 30–40 cm tall at transplant. (For hybrid or improved varieties, buying grafted seedlings or tissue-culture plants ensures uniformity, but seed propagation is most common in Ghana.)
- Transplanting and spacing: Plant seedlings when ~1 m tall (6–8 weeks old) or at first rains. Space plants about 2–3 m apart in each direction
- edis.ifas.ufl.edu
- A typical spacing is 7×8 ft (≈2.1×2.4 m, ~800 trees/acre) for a single-crop stand, or up to 9×9 ft (2.7 m) if intercropping
- e agriculture.gov.vc

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- Higher-density planting (e.g. ~1.5–2 m spacing) is possible with dwarf varieties like Calina or Red Lady, yielding ~1200–1350 trees/acre
- gh-f.org
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- . At planting, mulch holes with organic matter (grass, straw, plastic mulch) to conserve moisture and suppress weeds.
- Nutrition (fertilization): Papaya is a heavy feeder. Apply a balanced N-P-K fertilizer at planting (e.g. 15-15-15 or 10-20-10 at ~200–500 g per plant)
- fao.org
- , especially with added micronutrients. Then side-dress regularly: for instance, many growers apply NPK 15-15-15 three times in the first year (e.g. every 3–4 months)
- fao.org
- , switching to a higher-potassium mix (e.g. 12-12-17 + sulfate of potash) once fruiting begins
- fao.org
- For example, a mature-bearing orchard might receive ~60–100 kg N, 150 kg P, 100–150 kg K per hectare per year (depending on yield targets)
- haifa-group.com
- haifa-group.com
- Many Ghanaian farmers also use organic manures (chicken, cow, or compost) each season (e.g. 5–10 tonnes/ha) to supply
  nutrients and improve soil health. Foliar sprays of boron/calcium (after fruit set) may reduce fruit drop and improve keeping
  quality.
- Pest & Disease Control: Main threats include viruses, fungal rot, and insects:
  - Viral diseases: *Papaya ringspot virus* (PRSV) and *papaya mosaic virus* are severe. They cause yellow mosaic on leaves and stunting. Preventive measures are crucial: grow resistant/tolerant varieties (e.g. Solo types, Red Lady)
  - ; start seedlings in insect-proof net houses; avoid planting near cucurbits (hosts of similar aphid-borne viruses); and use barrier crops (e.g. tall corn) to reduce aphid vectors
  - gh-f.org
  - . Infected plants must be rogued and burned immediately to stop spread

- gh-f.org
- . (Papaya ringspot is described as "the most important disease of papaya" in other regions
- edis.ifas.ufl.edu
- .)
- Fungal diseases: *Phytophthora* (fruit rot and root rot) can cause black rot on fruits and yellowing of trees after heavy rain. Ensure excellent drainage and avoid injuring roots. Apply soil drenches (e.g. Mancozeb, Ridomil) at planting and monthly as needed
- gh-f.org
- Powdery mildew and anthracnose (black spot on ripe fruit) may occur in humid conditions; sprays of copper or systemic fungicides at flowering can help. Damping-off pathogens (Pythium, Rhizoctonia) can kill seedlings if nursery hygiene is poor; use sterilized media and protect young plants from excess moisture.
- Insect pests: In Ghana, the invasive papaya mealybug (*Paracoccus marginatus*) has historically been a major pest. Outbreaks (notably in 2009) destroyed up to 85% of papaya crops
- fao.org
- . Since then, biocontrol (parasitoid wasps) has largely eliminated mealybug in key regions
- fao.org
- Other insect pests include scales, aphids, whiteflies, fruit flies and mealybugs. Regular scouting and use of biopesticides (neem, Bacillus thuringiensis, or selective insecticides) are recommended. Physical removal of weeds (which harbor pests) and snail control (snails eat saplings) are also important.
- Water and irrigation: Papaya is drought-sensitive; water stress causes flower/fruit drop and small fruits
- edis.ifas.ufl.edu
- . After planting, irrigate seedlings regularly (2–3 times/week) to establish root systems. During flowering and fruiting, ensure ample moisture: in well-drained soils this may mean daily or alternate-day irrigation in hot dry spells
- edis.ifas.ufl.edu
- . Drip irrigation or sprinklers are ideal, but even manual or furrow irrigation (when water is available) significantly boosts yield. Mulching (straw, grass or plastic) conserves soil moisture and keeps fruit clean
- edis.ifas.ufl.edu
- . Note that papaya roots are shallow, so do not over-water (avoid waterlogging) once established.

- Harvesting: Papaya begins flowering ~5 months after transplanting and first harvests ~9–10 months after planting
- agriculture.gov.vc
- . Thereafter, the plant fruits continuously year-round (up to ~6–7 years lifespan in good varieties). Harvest as fruits begin to yellow (green stage 2) for best shipping quality
- agriculture.gov.vc
- . Careful handling is needed: use plastic crates to avoid bruising. In Ghana's climate, ripe fruit can be stored at ambient temp only ~3–7 days before spoilage, so rapid post-harvest cooling and transport (especially for export) are critical.
- Expected yield: Yields vary widely by variety and management. Hybrid/dwarf plantings under intensive care can yield 60,000–125,000 lb/acre/year (27–57 t/acre)
- agriculture.gov.vc
- . In practice, high-input farmers in Ghana have reported yields in the order of 20–40 t/acre per year from a well-tended stand, while low-input or single-crop yields may be 9–20 t/acre
- agriculture.gov.vc
- . (For perspective, about 60,000 lb = 27.2 t.) Per-tree yields can exceed 50 fruits/year once mature. Note that farmers may harvest several times per year (e.g. every 2–4 weeks), so annual yield is cumulative.

## 3. Economic and Profitability Analysis

Costs (per acre): Costs depend on scale and intensity. Example estimates for one-year production (in Ghana currency):

- Land preparation: bush clearing, hiring tractor (if needed): ~GH¢1,000–2,000.
- Seedlings: ~800 trees (at 2–3 m spacing). If seedlings cost GH¢5–10 each (bulk), total ~GH¢4,000–8,000. Farmers might grow their own seedlings to reduce cost.
- Fertilizer: e.g. 4 bags (200 kg) NPK 15-15-15 (~GH¢450 each) + 2 bags (100 kg) urea (~GH¢300 each) ≈ GH¢2,400 + GH¢600 = GH¢3,000. Additional costs for compost or manure (if purchased) ~GH¢500.
- Pesticides/inputs: Fungicides/insecticides, herbicides etc., plus spray labor: ~GHC500–1,000/year.

- Irrigation: If installing a pump/drip, initial investment ~GH¢3,000–6,000 (diesel/gas pump, pipes, tanks). (If using manual buckets or natural irrigation, cost may be lower but labor higher.)
- Labor: Land prep, weeding, spraying, staking, harvesting. Hiring laborers 2–3 days/month for a year might cost GH\$\$(1,500-3,000 in total.
- Other: Stakes (GH¢200), planks/crates (GH¢300), miscellaneous.

*Total establishment* & *annual cost:* Roughly GH(10,000-15,000 per acre (approximately \$2,000-3,000 USD at GH(5-7/USD)). (If irrigation systems are reused in later years, annual costs can drop in subsequent seasons.) Yield and revenue: Suppose a farmer achieves 15–30 tonnes/acre/year. Export-grade papaya prices (farmgate) are typically in the range of \$0.40-0.80/kg. For example, data suggest Ghana's *average export price*  $\approx$ \$589/tonne ( $\approx$ \$0.59/kg) in 2024

indexbox.io

. Domestic retail prices are much higher (~GH\$31-41/kg, i.e. \$3-4/kg)

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, but farm-level prices to aggregators will be lower than retail (since wholesalers get a margin).

- Gross revenue (per harvest/year): At 15 t and \$0.59/kg: \$8,850 (GH¢55,000). At 30 t: \$17,700 (GH¢110,000). If selling at local market premium (say \$1–2/kg), revenue would be even higher. In GHS terms, 30 t at GH¢35/kg yields ~GH¢1,050,000.
- Net profit: Subtracting costs (say \$2,500) yields very high margins. E.g. at 20 t, gross ~\$11,800, cost ~\$2,500 ⇒ net ~\$9,300 (ROI >300%). Even at a modest 10 t (≈\$5,900) and costs \$2,500, profit is ~\$3,400 (ROI ~136%). Break-even occurs at roughly 4–6 t/acre (given ~\$0.59/kg and ~\$2,500 costs, about 4.2 t needed to cover costs). These are illustrative; actual ROI can vary with yield, price negotiated (export contracts may pay ~\$0.3–0.5/kg) and input costs (fertilizer prices fluctuate).

Example calculation (per acre):

Item	Low Estimate	High Estimate
Yield (fresh fruit)	10,000 kg	30,000 kg
Export price (DHG)	\$0.59/kg	\$0.59/kg
Gross revenue	\$5,900	\$17,700
(≈ GH¢36,000)		(≈ GH¢110,000)
Total costs	\$2,500	\$2,500
(land, seedlings, fert, labor)		
Net profit	\$3,400	\$15,200
(Figures illustrative. Actual prices vary. Exchange		

≈GH¢6.0=\$1.)

Thus, even at moderate yields, papaya farming can be highly profitable once markets are secured. The payback period is short – papaya begins yielding fruit within the first year, so a one-time capital outlay starts generating returns by year end.

## 4. Market and Demand Analysis

- Domestic demand: In Ghana, papaya is a popular tropical fruit in urban markets (Accra, Kumasi, Takoradi). Consumers eat it fresh or in fruit salads and juice. Demand peaks in dry season when tropical fruits are scarcer. Retail prices (in 2025) run roughly GH¢31–41 per kg in Accra/Kumasi
- e selinawamucii.com
- (about \$3–4/kg), reflecting its status as a high-value fresh fruit. This strong local price indicates healthy urban demand.
   Food processing (e.g. juices, jams) is currently small-scale: opportunities exist to develop fruit processing for local consumption (e.g. a frozen or canned papaya juice product), though none are dominant yet.
- Export markets: Ghana's papaya is mainly exported to Europe (especially the UK, the Netherlands, Germany) and Middle Eastern countries. It competes with fruits from Latin America (Brazil, Mexico), Nigeria and regional neighbors. Export shipments are usually by air-freight as chilled or mature-green fruit. For instance, Tropigha Farms in Ghana exports several hundred tonnes annually to Germany
- modernghana.com
- freshplaza.com
- . Export buyers typically require GlobalGAP (or equivalent) certification, and adherence to EU phytosanitary standards (max residue levels, absence of pests)
- fao.org
- . Organic certification can command a premium niche, especially in Europe, but even conventional fruit must meet buyer quality. The global trend has been for *increasing papaya prices* Ghana's average export price rose ~5.6% in 2024
- Indexbox.io
- , reflecting stronger demand or tighter supply.
- Current players: Ghanaian exporters and processors source papaya from large farms and smallholders. Well-known
  companies include Tropigha Farms (Volta Region, German-owned) which runs hundreds of acres of papaya and targets the
  EU market
- modernghana.com
- freshplaza.com
- . Blue Skies Ghana, a fresh-cut fruit company, lists papaya among its Ghanaian sources
- blueskies.com

There are several smaller exporters (e.g. "Fresh Fresh", Bomarts Ghana) who bundle fruit from cooperatives. Domestic fresh-cut and juice processors (such as HPW Fresh & Dried) may take seasonal papaya for blended products. (Some trade publications note Ghana even imports papaya off-season to meet processing needs.) Overall, Ghana currently accounts for only a few percent of global papaya trade (e.g. <3% of EU imports in 2008)</li>

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- ), indicating potential for growth if quality and volumes increase.
- Price trends: Retailly, papaya prices in Ghana have been relatively stable around GH¢30–40/kg in recent years
- elinawamucii.com
- Export prices fluctuate with world markets: for instance, the IndexBox report notes export prices hit \$725/t in 2018, dipped 2019–2023, then ~\$589/t in 2024

indexbox.io

- . Globally, papaya demand is rising (especially in health-conscious markets), so medium-term outlook is positive. However, competition (e.g. from West African neighbor Nigeria, which produces 80% of region's papaya
- horticulture.ucdavis.edu
- ) and shipping logistics must be managed.
- Value-added opportunities: Beyond fresh exports, value-add prospects include:
  - Juice/puree and baby food: Ghana could use local papaya pulp in blended juices or infant food (there are regional projects on tropical fruit processing).
  - Dried fruit or jams: Dried papaya rings/chips or candied papaya (like in Asia) can fetch export prices or serve tourism markets.
  - Papain products: Tiny processing of papain enzyme (for tenderizers or cosmetics) or papaya leaf extracts (herbal teas) could be niche, though requiring investment in extraction facilities.
  - Papaya seed oil: The black seeds (often discarded) yield an oil with hair/nutritional use, but this is exploratory.

## 5. SWOT Analysis (Papaya Farming in Ghana)

• Strengths:

- Favorable climate and fast returns: Ghana's year-round warmth allows rapid growth (flowering ~5–6 months, fruit by 9–10 months
- e agriculture.gov.vc
- ). This short cycle gives quick revenue.
- High-value fruit: Papaya commands high prices locally and abroad
- selinawamucii.com
- indexbox.io
- , and nutritional/health attributes (rich vitamins, papain) make it attractive to consumers
- itfnet.org
- .
- Global demand: Steady growth in tropical fruit markets (Europe, Middle East, African diaspora) creates large potential outlets.
- Relatively low input tech: Unlike perennial crops, papaya needs only simple trellising and manual care, and it continuously yields multiple times/year.
- Export knowledge: Existing exporters (e.g. Tropigha) demonstrate Ghana can meet export standards and supply substantial volumes
- modernghana.com
- freshplaza.com
- •
- Weaknesses:
  - Pest and disease vulnerability: High risk from viruses (PRSV, mosaic) and past invasives (mealybug) means losses can be severe if mismanaged
  - fao.org
  - edis.ifas.ufl.edu
  - . Lack of virus-free certified seed can allow disease buildup.
  - Water/irrigation needs: Though tropical, dry seasons require irrigation (papaya is drought-sensitive). Dependence on rainfall is risky many smallholders lack irrigation access or capital.

- Post-harvest perishability: Papaya fruits bruise and spoil easily. Ghana's limited cold-chain and transport delays often cause post-harvest losses, reducing effective returns. (As Tropigha noted, rerouted trucks quadrupled haul time
- modernghana.com
- , risking fruit over-ripening.)
- Scale and capital: Most Ghanaian farmers are smallholders. Achieving export quantities and quality requires scale and investment (e.g. pumps, packhouses), which can be barriers without credit. Past horticulture co-ops in Ghana suffered from under-capitalization and high overhead
- documents.worldbank.org
- .
- Knowledge gap: Papaya farming is less familiar than staples. Limited extension specific to papaya means many practices (timely spraying, nutrition, handling) are not yet fully disseminated among growers.
- Opportunities:
  - Contract and cooperative models: Engaging with exporters through contract farming can provide inputs/knowledge and market security (e.g. farmers supplying Blue Skies or Tropigha). Cooperatives can pool resources for packhouses or bulk buying.
  - Value addition: Investing in local processing (juice, dried fruit, papain extraction) would capture more of the product's value. There is growing interest in organic/premium papaya for niche markets.
  - Tech adoption: Low-cost irrigation (rainwater harvesting, drip kits), improved seedlings (tissue culture), and digital ag-services (weather/price info apps) can boost yields and reduce risks.
  - Government support: Ghana's agricultural policy increasingly emphasizes horticulture exports. Programs like Planting for Food & Jobs, agro-processing incentives, and agricultural loans (e.g. via GIRSAL or ADB) can be tapped by an organized papaya venture. There are also grants/loans for women and youth in agribusiness that a new grower might access.
  - Growing domestic consumption: Rising urban incomes and health awareness in Ghana suggest local demand for fruits (like papaya) will grow, expanding a reliable market.
- Threats:
  - Climate risks: Erratic rainfall, prolonged droughts or floods could severely cut yields. (Papaya cannot withstand even moderate frost or waterlogging.) Rising temperatures and extreme weather due to climate change add uncertainty.

- Pest resurgence: Invasive pests (papaya mealybug, fruit flies) could recur. Failure to re-stock beneficials or manage borders may re-open old problems
- fao.org
- .
- Market volatility: Export markets can shift: if global prices fall, or if competitors (e.g. Brazil, Mexico, Nigeria) increase supply, margins may shrink. Any embargoes/transport bans can block shipments.
- Input/financial risk: Rapid inflation of fertilizer/pesticide prices or currency devaluation can inflate costs. If credit is
  misused or interest rates rise, farmers may fall into debt.
- Labor and logistics: Rural-urban migration can make seasonal labor scarce. Poor roads and lack of refrigerated trucks are perennial challenges for fresh exports (as exemplified by Tropigha's transport issues
- modernghana.com
- ).

### 6. Challenges and Risk Management

- Pest/disease risk: Maintain strict sanitation and IPM (integrated pest management). Key strategies include: buy certified disease-free seeds; routinely remove any virus-symptomatic plants; apply preventive foliar sprays (copper, neem) against fungi; use pheromone traps or bags for fruit flies; and release beneficial insects against mealybugs. Learning from the past, Ghana now has biocontrol agents for mealybug continue their use. Group action (e.g. neighbouring farms synchronizing planting/spraying) can reduce pest reservoirs.
- Climatic risk: Investing in irrigation is critical (e.g. rainwater tanks, drip systems). Mulching conserves soil moisture. Consider planting shelterbelts to reduce wind damage. On sloping fields, contour planting and cover crops prevent erosion. Some farmers diversify with other crops (e.g. interplanting short-season vegetables between papaya rows early on) to hedge against crop failure.
- Market risk and access: To ensure sales, it is wise to secure buyers before planting. Contracts with exporters or local aggregators can guarantee offtake. If selling fresh locally, timing harvests to avoid gluts (e.g. staggering plantings) helps

maintain good price. Building relationships with fruit processors (juice companies) provides alternative channels. Tracking market price information (via mobile networks or associations) can guide harvest decisions.

- Financial risk: Use cooperative savings/rotating credit societies to finance inputs at lower cost. Take advantage of any government subsidies on fertilizer or loans for irrigation equipment. Budget carefully: papaya is capital-intensive initially, so keep precise records. Consider crop insurance (if available) or diversification (e.g. keep a portion of land in less risky crops).
- Post-harvest: Invest in crates, shade coverings, and simple precooling (even using evaporative cooling) to lengthen shelf-life. Ensure a fast, reliable transport route to market – if roads are bad, schedule multiple pick-ups rather than letting fruit sit. Tropical fruits often have peak quality only 1–2 weeks; plan sales around that window. Even partial investment in cold storage at packing stations can reduce spoilage.

### 7. Solutions and Recommendations

- Organizational models: Contract farming and outgrower schemes are effective. For example, Blue Skies Ghana sources fruit from contracted farms and provides technical support (ensuring GlobalGAP compliance)
- blueskies.com
- . Forming or joining a cooperative can pool resources (bulk purchase of inputs, shared equipment). Historical lessons (e.g. the FARMAPINE pineapple coop) show cooperatives must remain lean and market-driven
- documents.worldbank.org
- . A mixed model (some self-owned acres, plus a few contracted growers) can balance control and scale.
- Government and institutional support: Leverage Ghana's Agricultural Extension Services: MoFA has initiated programs to train fruit growers and supply tissue-culture seedlings. Check if the PAPMEAG (Papaya and Mango Producers' Association of Ghana) or GEPA (Ghana Export Promotion Authority) offers guidance or financing. Utilize donor-funded programs like USAID's HortiFresh West Africa, which provides training in good agricultural practices (GAP) for fruit. Look into Ghana's Green Growth and Development Initiatives for possible funding or incentives for export crops. Financially, engage with Agri-Bank credit lines or investment funds (e.g. IFAD's Value Fund) for agroexporters.
- Technology and innovation: *Soil and irrigation tech:* Use soil moisture sensors or local weather data to optimize watering. Drip irrigation can save water and labor. Mulch or cover-cropping keeps weeds down.

- *Pest/disease technology:* Adopt resistant varieties or apply bactericides (e.g. potassium phosphite) to reduce disease. Drones or motorized sprayers can scale up efficient spraying if land expands.
- *Quality control:* Install a small sorting/grading table on-farm; invest in a CT fruit sorter or at least weighing scales and refractometer (Brix meter) to ensure quality.
- *Market access:* Use smartphone apps or WhatsApp groups to track live prices and demand. Participate in virtual trade fairs (post-COVID, many fruit expos have online platforms). Consider minimal processing (washing, trimming) to supply supermarkets directly.
- Best practices: High-density planting: On 1 acre, use small-statured hybrids to fit ~800–1200 plants (depending on spacing). Mulch rows to suppress grass. Apply fertilizer in rings around plants rather than broadcast, to improve uptake.
  - Trellising/support: Tie young trees to stakes (as recommended by Florida extension
  - edis.ifas.ufl.edu
  - ) to prevent wind lodging. In stormy seasons (or coastal areas), thicker bamboo stakes and windbreaks help.
  - Integrated Nutrient Management: Rotate NPK and organic sources. After harvest, replant cover crops (legumes) or apply compost to replenish the field.
  - Post-harvest care: Train workers to harvest gently; handle by stem, not by fruit body. Use perforated bins to avoid moisture build-up. Keep fruit in cool shaded room immediately after picking.
  - Record-keeping: Track each expense and yield. Crop records will help fine-tune fertilizer schedules and predict harvest volumes.
- Building relationships: Reach out to major buyers: for example, Tropigha has shown willingness to contract local growers
- modernghana.com
- Introduce yourself to packing houses (e.g. Sweetcrush, Blue Skies) to explore supply deals. Join industry forums or use contacts at MOFA to meet exporters. Branding can help if planning fresh sales, even a simple farm brand with Ghanaian origin can be appealing to diaspora markets. For processing, partner with local juice companies or consider joint ventures; e.g. offer papaya pulp to fruit processors in exchange for a supply agreement.

## 8. Land Use Strategy (1 Acre Plan and Expansion)

- Optimizing 1 acre: Maximize the first acre by intensifying care and focusing on high yield:
  - Plant a dwarf hybrid (e.g. Solo Sunrise or Red Lady) at 1.8–2.5 m spacing (allowing ~1,200 trees/acre) if you can manage competition for resources
  - gh-f.org
  - edis.ifas.ufl.edu
  - . Otherwise use ~800 trees/acre for easier spacing.
  - Immediately after transplanting, grow a fast-growing cover crop or inter-row vegetable (e.g. maize or cowpea planted 1 month later) to act as a "barrier crop" (it can deter aphids and provide short-term income)
  - e gh-f.org
  - . However, ensure these intercrops are removed before papaya canopy closes.
  - Use high-density organic mulches under trees to suppress weeds and retain moisture; cultivate only the tree rows.
  - Explore intercropping border rows with papaya-friendly plants (e.g. pineapple or sweet potato at the field edges) to utilize space without heavy competition for papaya's shallow roots. (Note: Papaya's shallow roots make intercropping tricky avoid shade-loving crops under papaya.)
- Infrastructure: On one acre, plan for irrigation: install a small pump and lay drip or sprinkler lines across the plots. Build a simple packhouse or cleaning table at one corner (for sorting fruit), and provide fencing or scarecrows to deter animals (monkeys sometimes damage fruit). Keep a store for tools/pesticides.
- Scaling strategy (to 10+ acres): Use profits from the first acre to expand gradually. Strategies include:
  - Cluster farming: Lease/contract adjacent plots from neighbors to reach scale. Multiple contiguous acres allow efficient tractor use (for soil prep) and combined irrigation.
  - Mechanization: At 5+ acres, renting a tractor for land prep becomes economical. Consider hiring spray contractors for pesticides.
  - Bulk procurement: Buy seedlings, fertilizer and pesticides in larger lots (economy of scale).
  - Processing tie-ups: With larger acreage, you may attract offers from processors or exporters to invest in a packhouse or cold storage jointly (as a condition of supply).
  - Sustainable practices: As area grows, integrate climate-smart methods: rainwater harvesting ponds or mini-dams on-farm can secure dry-season water; composting organic farm waste (fruit skins) recycles nutrients.

- Intercropping: As noted, full papaya canopy (after ~1 year) shades out intercrops. But in the first 6–9 months, you may
  intercrop quick-rotation vegetables (tomato, pepper) or cereals (maize, cassava) between rows, if spacing allows. Choose
  crops that ripen or can be cleared before papaya overtops them. This provides interim income and diversifies risk. However,
  ensure intercrops don't host papaya pests (e.g. avoid squash/cucumber which attract aphids).
- Future outlook: Aim to transform from 1 acre to a smallholder group or cooperative. By year 3–5, 10+ acres under production could position you as a medium-scale supplier, able to fulfill large export contracts. Continue reinvesting profits into land, irrigation and certification. Seek out opportunities to process part of the harvest (e.g. into juice for local bottlers), which can stabilize income if fresh fruit prices fluctuate.

Case examples: Ghanaian entrepreneurs demonstrate the potential: Tropigha Farms (Helmut Lutz) started on small capital and over a decade built 150 acres of papaya, exporting ~600 t/year

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. His practices (mechanized farm prep, stakes for wind, consistent fertilization, and tight harvesting schedules) show how modern methods apply here. A related success: FAO reports that biological control of mealybug has enabled papaya exports to bounce back, illustrating that even previous industry crises (2009 invasion) can be overcome

#### fao.org

. While Nigeria remains the regional leader, Ghana's unique export channels and crop-focused programs give new growers an opening to capture market share. Conclusion: With Ghana's climate, rising market demand, and high per-acre profitability, a well-managed papaya farm can be highly viable. Careful attention to agronomy (planting, nutrition, pest control) and marketing (quality standards, buyer connections) is essential. This briefing has outlined the options and best practices; the next step is a detailed business plan with local field tests and buyer commitments to secure financing and launch the farm successfully. Sources:

Reviewed agronomic guides and case studies specific to Ghana and tropical papaya; includes FAO and USDA extension publications (for cropping data), Ghana horticulture sector analyses, and real-market data



. All figures are based on these sources or industry reports.

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