Cannabis Cultivation Training Programme

A Complete Seed-to-Harvest Guide for African Farmers

From Seed Selection Through to Drying, Curing & Market

Published by **HeKa Consultants**

This guide was developed as part of one of the largest cannabis cultivation training programmes undertaken in Africa. It was originally produced for Malawian farmers participating in a training initiative developed by the founders of HeKa Consultants, and is now being made freely available to farming communities across African nations where cannabis production is being legalised.

African farmers now have the opportunity to participate in the growing cannabis and hemp industries. This guide provides a complete teaching programme for cannabis cultivation. Cannabis is a rewarding but demanding crop that requires careful management at every stage. If you are looking for a simpler starting point, we recommend our companion guide: the **HeKa Hemp Opportunity Guide**. Hemp cultivation is less complex, requires less intensive management, and offers strong commercial returns — making it an excellent first step into the industry.

This document is provided free of charge. We respectfully request that this guide is not sold, resold, or used for commercial profit. It is intended to be shared freely within farming communities to support sustainable cannabis cultivation practices.

This guide is also available in Chichewa (Malawian language).

Buku limeneli likupezekanso m'Chichewa.

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Why This Guide Exists

The Government of Malawi has taken a bold and forward-thinking decision to open the cannabis and hemp industry to its people. With global tobacco prices in long-term decline — the crop that has sustained Malawian farming communities for generations — the government has recognised that cannabis and hemp represent a powerful alternative: one that can revitalise rural economies, create thousands of new jobs, and generate significant foreign exchange earnings for the nation. This is a historic opportunity for Malawian farmers.

Many organisations in this industry choose to keep cultivation knowledge behind closed doors, treating it as proprietary information to be sold at a premium. HeKa Consultants takes a fundamentally different approach. We believe that the success of Malawi's cannabis and hemp industry depends on the success of its farmers — and farmers cannot succeed without access to proper training. That is why this guide is published free of charge and made freely available online for any farmer in Malawi to download and print. This is our contribution to the Government of Malawi's vision: reducing unemployment, increasing job opportunities across rural communities, and building an industry that brings real prosperity to the people who work the land.

Contents

I. Introduction

Welcome to the HeKa Consultants Cannabis Cultivation Training Programme. Thank you for taking the time to engage with this material. We recognise the wealth of agricultural experience you bring from cultivating crops such as tobacco, maize, groundnuts, and other staples, and we respect the dedication and hard work you have invested in your fields over many years.

Transitioning to a new crop like cannabis presents both exciting opportunities and unique challenges. Cannabis is not like growing maize or tobacco — it requires specific knowledge at every stage, from seed selection through to harvesting, drying, and curing. The difference between a high-value crop and a failed harvest often comes down to understanding these stages and getting them right.

This guide has been developed by experienced cannabis cultivators with deep roots in licensed cannabis farming across multiple jurisdictions. The knowledge shared here draws on decades of hands-on cultivation experience, including expertise in strain selection, tropical growing conditions, and the specific requirements of the African climate.

The purpose of this guide is to take you through the complete cultivation cycle — from understanding the cannabis plant itself, through seed selection, germination, planting, growth stages, flowering, and finally harvesting, drying, and curing. We also cover how to identify and solve common problems, understand quality standards that buyers require, and how to take your crop to market.

By following this guide carefully, you can lay a strong foundation for your cannabis crop and maximise your chances of producing a high-quality product that commands premium prices in the market.

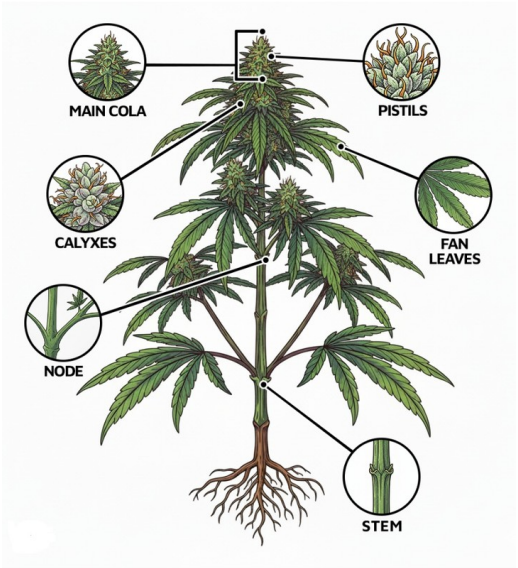
II. Understanding the Cannabis Plant

Before you plant a single seed, it is essential to understand the cannabis plant itself — its anatomy, its lifecycle, and critically, the difference between male and female plants. This knowledge will inform every decision you make throughout the growing process.

Plant Anatomy

Cannabis is a flowering plant with several key structures that you will need to recognise:

- **Roots:** The root system anchors the plant and absorbs water and nutrients. Healthy white roots are a sign of a healthy plant. Brown, slimy roots indicate problems such as overwatering or root rot.
- **Stem and Branches:** The main stem supports the plant upright. Branches grow from nodes. A strong, thick stem indicates a healthy, well-nourished plant.
- **Leaves:** The iconic fan leaves capture sunlight for photosynthesis. Healthy leaves are vibrant green. Discolouration is often the first visible sign of nutrient problems or disease.
- **Nodes:** Points where branches meet the main stem. This is where you will first see signs of the plant's sex (male or female).
- **Flowers (Buds):** The flowers of the female plant contain the cannabinoids (THC, CBD) and terpenes that give cannabis its value. Male plants produce pollen sacs instead.
- **Trichomes:** Tiny crystal-like structures covering the flowers. They produce resin containing cannabinoids and terpenes. Trichome colour is a key indicator of harvest readiness.



Cannabis plant anatomy — main cola, pistils, calyxes, fan leaves, nodes, stem, and root system

Male and Female Plants — Why This Matters

This is one of the most important things to understand in cannabis cultivation. Cannabis is a dioecious plant, meaning individual plants are either male or female.

Female plants produce the flowers (buds) that contain high levels of cannabinoids. An unfertilised female plant puts all its energy into producing large, resinous flowers — this is called 'sinsemilla' (seedless cannabis) and commands the highest market prices.

Male plants produce pollen sacs instead of flowers. If a male plant pollinates your females, they will divert energy from producing resinous buds into producing seeds. This dramatically reduces quality and market value. A single male plant can pollinate an entire field.

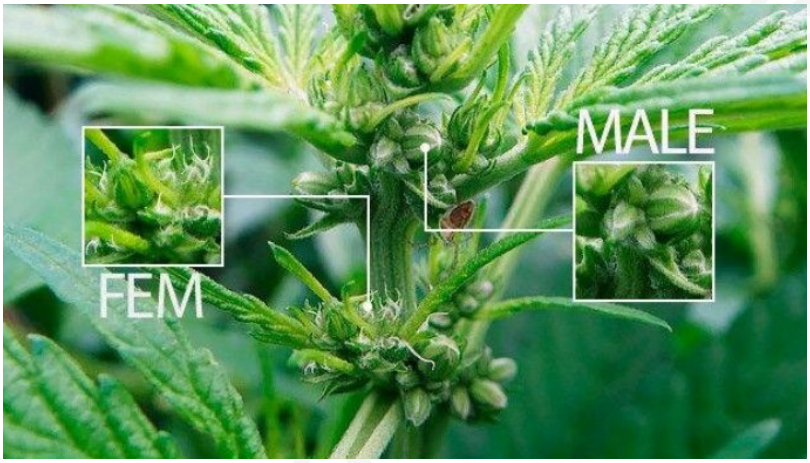
How to Identify Male and Female Plants

At around 4–6 weeks of growth, you will see 'pre-flowers' forming at the nodes:

- **Female pre-flowers:** Small, pear-shaped structures (calyxes) with two white hair-like pistils emerging from the top. These pistils look like tiny white 'V' shapes.
- **Male pre-flowers:** Small, round, ball-shaped sacs that hang in clusters, similar to tiny bunches of grapes. They do NOT have pistils (white hairs).

Female pre-flowers — visible white pistils emerging in a V shape at the node

Male pre-flowers — round ball-shaped pollen sacs at the node. REMOVE THIS PLANT IMMEDIATELY



Hermaphrodite plant — showing BOTH male pollen sacs (MALE) and female pistils (FEM) on the same plant. THIS PLANT MUST BE REMOVED

Action required: Inspect every plant carefully at 4–6 weeks. Remove ALL male plants immediately by pulling them out completely (roots and all) and disposing of them away from your growing area. Do not compost male plants near your crop.

The Cannabis Lifecycle

Cannabis moves through distinct stages during its life:

- **Germination (3–10 days):** The seed absorbs water, cracks open, and a taproot emerges.
- **Seedling Stage (2–3 weeks):** The first leaves appear and the plant establishes itself.
- **Vegetative Growth (3–16 weeks):** The plant grows rapidly in size, developing stems, branches, and leaves.
- **Flowering (6–12 weeks):** Triggered by light cycle changes, the plant produces flowers.
- **Harvest, Drying and Curing:** The final stage where your careful work pays off.

III. Seed Selection

Understanding the different seed types is crucial for making informed decisions specific to your needs and growing conditions.

1. Feminised Seeds

- **Guaranteed Females:** Nearly all plants mature into females. Eliminates the need to identify and remove males.
- **Consistent Yields:** More consistent crop in terms of flower quality and bud size.

- **Higher Costs:** Feminised seeds come with a higher price due to the specialised breeding process.

Considering the African Context: While more expensive, when you consider that regular seeds produce approximately 50% males (which must be removed), the effective cost per productive plant may be comparable.

2. Regular Seeds

- **Natural Selection:** Contains both male and female plants in roughly 50/50 proportions. Allows for breeding your own strains.
- **Cost-Effective:** Typically the most affordable option.
- **Identifying Males:** You will need to identify and remove male plants before they pollinate females.

3. Autoflowering Seeds

- **Fast Flowering:** Automatically transition to flowering after a set period, regardless of light schedule.
- **Multiple Harvests:** Shorter growth cycle allows for potential of multiple harvests per year.

Strains for Hot African Climates

- **Heat and Drought Resistant:** Durban Poison (South African landrace), Malawi Gold (landrace Sativa), Chocolope (Sativa-dominant).
- **Shorter Flowering Time:** Northern Lights (Indica-dominant) or OG Kush (Indica-dominant).

HeKa Consultants can advise on strain selection for your specific region and target market.

IV. Land Preparation

Site Selection

- **Sunlight:** Cannabis thrives in full sun — at least 6–8 hours of direct sunlight daily.
- **Drainage:** Good drainage is essential to prevent waterlogging and root rot. Sandy loam soils are ideal.
- **Shelter from Wind:** Strong winds can damage plants. Consider windbreaks using companion crops.
- **Security:** Cannabis is a high-value crop. Ensure adequate security and compliance with regulatory requirements.

Soil Quality

Cannabis thrives in well-aerated, loose soil with a pH between 6.0 and 7.0. This range optimises nutrient availability.

Optimising Your Soil

- **Compost:** Well-aged compost enriches soil, improves drainage, and introduces beneficial microbes.
- **Aged Manure:** From herbivores — ensure well-aged (at least 6 months) to avoid burning plants.
- **Perlite:** Improves drainage and aeration, especially in heavy clay soils.

V. Germination

Germination is the process by which a seed comes to life. A successfully germinated seed will crack open and produce a small white root called a taproot.

Conditions for Successful Germination

- **Temperature:** Seeds germinate best at 20–30°C. In most African climates, ambient temperatures will be suitable.
- **Moisture:** Seeds need consistent moisture but should never be submerged in standing water.

- **Darkness:** Seeds germinate best in the dark. Light is not needed until the seedling emerges.
- **Patience:** Germination typically takes 3–10 days. Do not give up too early.

Method 1: Paper Towel Method (Recommended)

- **Step 1:** Take two sheets of paper towel or clean cloth. Moisten so they are damp but not dripping.
- **Step 2:** Place seeds on one damp sheet, spaced apart. Cover with the second damp sheet.
- **Step 3:** Place inside a plate or shallow container. Cover to create a dark, humid environment.
- **Step 4:** Store in a warm place (20–30°C). Check daily and re-moisten if they dry out.
- **Step 5:** Within 3–10 days, a white taproot emerges. Once 1–2 cm long, the seed is ready to plant.

Handle with care: The taproot is extremely delicate. Use tweezers or gently pick up the seed by the shell. Never touch the taproot directly with your fingers.

Germinated cannabis seed — white taproot of 1–2 cm emerging from cracked shell

Transplanting Germinated Seeds

- **Step 1:** Prepare a small pot with moist, light soil or seedling mix.
- **Step 2:** Make a small hole approximately 1–2 cm deep.
- **Step 3:** Place the seed with taproot pointing downward.
- **Step 4:** Gently cover with soil. Do not pack tightly.
- **Step 5:** Lightly moisten and place in a warm area with indirect light.

VI. Planting

Climate Considerations (Malawi Example)

- **Rainy Season (November – April):** High rainfall and warm temperatures. Excessive rain can cause waterlogging and mould.
- **Dry Season (May – October):** Minimal rainfall and cooler temperatures. Offers the best window for outdoor cultivation.

Ideal Planting Times

Early Dry Season (May – June): Plants establish strong root systems before the hottest months.

Mid-Dry Season (July – August): Consistent sunlight and minimal rainfall provide ideal conditions.

Planting Depth and Spacing

- **Compact Strains (Indica-dominant):** 30–60 cm spacing between plants.
- **Average Strains (Hybrids):** 60–90 cm spacing between plants.
- **Tall Strains (Sativa-dominant):** 90–120 cm or more spacing between plants.

Row Spacing: Double the spacing between plants for row spacing. This allows air circulation and easier access.

VII. Seedling Stage (Weeks 1–3)

The seedling stage is the most vulnerable period. Seedlings are delicate and require careful attention to light, water, and temperature.

What to Expect

- **Cotyledons:** The first two small, round leaves. These are not true cannabis leaves — they provide the seedling with initial energy from the seed.
- **True Leaves:** After the cotyledons, you will see the first true cannabis leaves with serrated edges. Successive sets will have more blades (1, then 3, then 5, then 7).
- **Stem Development:** Should be short and sturdy. If very tall and thin ('stretching'), the seedling is not getting enough light.

Cotyledon stage — first round embryonic leaves emerging from the seed shell

First true leaves with single blade developing after the cotyledon stage

Healthy young cannabis plant with multiple leaf sets, strong stem and visible nodes

Seedling Care

- **Light:** Gentle, consistent light. In Africa's strong sun, morning light or partial shade for the first week. Gradually increase exposure.
- **Water:** Gently and sparingly. Soil should be moist but never saturated. Overwatering is the number one killer of seedlings.
- **Temperature:** Maintain 20–25°C if possible. Provide shade during the hottest part of the day.
- **Nutrients:** Do NOT add any nutrients during the seedling stage. The seed contains all the nutrients needed for the first 2–3 weeks.

When to Transplant Outdoors

Seedlings are ready to transplant when they have 3–4 sets of true leaves (typically 2–3 weeks old). Transplant in early morning or late afternoon. Water thoroughly after transplanting.

VIII. Vegetative Growth and Plant Care

The vegetative stage is when your plant grows rapidly. This stage can last 3 to 16 weeks. The plant is building the structure to support heavy flowers during flowering.

Watering During Vegetative Growth

- **Overwatering:** Leads to waterlogged soil, hindering oxygen flow to roots. Signs: wilting despite wet soil, yellowing foliage.
- **Underwatering:** Stunts growth. Signs: crispy leaf edges and dry, powdery soil.
- **The Finger Test:** Insert your finger 2–3 cm into the soil. If moist, wait. If dry, water thoroughly.
- **Watering Method:** Water at the base of the plant, not over the leaves. Early morning watering is best.

Remember: It is better to underwater slightly than to overwater. Cannabis prefers a wet-dry cycle.

Nutrient Management

During vegetative growth, cannabis is a hungry plant. The three primary nutrients are nitrogen (N), phosphorus (P), and potassium (K):

- **Nitrogen (N):** Most important during veg. Drives leaf and stem growth. Deficiency: yellowing of lower leaves progressing upward.
- **Phosphorus (P):** Supports root development and energy transfer. More important during flowering.
- **Potassium (K):** Supports overall health, water regulation, and disease resistance.

Recommended NPK ratio for vegetative growth: High nitrogen, such as 3:1:2. Achievable organically with compost tea, aged manure, bone meal, or wood ash.

Nitrogen deficiency — yellowing of lower (older) leaves is the classic first sign

Phosphorus deficiency — leaves turning dark purple/reddish, especially on older growth

Potassium deficiency — brown crispy spots and burnt leaf edges

Male Identification and Removal

If using regular seeds, weeks 4–6 of the vegetative stage is when you must identify and remove males. Refer to Section II for identification guidance. Missing even one male plant can pollinate your entire crop.

Organic Pest Control During Vegetative Growth

- **Companion Planting:** Basil repels aphids, marigolds deter whiteflies, lavender attracts pollinators while repelling moths.
- **Neem Oil Spray:** Effective against aphids, mites, and whiteflies. Mix with water and liquid soap. Apply in early morning or evening.
- **Beneficial Insects:** Ladybugs and lacewings naturally control pest populations.

Healthy cannabis plant in full vegetative growth — vibrant green leaves, strong structure, good branching

IX. Flowering and Pre-Harvest

The flowering stage is when your plant stops growing taller and redirects all energy into producing flowers. This determines the quality and quantity of your harvest.

What Triggers Flowering?

Cannabis flowers in response to light cycle changes. In many African countries near the equator, the natural light cycle is approximately 12/12, so plants may begin flowering relatively quickly after the vegetative stage.

Nutrient Shift During Flowering

Reduce nitrogen and increase phosphorus and potassium:

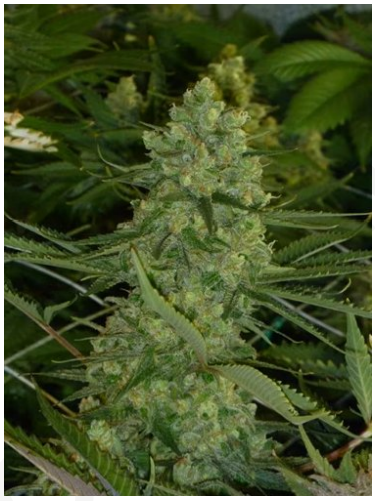
- **Recommended NPK ratio:** Low nitrogen, high phosphorus and potassium, such as 1:3:2.
- Bone meal provides slow-release phosphorus. Wood ash or composted banana peels provide potassium.

Monitoring Flower Development

As flowering progresses over 6–12 weeks:

- **Weeks 1–2:** The plant stretches and begins producing white pistils at the nodes.
- **Weeks 3–4:** Buds begin forming where pistils cluster together. Resin production increases.
- **Weeks 5–6:** Buds swell and become dense. Trichomes become visible as a frosty coating.
- **Weeks 7+:** Buds continue to ripen. Pistils begin changing from white to amber/brown.

Weeks 1–2: Early white pistils emerging from developing bud sites



Weeks 3–4: Buds forming and swelling with increasing trichome coverage

Weeks 6+: Dense, swollen buds with heavy trichome frost — note caterpillar pest (red arrows)

Knowing When to Harvest — Trichome Method

Using a magnifying glass or jeweller's loupe, examine the trichomes on the buds:

- **Clear trichomes** = NOT ready. The plant is still developing.
- **Milky/cloudy trichomes** = PEAK THC. This is the optimal harvest window.
- **Amber trichomes** = THC is degrading into CBN. More sedative effect.

Harvest when most trichomes are milky with some amber beginning to appear.

Trichome colour stages: Clear (not ready) → Milky (peak THC) → Amber (THC converting to CBD/CBN)

Comparison: Cloudy/milky trichomes (top — harvest ready) vs clear trichomes (bottom — not ready)

Knowing When to Harvest — Pistil Method

When 70–80% of pistils have darkened to amber or brown, the plant is approaching peak harvest readiness. This is the simplest method for farmers without magnification equipment.

Pistil colour progression: <50% darkened (too early) → 60–70% (getting close) → 80–90% amber/brown (harvest ready)

Final Flush

In the final 1–2 weeks before harvest, stop all nutrients and water with plain water only. This forces the plant to use up remaining nutrients, producing a cleaner final product.

X. Harvesting, Drying and Curing

This is the stage that separates professional-quality cannabis from poor-quality product. Many farmers lose significant income through poor post-harvest handling.

Harvesting

- **Timing:** Harvest in early morning before heat, when terpene content is highest.
- **Cutting:** Use clean, sharp tools. Cut at the base of the main stem, or cut individual branches.
- **Handle with care:** Avoid touching buds with bare hands. Oils and heat from hands damage trichomes.

Drying

The goal is to slowly remove moisture over 7–14 days. Drying too fast destroys terpenes and cannabinoids.

- **Method:** Hang branches upside down on lines in a dark, well-ventilated space.
- **Temperature:** Ideally 15–21°C. In hot African climates, use the coolest available space away from sunlight.
- **Humidity:** Aim for 45–55%. High humidity causes mould; low humidity dries too fast.
- **Air Circulation:** Gentle airflow around buds. Do NOT point fans directly at them.
- **Darkness:** Dry in the dark or very low light. UV light degrades THC.
- **Duration:** 7–14 days. Check daily for mould. Remove any affected buds immediately.

Proper drying setup — cannabis branches hung upside down on lines in a dark, ventilated space

The Snap Test

Buds are dry enough when smaller stems snap cleanly when bent, rather than bending. The outside should feel dry but not crispy.

Curing

Curing dramatically improves quality, taste, and smoothness:

- **Step 1:** Once buds pass the snap test, trim remaining leaves.
- **Step 2:** Place trimmed buds loosely into airtight containers (glass jars). Fill approximately 75% full.
- **Step 3 (Burping):** For the first 1–2 weeks, open containers 2–3 times daily for 10–15 minutes. If you smell ammonia, buds are too moist.
- **Step 4:** After 2 weeks, reduce burping to once daily. After 4 weeks, burp every few days.
- **Duration:** Minimum 2–4 weeks. Premium cannabis is cured for 4–8 weeks or longer.

Curing in airtight glass jars — filled approximately 75% full with properly dried buds

Storage

Store in airtight containers in a cool, dark place. Properly cured cannabis maintains quality for 6–12 months. Avoid light, heat, humidity, and air.

XI. Understanding GACP and Routes to Market

Once you have produced a quality cannabis crop, the next question is: who will buy it, and what standards do they require?

What is GACP?

GACP stands for Good Agricultural and Collection Practices — an internationally recognised quality standard for medicinal plant production. **GACP certification is required for cannabis entering pharmaceutical supply chains.**

The GACP Challenge for Smallholder Farmers

Full GACP certification is expensive — tens of thousands of dollars in initial investment plus ongoing compliance costs. For most smallholder farmers starting out, this is prohibitive. However, the pharmaceutical market is only one part of the global cannabis industry. There are several legitimate, profitable routes to market without full GACP certification.

Routes to Market Without GACP

1. The Aggregator / Processor Model

A GACP-certified processing company purchases raw biomass from multiple small-scale farmers and processes it in their certified facility. The farmer does not need certification — the processor does. This is exactly how the tobacco industry in Malawi already works.

2. The Wellness, Cosmetics and Nutraceutical Market

CBD oils, topicals, cosmetics, and food supplements operate under different regulatory frameworks. A farmer producing CBD-rich biomass for extraction has a viable market without GACP, provided basic quality standards are met.

3. The Industrial Extract Market

Companies purchasing biomass for cannabinoid extraction often have their own quality specifications rather than requiring GACP. What they care about is cannabinoid content, cleanliness, and consistency.

4. Regional African Markets

South Africa, Lesotho, Zimbabwe, and other African nations are developing their own cannabis industries with their own standards — not all aligned to EU GACP.

5. Building Towards GACP: The 'GACP-Ready' Pathway

HeKa Consultants recommends that all farmers implement basic quality practices from day one:

- Keep written records of what you plant, when, what inputs you use, and when you harvest.
- Grow without chemical pesticides or synthetic fertilisers where possible.
- Ensure proper drying and storage conditions.
- Maintain cleanliness throughout cultivation and post-harvest.

This creates a documented track record that makes future GACP certification easier and cheaper. Do not let the GACP barrier discourage you — the wellness, cosmetics, extract, industrial, and regional African markets are enormous and growing rapidly.

XII. Taking Your Crop to Market

Growing a quality crop is half the equation. Finding a buyer at the right price is the other half.

Understanding Your Buyers

- **Pharmaceutical companies:** Require GACP, specific cannabinoid profiles, lab testing, full traceability. Highest prices but highest barriers.
- **Extract companies / processors:** Purchase raw biomass. Primarily interested in cannabinoid content, cleanliness, and moisture levels.
- **Wellness / cosmetics companies:** Require quality product free from contaminants. GACP not always required.
- **Regional buyers:** African processors developing local supply chains. Requirements vary by country.

Do Not Plant Without a Plan

We strongly advise all farmers to establish buyer relationships before planting. Understand what strain the buyer wants, what quality they require, what price they will pay, and what volumes they need.

How HeKa Consultants Can Help

- Identifying potential offtakers for your product type and volume.
- Advising on buyer quality requirements and how to meet them.
- Connecting producers with processors who can aggregate and certify under their own GACP.
- Providing guidance on building towards GACP compliance over time.
- Advising on strain selection based on current market demand.

Contact HeKa Consultants before planting to discuss market requirements, quality standards, and buyer introductions.

XIII. Common Problems and Troubleshooting

Even experienced cultivators encounter problems. The key is identifying issues early and taking corrective action. This section provides detailed identification and step-by-step solutions for each problem.

Nutrient Deficiencies

Nitrogen (N) Deficiency

How to identify: Lower (older) leaves turn pale green, then yellow, then brown and eventually fall off. The yellowing progresses upward through the plant. Growth slows noticeably.

How to fix:

• **Quick fix — Compost tea:** Fill a bucket one-third full with mature compost. Top up with water. Stir well and leave to brew for 24–48 hours, stirring occasionally. Strain through cloth and water plants at the base with the liquid. Apply every 5–7 days until symptoms improve.

• **Quick fix — Manure tea:** Place a shovel-full of well-aged cow or goat manure into a cloth sack. Soak in a bucket of water for 3–5 days. Dilute until the colour of weak tea. Apply to the soil around the base of the plant.

• **Prevention:** Mix well-aged manure or compost into your soil before planting. During vegetative growth, apply compost tea every 2 weeks as routine feeding.

Nitrogen deficiency — yellowing starts at the bottom (older leaves) and moves upward

Phosphorus (P) Deficiency

How to identify: Leaves turn dark green or develop a purple/reddish tint, especially on the undersides and stems. Older leaves may develop dark brown or black spots. Growth is stunted and roots develop poorly.

How to fix:

• **Quick fix — Bone meal:** Sprinkle 1–2 tablespoons of bone meal around the base of each plant. Work it lightly into the top 2–3 cm of soil. Water in gently. Takes 1–2 weeks to show improvement.

• **Quick fix — Bat guano:** If available, mix 1 tablespoon of bat guano into 4 litres of water. Stir well and apply to the base of the plant. Bat guano is high in phosphorus and acts faster than bone meal.

• **Prevention:** Mix bone meal into your soil before planting. For flowering plants, top-dress with bone meal every 3–4 weeks.

Phosphorus deficiency — dark purple/reddish leaves, particularly on older growth

Potassium (K) Deficiency

How to identify: Leaf edges and tips turn brown and crispy ('leaf burn'). Brown spots may appear on leaves. Leaves may curl upward. Plants become weak and susceptible to disease.

How to fix:

• **Quick fix — Wood ash:** Sprinkle a thin layer (approximately 1 tablespoon) of wood ash from natural, untreated wood around the base of each plant. Do not apply too much — excess raises soil pH. Apply once and wait 2 weeks before reapplying.

• **Quick fix — Banana peel tea:** Chop 3–4 banana peels and soak in 4 litres of water for 48 hours. Strain and use the liquid to water your plants. Banana peels are naturally rich in potassium.

• **Quick fix — Composted banana peels:** Bury chopped banana peels 5–10 cm deep around the base of the plant. They decompose and slowly release potassium.

• **Prevention:** Include banana peels and wood ash in your compost. Apply compost before planting to ensure a potassium-rich soil.

Potassium deficiency — brown crispy spots and burnt leaf edges

Calcium Deficiency

How to identify: New growth at the top of the plant is distorted, curled, or stunted. Brown or yellow spots appear on younger leaves. Roots may develop poorly.

How to fix:

• **Quick fix — Crushed eggshells:** Crush eggshells into a fine powder. Sprinkle around the base of the plant and work into the top layer of soil. This releases calcium slowly over several weeks.

• **Quick fix — Agricultural lime:** If available, add a small amount of agricultural lime (dolomite lime) to the soil. Use sparingly — approximately 1 teaspoon per plant worked into the top soil. Water in well.

• **Prevention:** Add crushed eggshells or lime to your compost mix before planting season.

Magnesium Deficiency

How to identify: Yellowing between the veins of older leaves while the veins themselves remain green ('interveinal chlorosis'). Leaves may curl and eventually drop off.

How to fix:

• **Quick fix — Epsom salts:** Dissolve 1 tablespoon of Epsom salts (magnesium sulphate) in 4 litres of water. Water the base of the plant with this solution. Can also be used as a foliar spray — mist onto leaves in early morning or evening. Apply once per week until symptoms improve.

• **Prevention:** Add Epsom salts to your regular watering schedule every 2–3 weeks during the growing season, using a weaker solution (½ tablespoon per 4 litres).

Watering Problems

Overwatering

How to identify: Leaves droop downward and feel heavy or swollen. Soil is constantly wet. Lower leaves may yellow. In severe cases, roots turn brown and slimy (root rot).

How to fix: Stop watering immediately. Allow the soil to dry out completely before watering again. If root rot has set in (plant wilts even in wet soil and roots smell bad), you may need to carefully dig up the plant, trim away brown/dead roots, and replant in fresh, well-draining soil.

Prevention: Always use the finger test — insert your finger 2–3 cm into the soil. Only water when dry at that depth. Ensure good drainage in your soil and containers. Cannabis prefers a wet-dry cycle.

Underwatering

How to identify: Leaves wilt and droop downward but feel thin and papery (unlike the heavy droop of overwatering). Soil is dry and powdery. Leaf edges may become crispy.

How to fix: Water thoroughly and slowly, allowing the water to soak deep into the root zone. If the soil has become compacted, break up the top layer gently before watering.

Prevention: Establish a consistent watering schedule. In hot African climates, you may need to water daily during the hottest months. Mulch around the base of your plants to retain moisture.

Heat Stress

How to identify: Leaves curl upward like a taco. Leaf edges turn crispy and brown. Buds closest to direct sun may bleach white. Growth slows.

How to fix:

- Provide shade during the hottest part of the day (12pm–3pm) using shade cloth, banana leaves, or temporary structures.
- Mulch heavily around the base of plants (straw, dried grass, banana leaves) to keep roots cool and retain moisture.
- Water more frequently during heat waves — early morning and late evening if needed.
- If growing in containers, move them to a shadier location during extreme heat.

Pests — Identification and Treatment

Aphids

How to identify: Small (1–3 mm), soft-bodied insects that cluster on new growth, undersides of leaves, and around buds. They can be green, yellow, black, or brown. They excrete sticky 'honeydew' which can attract black sooty mould.

How to treat:

- **Neem oil spray:** Mix 5 ml (1 teaspoon) of cold-pressed neem oil with 1 litre of warm water and 2–3 drops of liquid soap (the soap helps the oil mix with water). Shake well and spray all surfaces of the plant, paying special attention to the undersides of leaves. Apply in early morning or evening — never in direct sun. Repeat every 3–5 days until aphids are gone.
- **Soap spray:** Mix 5 ml of natural liquid soap (not detergent) with 1 litre of water. Spray directly onto aphids. The soap suffocates them. Repeat every 2–3 days.
- **Water blast:** Use a strong spray of water to physically knock aphids off the plant. Effective for light infestations.
- **Biological control:** Introduce ladybugs or lacewings to your growing area. A single ladybug can eat 50+ aphids per day.

Aphids — small soft-bodied insects clustering on new growth and leaf undersides

Spider Mites

How to identify: Extremely tiny mites (barely visible to the naked eye) that live on the undersides of leaves. The first visible sign is usually fine silk-like webbing between leaves or across bud sites. Leaves may develop tiny yellow or white speckles (stippling) on the upper surface.

How to treat:

- **Neem oil spray:** Same mixture as for aphids (5 ml neem oil, 1 litre warm water, 2–3 drops soap). Spray thoroughly, especially undersides of all leaves. Repeat every 3 days for at least 2 weeks — spider mites reproduce rapidly and you must break their lifecycle.
- **Increase humidity:** Spider mites thrive in hot, dry conditions. Misting your plants regularly or watering the ground around them can help deter mites.
- **Remove heavily infested leaves:** If a leaf is covered in webbing and mites, remove it entirely and dispose of it far from your crop. Do not compost infested material.
- **Important:** Spider mites are one of the most destructive cannabis pests. If you see webbing, act immediately — an infestation can destroy your crop within days.

Spider mite webbing — fine silk-like webs across cannabis leaves, a sign of serious infestation

Caterpillars

How to identify: Visible chewing damage — holes in leaves and buds. Caterpillar droppings (small dark pellets) on leaves. You may see the caterpillars themselves, especially in the early morning or evening.

How to treat:

- **Hand-pick:** Inspect plants daily, especially in the morning and evening. Pick off any caterpillars you find and crush them or drop them in soapy water.
- **BT spray (Bacillus thuringiensis):** This is a naturally occurring bacterium that kills caterpillars but is safe for humans and beneficial insects. Mix according to package directions and spray onto all leaf surfaces. The caterpillar eats the treated leaf and dies within 1–3 days. Reapply after rain.
- **Check inside buds:** Caterpillars love to burrow into dense buds where they are hidden. If you see unexplained browning inside a bud, carefully open it — you may find a caterpillar. Their droppings inside buds cause bud rot.

Caterpillar damage — chewing holes and eaten leaf edges

Whiteflies

How to identify: Small white flying insects (1–2 mm) that cluster on the undersides of leaves. If you shake the plant, a cloud of tiny white insects will fly up briefly and then resettle. Like aphids, they excrete sticky honeydew.

How to treat:

- **Neem oil spray:** Same mixture as above. Spray undersides of all leaves thoroughly. Repeat every 3–5 days.
- **Yellow sticky traps:** Whiteflies are attracted to yellow. Coat yellow cards or plastic sheets with vegetable oil or petroleum jelly and hang them near your plants. The flies land on the sticky surface and cannot escape.
- **Companion planting:** Plant marigolds and basil around your cannabis. Marigolds repel whiteflies, and basil repels a wide range of pests.
- **Soap spray:** Same soap spray mixture as for aphids. Spray directly onto whiteflies on the undersides of leaves.

Whiteflies — dozens of small white insects clustered on the underside of a cannabis leaf

Mould and Mildew — Identification and Treatment

Bud Rot (Botrytis cinerea)

How to identify: Grey, fuzzy mould growing inside dense buds. Affected buds turn brown, mushy, and may smell musty. Often starts in the largest, densest buds where moisture gets trapped. You may notice individual leaves on a bud turning yellow or brown for no apparent reason — pull the bud apart gently and check inside.

How to treat:

- **Remove immediately:** Cut the affected bud off the plant at least 5 cm below the visible mould. Place it in a bag and dispose of it far from your growing area. Do NOT compost infected material. Wash your hands and sterilise your cutting tools (wipe with rubbing alcohol or flame) before touching healthy plants.
- **Improve airflow:** Remove some lower leaves and branches to open up the plant. Ensure adequate spacing between plants. If growing in a structure, ensure cross-ventilation.
- **Reduce humidity:** If possible, avoid watering late in the day so plants are not wet overnight. In humid climates, consider shaking excess water off plants after rain.
- **Prevention:** Good spacing, airflow, and choosing mould-resistant strains are the best defences. During flowering, inspect the largest buds daily. Early detection saves your crop.

Bud rot (Botrytis) — grey/white fuzzy mould visible inside the bud

Powdery Mildew

How to identify: White, powdery patches on the upper surfaces of leaves, like they have been dusted with flour. Starts as small circular white spots and spreads rapidly. Common in humid conditions with poor air circulation, especially when days are warm and nights are cool.

How to treat:

- **Remove affected leaves:** Carefully cut off any leaves showing powdery mildew. Place them in a bag — do not shake them or the spores will spread to other plants. Dispose of them away from your growing area.
- **Milk spray:** Mix 1 part milk to 9 parts water. Spray onto all leaf surfaces in the morning. The proteins in milk have antifungal properties. Reapply every 5–7 days. This is one of the most effective and cheapest organic treatments available.
- **Baking soda spray:** Dissolve 1 tablespoon of baking soda and 2–3 drops of liquid soap in 4 litres of water. Spray all leaf surfaces. The alkaline environment kills mildew. Reapply after rain or every 7 days.
- **Neem oil:** Same neem oil mixture as for pests. Neem has both insecticidal and antifungal properties.
- **Improve circulation:** Space plants further apart. Remove dense lower foliage. Ensure air moves freely around all plants.
- **Prevention:** Good spacing, morning watering (so leaves dry during the day), and regular inspection. Avoid touching healthy plants after handling infected ones.

Powdery mildew — white powdery patches spreading across the leaf surface

Quick Reference: Making Neem Oil Spray

Neem oil is your single most versatile organic treatment. It works against aphids, spider mites, whiteflies, caterpillars, and powdery mildew. Here is the standard recipe:

- **Ingredients:** 5 ml (1 teaspoon) cold-pressed neem oil, 1 litre of warm water, 2–3 drops of natural liquid soap.
- **Method:** Mix the soap into the warm water first, then add the neem oil. Shake or stir well. The soap acts as an emulsifier to help the oil mix with water.

• **Application:** Spray all surfaces of the plant, including tops and undersides of leaves, stems, and around buds. Apply in early morning or evening — never in direct sun, as the oil can burn leaves.

• **Frequency:** Every 3–5 days for active infestations. Every 7–10 days as a preventive measure during the growing season.

• **Important:** Stop all neem oil application at least 2 weeks before harvest. You do not want neem residue on your final product.

XIV. Conclusion and Legal Note

This guide has taken you through the complete cannabis cultivation cycle. We encourage you to:

• **Start small and experiment.** Begin with a manageable number of plants before scaling up.

• **Keep records.** Document everything — what you plant, when, what inputs you use, what works.

• **Plan your market access.** Contact HeKa Consultants before planting to discuss buyer requirements.

• **Adapt your approach.** Your local climate may require adjustments.

• **Seek further knowledge.** Continue learning. Consult experienced growers and stay informed.

Legal Compliance

Cannabis cultivation is subject to national laws. In Malawi, cannabis is regulated by the Cannabis Regulatory Authority (CRA) under the Cannabis Regulation Act 2020. All farmers must hold a valid licence before cultivating cannabis. Cultivating without a licence is a criminal offence.

HeKa Consultants strongly advises all farmers to ensure full compliance with their national cannabis regulations.

Contact HeKa Consultants

Whether you are a licensed farmer seeking buyer introductions, a cooperative looking for market access, or an investor exploring cannabis opportunities in Africa, HeKa Consultants is available to assist you.

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