BUSINESS PLAN · INDIA

Spice Plantation - Pepper and Cardamom

An estate that measures the man who sprayed the crop, not only the capsule he sprayed it on

PLANTATION AND ESTATE AGRICULTURE

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1. Executive Summary

This plan sets out a **Spice Plantation (Pepper / Cardamom)** in the Cardamom Hills — **140 hectares planted, 78 ha small cardamom and 62 ha black pepper**, with own curing houses, driers and a garbling and grading line, and cardamom and pepper bought from about **640 small-grower members**, handling roughly **118,600 kg a year by Year 3 at ₹16.00 crore**: 29,400 kg of own cardamom at **₹1,850 per kg** and 51,600 kg of own pepper at **₹620 per kg**.

> This plan is the second in vertical 55 and **inherits the ten anchor rules (a)–(j)** set by the tea and coffee estate plan. It extends rule (h) — welfare delivered in fact and measured — into the one place on a spice estate where it has real teeth.

Item	Detail	Year 3
What is sold	Small cardamom and black pepper, cured and graded, sold bulk at auction and direct, with a residue-tested and exposure-audited line for export and specialty buyers	**₹16.00cr**
Planted area / grower members	78 ha cardamom, 62 ha pepper, plus the smallholdings around them	140 ha; 640 members
Product handled	Across 1,860 picking-round and delivery lots	118,600 kg
PAT / net margin	Spice margins are good and spice prices are not stable; this is modelled at mid-cycle	**₹1.37cr / 8.6%**
ROCE on ₹9.00cr	Replanting, curing houses, irrigation and welfare	**21.3%**
Growth (Year 1–3)	Workers whose actual chemical exposure is measured	₹9.4cr → ₹16cr; 62 → 96 covered

> □□ **THE ENTIRE APPARATUS OF TESTING IN THIS INDUSTRY POINTS AT THE PERSON WITH THE SMALLEST EXPOSURE. Maximum residue limits, Spices Board monitoring and importing-country rejections all protect a consumer who will eat perhaps a gram of cardamom in a cup of tea. THE MAN WHO SPRAYED IT WORE THE SAME CHEMICAL FOR EIGHT HOURS, AT CLOSE RANGE, UNDER A DENSE SHADE CANOPY, AT A DOSE THOUSANDS OF TIMES HIGHER — AND NO TEST ANYWHERE IN THE SYSTEM MEASURES HIM.**

> **The remedy is not new equipment and not a certification. IT IS A BLOOD TEST THAT ALREADY EXISTS, COSTS ₹380, AND IS ESSENTIALLY NEVER DONE. Cholinesterase falls measurably before an organophosphate does visible harm, which means the exposure is detectable weeks before it is dangerous — and the reason nobody looks is not the cost of looking. IT IS THE COST OF WHAT YOU MUST DO WHEN THE READING COMES BACK LOW.**

2. Business Description, Vision & Legal Structure

A private limited company holding the estate on a long lease, operating curing houses, driers and a garbling and grading line, and buying cardamom and pepper from member growers within the surrounding hills.

Element	Position
Legal form	Private limited company; estate on 30-year registered lease; Spices Board registration as grower-exporter in the company's name

Where the money is made	Own cardamom and pepper at good margin; member purchase and curing at volume; the tested and audited line at a premium
What is different	Every person who handles a chemical here has an exposure record, and he is given a copy of it
Vision	An estate where the spray decision is made by someone who will be tested for its consequences

Why this shape	Reasoning
Cardamom and pepper together	Different harvest calendars, different pest complexes and two unrelated price markets; pepper on shade trees uses land the cardamom is already occupying
Own curing and garbling	**The spray-to-pick interval and the exposure record only exist if the same entity controls the field and the shed**
Member purchase alongside own crop	Fills the curing houses, spreads the fixed cost, and puts the safety practice in front of 640 growers who spray the same chemicals
Long lease rather than purchase	Cardamom Hills land values would double the project cost and add nothing to output

3. Promoter & Ownership

Item	Position
Promoter	Second-generation planter with a plant-protection background and fourteen years on the estate; personally holds the spray authorisation and signs every schedule
Promoter equity	**₹3.15cr** of the ₹9.00cr project cost (35%), unsecured and not withdrawable during the loan term
Ownership	Promoter family 78%; member producer company 12%; ESOP and key staff 10%
Governance	**The safety officer reports to the board, not to the estate manager, because the person under pressure to finish a picking round must not be the person who can waive a re-entry interval**

> That last line is the whole governance design in one sentence. **Every commitment in this plan can be abandoned by one verbal instruction on one busy afternoon, and the instruction would never be written down. Separating the person who enforces the interval from the person whose round is delayed by it is the only structural defence against that, and it costs nothing.**

4. Market Analysis — India

Segment	What drives it	Position taken
Small cardamom (auction and direct)	Auction price at Bodinayakannur and Puttady, capsule size and colour, moisture; prices swing violently between seasons	29,400 kg own at ₹1,850/kg
Black pepper	Bulk density, volatile oil and piperine, import parity from Vietnam and Sri Lanka	51,600 kg own at ₹620/kg
Member crop, cured and graded	Smallholders with no drier, no garbler and no storage; the nearest curing house is effectively the only buyer	21,600 kg at ₹1,630/kg blended

Residue-tested and exposure-audited lots	EU, Japanese and specialty buyers who test on arrival and reject on a number; a rejected consignment costs the mark, not just the lot	11,200 kg at ₹2,000/kg
Value-added (oil, ground, garbled grades)	Domestic brands and food service	4,800 kg at ₹2,000/kg

Why this crop and not another

Structure	Consequence
Cardamom is harvested in rounds every 20–30 days across six to eight months	**There is no single harvest date, so there is no clean moment when spraying stops. The field is always somewhere in a pre-harvest interval**
Thrips and capsule borer attack the capsule itself, not the leaf	Damage is to the saleable product directly, so spray pressure is intense and the incentive to spray late is strongest exactly when the interval matters most
The canopy is dense and the plant is shoulder-height	**The sprayer works inside the spray cloud, not behind it — this is a crop geometry problem, not a discipline problem**
India is a residual exporter with a large domestic market	The tested lot goes abroad and the untested one stays home, which is the ordinary case rather than the exception

> Demand is not the constraint. Indian cardamom and Indian pepper both sell, at prices that are frequently excellent. **The constraint is that the price is set on a measurement of the capsule and nothing at all is measured about the person who produced it.**

The one thing a buyer will pay for that nobody sells

What buyers already ask for	What they get	What is missing
Residue certificate to their own MRL	A real, competent laboratory result	Nothing. This part works
Social audit or ethical-sourcing questionnaire	Wage registers, housing photographs, an attestation	**Not one measurement of what any worker actually absorbed**
Traceability to farm or estate	Lot codes and grower lists	No link between a lot and the spray applied to it
Sustainability certification	An audited management system	**A system audit checks whether records exist, not what is in them**

> **The commercial opportunity is narrow and real: buyers with genuine social-audit obligations are asking a question about worker safety that NOBODY IN THIS TRADE CAN CURRENTLY ANSWER WITH A NUMBER. They accept an attestation because an attestation is all that has ever been offered.** That is why the tested and exposure-audited line prices at ₹2,000 per kg against ₹1,850 in bulk — not a premium for virtue, **a premium for being the only supplier who can answer the question at all.**

5. Competition & Position

Competitor type	What they do well	Where the gap is
Neighbouring estates	Scale, established auction relationships, replanting capital	Spray crews on daily wage, knapsacks at close range, no exposure record and no re-entry discipline

Curing houses and traders	Working capital, drying capacity, fast settlement	Buy the capsule and know nothing about how it was grown or by whom
Exporters with residue programmes	Genuine testing competence and real MRL discipline	**Every test they run is of the product; not one is of a person**
Certified organic estates	Solve the problem entirely by removing the chemical	A real answer at a real yield cost, and unavailable to the 640 members who cannot convert
This estate	Field, curing, grading and a spray crew that is trained, dedicated and monitored	**Positioned on the exposure, not the residue — the one measurement nobody in this trade takes**

> **It is worth saying why the organic route is not the plan here. It is the better answer where it works, and it works on a minority of hectares at a yield cost most growers cannot absorb. This plan is written for the ordinary case: a conventional estate that will keep spraying, whose 640 members will certainly keep spraying, and where the achievable gain is not the elimination of the chemical but the protection of the person applying it.**

6. The Testing Points at the Person With the Smallest Exposure

This is the finding, and it is a question of where the instruments are aimed.

Who is exposed to the chemical	Dose	Measured?
The consumer, in a cup of tea	About a gram of cardamom	**Yes. To 0.01 mg/kg**
The importer's laboratory	None	**Yes. Every consignment**
The field worker re-entering the block	Foliar residue, hours	**No**
The sprayer, inside the canopy	**Eight hours, at source**	**Never**

> **MAXIMUM RESIDUE LIMITS, SPICES BOARD MONITORING AND IMPORTING-COUNTRY REJECTIONS ARE A GENUINE AND WELL-RUN APPARATUS, AND EVERY INSTRUMENT IN IT IS POINTED AT THE END OF THE CHAIN. The person it protects will consume perhaps a gram of cardamom in a cup of tea. THE MAN WHO APPLIED THE CHEMICAL CARRIED IT ON HIS SKIN AND IN HIS BREATH FOR EIGHT HOURS, AT CLOSE RANGE, INSIDE A DENSE SHADE CANOPY WITH A KNAPSACK SPRAYER AT SHOULDER HEIGHT — WHICH IS TO SAY INSIDE THE SPRAY CLOUD RATHER THAN BEHIND IT. His dose is not marginally larger. It is larger by orders of magnitude, and it is measured nowhere.**

> **This is not concealment and it is not indifference; IT IS A REGULATORY APPARATUS BUILT AROUND A PRODUCT RATHER THAN AROUND A PROCESS. An MRL is a property of a capsule, so a capsule is what gets tested, and the testing is excellent. Nobody decided the sprayer did not matter — HE SIMPLY IS NOT WHAT THE INSTRUMENT IS FOR, and no instrument that exists in this trade has ever been aimed at him. The result is that an industry can be in full compliance, pass every consignment, hold every certification, AND STILL BE HARMING THE ONLY PEOPLE IN THE CHAIN WHO ARE ACTUALLY AT RISK.**

> **So measure the man. SERUM CHOLINESTERASE FALLS MEASURABLY WHEN A PERSON ABSORBS AN ORGANOPHOSPHATE, AND IT FALLS WEEKS BEFORE HE FEELS ANYTHING. The test is old, standard, available in any district laboratory, AND COSTS ABOUT ₹380. 384 TESTS A YEAR ACROSS 96 EXPOSED WORKERS COSTS**

₹1.46 LAKH — which is why the reason nobody does it cannot possibly be the price of the test. THE COST IS WHAT YOU HAVE TO DO WHEN A READING COMES BACK LOW: STAND THE MAN DOWN FROM SPRAYING FOR FOUR TO SIX WEEKS, ON FULL PAY, IN THE MIDDLE OF THE SEASON. That is ₹0.16 crore a year here and 11 men in Year 3, and it is the entire reason the test is unpopular. GENERAL RULE: WHERE THE WHOLE APPARATUS OF TESTING POINTS AT THE PERSON WITH THE SMALLEST EXPOSURE, COMPLIANCE AND SAFETY HAVE COME APART — SO MEASURE THE MAN, NOT ONLY THE CAPSULE.

And it should be said clearly that this is not a story about villains. The estate owner is not indifferent, the Spices Board is not negligent, and the importing laboratory is doing exactly the job it was built to do. Each party is discharging a real responsibility competently, and the sprayer falls between all of them: he is not a consumer, so food law does not reach him; his harm is chronic and cumulative rather than acute, so no accident register records it; and the symptoms — headache, nausea, weakness at the end of a long spraying week — ARE INDISTINGUISHABLE FROM THE ORDINARY TIREDNESS OF HARD OUTDOOR WORK. SO EVEN THE MAN HIMSELF DOES NOT KNOW, WHICH IS WHY HE HAS NEVER ASKED FOR THE TEST.

7. The Two Intervals a Continuous Harvest Cannot Honour

The second thread is the operational cause of the first, and of the residue problem as well.

Label condition	What it protects	Why it is breached
Pre-harvest interval	The eater	The capsules ripen when they ripen
Re-entry interval	The worker	The picking round cannot wait
Dose and dilution	Both	Measured by eye, in a bucket
Rotation of actives	Efficacy	Whatever the dealer has in stock

Every pesticide label carries two waiting periods. The PRE-HARVEST INTERVAL says how long after spraying the crop must not be picked, and it protects the eater. THE RE-ENTRY INTERVAL says how long after spraying a person must not go into the block, and it protects the worker. A cardamom estate breaches both routinely, and not through carelessness: THE CROP IS PICKED IN ROUNDS EVERY TWENTY TO THIRTY DAYS FOR MOST OF THE YEAR, SO THE FIELD IS PERMANENTLY INSIDE SOMEBODY'S INTERVAL. Wait out a 21-day PHI and the capsules over-mature and split; honour a 48-hour re-entry and the round slips.

And here is what makes the intervals different from every other rule in this plan: A RESIDUE TEST CAN TELL YOU A CHEMICAL IS PRESENT, BUT NEITHER INTERVAL LEAVES ANY TRACE AT ALL. They are facts about elapsed time, and time does not stay in the capsule. A lot picked six days after a spray can pass an MRL test on dilution alone, and a perfectly managed lot can fail on drift from a neighbour. SO THE ONE CONTROL THAT WOULD ACTUALLY WORK IS A WRITTEN SPRAY-TO-PICK LOG PER BLOCK, KEPT AT THE TIME — because after the fact there is nothing left to find.

8. Operations Plan (spray, wait, pick, cure)

- **Spray.** A dedicated crew of 22, trained and authorised, never drawn from the picking gangs; motorised mist blowers on 18 of 22 by Year 3 to move the operator out of the cloud; dose measured, not judged; every application logged to the block with active, dose, date and time.

- **Wait.** Re-entry interval enforced by the safety officer, who reports to the board; the block is physically flagged and the picking roster is built around the flag rather than the flag around the roster.
- **Pick.** Cardamom in rounds every 20–30 days at capsule maturity; pepper on spike colour; **a round inside a PHI is deferred, and the cost of deferring it is recorded rather than absorbed silently.**
- **Cure.** Cardamom dried at controlled temperature to hold green colour, then garbled and graded; pepper threshed, blanched and dried to 11% moisture.
- **Test.** Residue tested to a single standard for every destination; workers tested for cholinesterase quarterly; both results recorded against the person and the block they came from.

Step	What is recorded	Who is given it
Application	Active, dose, block, date, time, operator	Log, kept at the time
Re-entry clearance	Flag lifted, by whom, when	**Safety officer, not the manager**
Picking round	Days since last application on that block	**On the round sheet**
Cholinesterase	**Reading, trend, and any stand-down**	**The worker himself, in writing**
Residue	Lot result against one standard	Buyer and member grower

> **The operational hinge is a block sprayed on a Thursday with a 21-day pre-harvest interval and a 48-hour re-entry, whose capsules reach picking maturity on the Saturday — two days later, inside both. The trade answer is to pick it, and nothing observable happens: the lot will very probably pass its residue test on dilution, and the pickers will very probably be fine. Ours: the round is deferred nineteen days, 310 kg of the block's 740 kg splits and drops from ₹1,850 to ₹1,520 per kg, and ₹1.02 lakh is lost on one block. Across the year that is ₹0.38 crore — 4,200 kg of cardamom downgraded and 3,900 kg of pepper lost to berry drop — and it is the price of a rule that only means anything on the day it is expensive.**

> **The 640 members matter here more than they do in the accounts. They spray the same chemicals on the same crop with the same knapsacks, and nothing in this plan reaches inside their holdings. What the safety service does is put a trained sprayer, a measured dose and a cholinesterase test within reach of a grower who has never been offered any of the three** — priced at ₹64 lakh, at cost plus a margin, and deliberately never bundled into the price paid for his crop. **Bundling it would make the safest thing on offer look like a deduction, which is exactly how this trade has buried every other cost it did not want to name.**

9. Spices Board, Insecticides Act & Plantation Labour Compliance (India)

Area	Requirement
Spices Board	Registration as grower and exporter; certificate of registration as exporter of spices; quality certification and the Board's residue monitoring programme
Plant protection	**Insecticides Act 1968 and Rules 1971: only registered actives, label claims, prescribed dose, and the pre-harvest and re-entry intervals printed on the label**
Residue	FSSAI Contaminants, Toxins and Residues Regulations for the domestic market; importing-country MRLs for export, **which are materially tighter on several actives used routinely in cardamom**
Occupational	**Factories Act and the Plantations Labour Act require protective equipment and medical examination for workers handling hazardous substances — the obligation exists and the specific test is left unspecified**

Labour	Plantations Labour Act 1951 and state rules: housing, drinking water, crèche, medical facilities; EPF, ESI, Minimum Wages
Food safety	FSSAI licence for curing, garbling, grinding and packing; hygiene and traceability for value-added lines
Environment	Water and Air consents for curing and drying; Biological Diversity Act for shade species; empty-container disposal under the Insecticides Rules
Tax	Income from growing and curing spices is largely agricultural and exempt under section 10(1); the purchased-and-cured and value-added lines are business income; GST applies to processed and branded spice

> **The law here is closer than it is in most of this library — it does require protective equipment and it does require medical examination. What it does not do is name the test. A general duty of medical examination is discharged by an annual physical that would not detect a falling cholinesterase, and a specific duty to run the one test that would is nowhere written down. So the gap is not an absent obligation; IT IS AN OBLIGATION WITH NO INSTRUMENT ATTACHED, WHICH IS DISCHARGED EVERY YEAR BY EVERY ESTATE AND FINDS NOTHING.**

10. Organisation & Manpower Plan

Function	Yr 1	Yr 3	Note
Estate director	1	1	Holds the spray authorisation
Field workers	216	**259**	**Derived, not assumed: 78 ha cardamom at 2.6/ha + 62 ha pepper at 0.9/ha**
Spray crew	18	**22**	**Dedicated and trained; never drawn from picking gangs**
Curing, garbling and grading	34	46	Two shifts in peak rounds
Quality, residue sampling, traceability	7	12	One standard, every destination
Agronomy and member liaison	11	18	640 members
Welfare and safety	6	8	**Reports to the board**
Sales, admin and accounts	9	12	—
Total	**302**	**378**	**118,600 kg; 1,860 lots; 96 workers under exposure monitoring**

> **The 60 people in spraying, quality, agronomy and safety are the commitment made flesh.** Their salaries are **₹1.02 crore of the ₹1.54 crore line — ₹1.70 lakh average CTC across 60** — and the remaining **₹0.52 crore** is mist-blower running cost, PPE consumables, the tests themselves, residue laboratory fees, decontamination and the wash-and-change facilities. **Across the 281 people actually exposed to a chemical here — 22 sprayers and 259 field workers who re-enter blocks — protection costs ₹39,146 per person per year, which is about a fifth of what that worker costs to employ.**

> **That ratio is the number a sceptical reader should sit with. Adding a fifth to the cost of an exposed worker is not a gesture and it is not a line in a sustainability report — it is a decision that shows up in the cost of every**

> **kilogram sold, and it is why an estate can be entirely sincere about worker safety and still not do this.** The spray crew is kept separate from the picking gangs for the same reason a hospital does not rotate its radiographers through the wards: **exposure that is spread thin across everybody is exposure nobody is accountable for and nobody measures.**

11. Implementation Timeline & Milestones

Phase	Months	Milestone
Registrations and finance	0–4	Spices Board registration, FSSAI, term loan sanction, lease registered
Spray safety	2–9	**Dedicated crew formed and trained; mist blowers commissioned; PPE store, wash-and-change and decontamination built**
Exposure monitoring	4–8	District laboratory tie-up; baseline cholinesterase for every exposed worker before the first season
Curing and grading	5–14	Curing houses, controlled-temperature driers, garbling and grading line
Member enrolment	7–22	380 → 640 members; spray-safety service offered alongside purchase
Replanting	9–30	46 ha of cardamom replanted with improved suckers; shade regulated

Milestone that must not slip	Why
Baseline cholinesterase before the first spray	The whole programme is unreadable without it, permanently, for every worker missed
Wash-and-change built before the blowers arrive	A worker who carries the chemical home on his clothes has taken the exposure out of the block and into his house
Safety officer appointed and reporting line fixed before the first peak round	The first time an interval is inconvenient sets the precedent for every time after it
Spray-to-pick log running before member purchase starts	Member crop with no log is crop whose interval cannot be asserted to any buyer
Replanting inside the monsoon window	46 ha is a third of the cardamom area; a late sucker is a year lost

> **The baseline cholinesterase reading is scheduled before the first season and cannot be caught up later. The test is only meaningful against a person's own baseline — population ranges are far too wide to read a single value against — so a worker who is first tested in month fourteen has an unreadable result for the rest of his working life.**

12. Financial Plan (Illustrative)

All figures are illustrative model assumptions in Indian rupees, not forecasts or guarantees. Drivers are shown so every number can be changed.

12.1 Revenue build (₹ lakh)

Stream	Yr 1	Yr 2	Yr 3	Share	GM

Small cardamom, own estate	336	452	544	34.0%	40.0%
Black pepper, own estate and shade trees	204	268	320	20.0%	44.0%
Member cardamom and pepper, cured and graded	194	276	352	22.0%	18.0%
Residue-tested and exposure-audited lots	106	168	224	14.0%	52.0%
Value-added: oil, ground pepper, garbled grades	60	84	96	6.0%	46.0%
Spray-safety and agronomy service to members	40	52	64	4.0%	58.0%
Total	**940**	**1,300**	**1,600**	**100%**	**38.7%**

> Own crop is **54% of revenue and carries the margin**; member purchase is 22% at 18% and exists to fill the curing houses and spread their fixed cost. **The two lines that pay for the programme — the tested and audited lots and the member safety service — are 18% of revenue and a quarter of the gross profit**, and neither of them can exist without the thing the programme produces. **That is the commercial logic here in one sentence: the record is not a cost the business absorbs out of principle, it is the input to the only two streams that price above the auction.**

12.2 What is committed, and what it is measured on

Commitment	Yr 1	Yr 3
Sprayers with fitted PPE / use audited on site / motorised blowers replacing knapsack	100% / 42% / 6	**100% / 100% / 18 of 22**
Cholinesterase tests / workers covered / men stood down on a low reading, on full pay	148 / 62 / 4	**384 / 96 / 11**
Re-entry intervals observed / picking rounds deferred for an interval	71% / 34	**100% / 88**
Spray-to-pick logged by block / lots tested to a single standard for every destination	68% / 54%	**100% / 100%**
Gross profit forgone to deferred rounds (over-maturity and berry drop)	₹0.14cr	**₹0.38cr**
Workers given their own exposure record in writing	62%	**100%**

> **Row two carries the plan and row three pays for it. Eleven men stood down on full pay in a single year is not a failure of the programme — IT IS THE PROGRAMME WORKING, and an estate reporting zero stand-downs across 96 monitored workers is an estate whose readings nobody is acting on.**

12.3 Profit & loss (₹ lakh)

Line	Yr 1	Yr 2	Yr 3
Revenue	940	1,300	1,600
Cost of goods (planting materials, inputs, member purchase, curing)	(575)	(795)	(980)
Gross profit	**365**	**505**	**620**
Sprayer protection: PPE, blowers, wash facilities, re-entry enforcement	(44)	(58)	(72)
Exposure monitoring: testing, records, medical follow-up, paid stand-down	(22)	(30)	(38)
Spray-to-pick logging and residue testing to one standard	(26)	(34)	(44)

Selling and distribution	(28)	(36)	(44)
Estate, curing and welfare overhead	(74)	(90)	(106)
Administration	(30)	(34)	(38)
EBITDA	**141**	**223**	**278**
Depreciation and amortisation	(62)	(74)	(86)
Finance cost	(42)	(48)	(52)
Other income (shade timber, planting material sales)	8	12	16
PBT	**45**	**113**	**156**
Tax (agricultural income largely exempt, ~12% effective)	(5)	(14)	(19)
PAT	**40**	**99**	**137**
Net margin	4.3%	7.6%	**8.6%**
ROCE on ₹9.00cr	8.8%	16.6%	**21.3%**

> **The tax line is low because most of this income is agricultural and exempt under section 10(1), not because of any structuring** — growing and curing one's own spice is agricultural income, while the purchased-and-cured stream and the value-added lines are business income and are taxed. **A reader should note that this cuts both ways: the exemption also means the ₹1.92 crore spent on safety and interval discipline earns no tax shield on the exempt portion, so its after-tax cost is very close to its full cost.**

12.4 Project cost & funding (₹ lakh)

Use of funds	₹L	%	Source of funds	₹L
Cardamom replanting, suckers, shade regulation, 46 ha	234	26%	Promoter equity	315
Curing houses, driers, garbling and grading line	198	22%	Term loan (NABARD-refinanced)	360
Irrigation, sprinklers, water harvesting	135	15%	Spices Board subsidy	135
Worker housing, crèche, medical	108	12%	Working capital limit	90
Spray safety: mist blowers, PPE store, wash-and-change, decontamination	99	11%	—	—
Residue laboratory tie-up, sampling, traceability	54	6%	—	—
Working capital margin and pre-operative	72	8%	—	—
Total	**900**	**100%**	**Total**	**900**

12.5 Sensitivities (₹ crore PAT, Year 3)

Scenario	What changes	PAT
Base case as planned	As above	**₹1.37cr**

Trade-standard practice instead	Pick on the round regardless of interval (+₹0.38cr), spray without re-entry constraint through the peak pest window (+14% own-crop revenue, +₹1.21cr), close the safety, testing and logging programmes (+₹1.54cr): revenue ₹17.59cr at 40.3% gross margin	**₹3.34cr**
Cardamom price −30%	₹8.20cr of cardamom-linked revenue takes the fall to gross profit; this crop genuinely moves that far	(₹0.79cr)
Capsule rot and thrips cutting own yield 22%	Volume loss plus unabsorbed curing overhead, ₹1.12cr	₹0.39cr
An export consignment rejected on residue	Lot value, freight and re-testing, ₹0.68cr in one season	₹0.77cr
Labour cost +12% on a wage revision	₹0.42cr across field, spray crew and curing	₹1.00cr

> **THE SECOND ROW IS THE PLAN IN ONE NUMBER, AND IT IS THE LEAST COMFORTABLE ONE HERE.** Trade-standard practice earns **₹3.34 crore against ₹1.37 crore** — and **the largest single component of that gap is not the safety spending at all. It is the 14% of own-crop yield given up by spraying inside a discipline instead of on demand. That figure is the least certain assumption in this plan and it is stated openly, because a reader who wants to argue with the model should argue with that number and not with the ₹380 test.**

12.6 Volumes and unit economics (Year 3)

Physical driver	Volume	Realisation	Revenue
Own small cardamom, sold bulk	29,400 kg	₹1,850/kg	₹544L
Own black pepper, sold bulk	51,600 kg	₹620/kg	₹320L
Member crop, cured and graded	21,600 kg	₹1,630/kg	₹352L
Residue-tested and exposure-audited lots	**11,200 kg**	**₹2,000/kg**	**₹224L**
Value-added (oil, ground, garbled)	4,800 kg	₹2,000/kg	₹96L
Service to members	640 members	—	₹64L
Total product handled	**118,600 kg**	**₹1,349/kg**	**₹1,600L**

Derived figure	Working	Result
Own yields	29,400 kg / 78 ha cardamom; 51,600 kg / 62 ha pepper	377 and 832 kg/ha
Average lot	118,600 kg across 1,860 picking-round and delivery lots	64 kg
Cost of the commitment per kg handled	₹1.54cr over 118,600 kg	**₹130/kg, 9.6% of revenue**
Cost per exposed worker	₹1.10cr of safety and monitoring over 281 people	**₹39,146 per year**
The test itself	384 tests at ₹380	**₹1.46 lakh**
Acting on the test	11 men stood down four to six weeks on full pay	**₹0.16cr**

> The last two rows are the argument. **The measurement costs ₹1.46 lakh and the consequence of the measurement costs ₹16 lakh — eleven times more. Any explanation for why this test is not standard practice across the Indian spice sector has to account for that ratio, and no explanation that starts with the price of the test can.**

13. Funding Requirement & Bankability

Item	Position
Requirement	**₹9.00cr**: ₹3.15cr promoter equity, ₹3.60cr term loan, ₹1.35cr Spices Board subsidy, ₹0.90cr working capital limit
Security	Leasehold improvements, curing and grading plant, hypothecation of stock and receivables; personal guarantee of the promoter
Debt service	Year 3 EBITDA ₹2.78cr against interest ₹0.52cr and scheduled repayment; DSCR above 2.0x from Year 3
Subsidy risk	₹1.35cr of Spices Board subsidy is reimbursement-based; the model assumes a 10-month lag and the working capital limit carries it
Price risk	**Cardamom is one of the most volatile agricultural prices in India; a lender should stress this book at −30%, where it makes a loss with nothing operationally wrong**
What a lender should test	**Not the PPE inventory — the stand-down register. Equipment issued proves procurement; a man taken off spraying in the middle of a season on full pay proves the programme is real**

Year	EBITDA	Interest	Repayment	DSCR
Year 1	₹1.41cr	₹0.42cr	Moratorium	—
Year 2	₹2.23cr	₹0.48cr	₹0.45cr	2.40x
Year 3	**₹2.78cr**	**₹0.52cr**	**₹0.60cr**	**2.48x**

> **Year 1 carries a moratorium on principal and it is the plan rather than a concession:** 46 hectares of replanted cardamom yield nothing for three years, a member drive from 380 to 640 growers is two seasons of work, and the baseline testing has to be paid for before a single monitored season has run. **What a lender is really underwriting in Year 1 is the promoter's ₹3.15 crore and a curing house that will be full whether or not the cardamom price cooperates.**

14. Risk Analysis & Mitigation

Risk	Impact	Mitigation

The testing points at the person with the smallest exposure	MRLs, Spices Board monitoring and importing-country rejections form a competent apparatus in which **every instrument is aimed at a consumer who will eat a gram of cardamom.** The sprayer wore the chemical for eight hours at close range inside a dense canopy, **at a dose larger by orders of magnitude, and it is measured nowhere.** Nobody decided he did not matter — an MRL is a property of a capsule, so a capsule is what gets tested. **The result is that an estate can pass every consignment, hold every certification, and still be harming the only people in the chain actually at risk**	**MEASURE THE MAN. Cholinesterase falls weeks before an organophosphate does visible harm; the test is standard and costs ₹380. 384 TESTS ACROSS 96 EXPOSED WORKERS COSTS ₹1.46 LAKH — so the price of the test cannot be the reason nobody runs it. THE COST IS ACTING ON IT: 11 MEN STOOD DOWN FROM SPRAYING FOR FOUR TO SIX WEEKS ON FULL PAY IN MID-SEASON, ₹0.16cr. Baseline before the first season, because the reading only means anything against a man's own. Motorised blowers on 18 of 22 to move the operator out of the cloud; PPE use audited on site rather than issued and recorded; the exposure record given to the worker himself. GENERAL RULE: WHERE THE WHOLE APPARATUS OF TESTING POINTS AT THE PERSON WITH THE SMALLEST EXPOSURE, COMPLIANCE AND SAFETY HAVE COME APART — SO MEASURE THE MAN, NOT ONLY THE CAPSULE**
The two intervals a continuous harvest cannot honour	Every label carries a pre-harvest interval protecting the eater and a re-entry interval protecting the worker. **Cardamom is picked in rounds every 20–30 days for most of the year, so the field is permanently inside somebody's interval** — and **neither interval leaves any trace, because both are facts about elapsed time. A lot picked six days after a spray can pass on dilution alone**	**A written spray-to-pick log per block, kept at the time, because after the fact there is nothing to find. Re-entry enforced by a safety officer reporting to the board, not to the manager whose round is delayed. Blocks physically flagged and the picking roster built around the flag. 88 rounds deferred in Year 3 at ₹0.38cr of forgone gross profit — 4,200 kg of cardamom downgraded and 3,900 kg of pepper lost to berry drop**
Cardamom price volatility	Cardamom is among the most volatile agricultural prices in India and moves on things this estate does not influence: a −30% year takes PAT to (₹0.79cr), **a loss with nothing operationally wrong**	Two crops on unrelated price cycles; the tested and audited line at 14% of revenue prices off a verified attribute rather than the auction; value-added lines absorb off-grade capsule; working capital sized to hold stock through a bad auction week rather than sell into it
Capsule rot, thrips and capsule borer	The pests attack the saleable capsule directly, so a bad year is a revenue event rather than a cost event; a 22% yield loss plus unabsorbed curing overhead is ₹1.12cr and takes PAT to ₹0.39cr. **Spraying within a discipline rather than on demand makes this risk genuinely larger, and that is the honest trade-off in this plan**	Shade regulation and drainage as the first line rather than the spray; rotation of actives to slow resistance; irrigation and water harvesting at 15% of project cost; scouting thresholds so applications are triggered by counts rather than by the calendar or the dealer
Export residue rejection	A consignment rejected on an importing-country MRL costs the lot, the freight and the mark — ₹0.68cr in a season, taking PAT to ₹0.77cr	One residue standard for every destination, tested by lot, so a domestic lot and an export lot are the same lot; the spray-to-pick log makes a rejection traceable to a block and a date instead of unexplainable
Labour cost and availability	A 12% wage revision costs ₹0.42cr; picking labour is scarce and the trained spray crew scarcer	Housing, crèche and medical at 12% of project cost; the safety programme itself is a retention argument for the crew

Member concentration	640 members can sell elsewhere for a better day rate	Curing, grading and the safety service are what they cannot get elsewhere

15. SWOT Analysis

Strengths	Weaknesses
Field, curing, garbling and grading in one entity, so the spray-to-pick log and the exposure record can actually be produced; a dedicated trained spray crew rather than picking gangs handed a knapsack; a safety officer reporting to the board; two crops on unrelated price cycles; 640 members who bring volume and a channel for the safety practice	Cardamom price volatility is severe and unhedgeable; the safety and interval discipline costs ₹1.92cr a year against ₹1.37cr of PAT; the 14% yield assumption in the trade-standard comparison is the least certain number in the plan; ₹1.35cr of subsidy carried as a receivable
Opportunities	**Threats**
Buyers with genuine social-audit requirements have nothing to point at on worker exposure and would pay for a record that exists; the exposure programme is a recruitment advantage for scarce spray crew; the member service is a margin line rather than a cost centre; value-added absorbs off-grade capsule	A neighbouring estate that sprays on demand simply out-yields this one in a heavy pest year; auction price collapse; climate variability in the Cardamom Hills; a well-capitalised competitor could copy the programme and outspend it

> **The honest reading is that this plan trades yield for exposure, and the trade is real rather than rhetorical. Nothing here makes the estate more profitable than a neighbour who sprays on demand and picks on the round — it makes it an estate whose workers can be shown what it has done to them, which is a different claim and a slower one.**

16. Recommended AiSevak Tools for This Business

- **Business plan and project report generator** — for the Spices Board subsidy application and the term loan file.
- **Compliance calendar** — Spices Board returns, FSSAI renewal, Insecticides Act records, EPF and ESI, Plantations Labour Act registers.
- **Labour and payroll toolkit** — muster rolls, welfare-facility records, and the medical-examination register that the exposure programme sits inside.
- **Export documentation helper** — Spices Board certificate of registration as exporter, phytosanitary and residue certificates, certificates of origin.
- **GST and invoicing helper** — agricultural versus processed treatment, member purchase vouchers, reverse charge.
- **Cost and pricing calculator** — cost per kg by block and by round, drying loss, garbling outturn.
- **Contract and terms drafting helper** — the member supply agreement and the published safety standard, which only means anything written down before the first busy afternoon.

> Every tool above is **free to use on AiSevak and needs no signup to explore.** The toolkit link at the end of this plan opens the whole plantation set; each tool guides you step by step.

17. Key Assumptions & Notes

- **All financials are illustrative model assumptions, not forecasts, projections or guarantees.** Revenue, planted area, yields, cardamom and pepper prices, spray frequency and stand-down rates are editable inputs; outcomes depend on auction prices, pest pressure, weather and labour availability. Figures are in Indian rupees. **This plan is the second in vertical 55 and inherits its ten anchor rules (a)–(j).**

- **The central finding is that the entire apparatus of testing in this industry points at the person with the smallest exposure.** MRLs, Spices Board monitoring and importing-country rejections protect a consumer who will eat about a gram of cardamom. **The sprayer carried the same chemical for eight hours at close range inside a dense canopy, at a dose larger by orders of magnitude, and no test anywhere measures him.**
- **This is not concealment; it is an apparatus built around a product rather than a process.** An MRL is a property of a capsule, so a capsule is what gets tested. **The consequence is that an estate can pass every consignment, hold every certification, and still be harming the only people in the chain who are actually at risk.**
- **The remedy already exists and is not expensive.** Serum cholinesterase falls measurably weeks before an organophosphate does visible harm; the test is standard and costs about ₹380. **384 tests across 96 exposed workers costs ₹1.46 lakh. Acting on the results — 11 men stood down four to six weeks on full pay in mid-season — costs ₹0.16 crore, eleven times more, AND THAT RATIO IS THE ONLY HONEST EXPLANATION FOR WHY THE TEST IS NOT STANDARD PRACTICE. GENERAL RULE: WHERE THE WHOLE APPARATUS OF TESTING POINTS AT THE PERSON WITH THE SMALLEST EXPOSURE, COMPLIANCE AND SAFETY HAVE COME APART — SO MEASURE THE MAN, NOT ONLY THE CAPSULE.**
- **The second thread is the two intervals a continuous harvest cannot honour.** The pre-harvest interval protects the eater and the re-entry interval protects the worker, and cardamom picked in rounds every 20–30 days is permanently inside one of them. **Neither leaves a trace, because both are facts about elapsed time — so a written spray-to-pick log kept at the moment is the only control that works.** 88 rounds deferred in Year 3 at ₹0.38cr forgone.
- **Volumes and unit economics.** 118,600 kg across 1,860 lots: 29,400 kg own cardamom at ₹1,850/kg and 51,600 kg own pepper at ₹620/kg sold bulk, 21,600 kg of member crop cured at ₹1,630/kg, 11,200 kg tested and audited at ₹2,000/kg. Field headcount is derived, not assumed: 78 ha at 2.6/ha plus 62 ha at 0.9/ha = 259. Protection costs ₹39,146 per exposed worker per year across 281 people — about a fifth of what that worker costs to employ.
- **The honest version is the less profitable one, and here the reason is uncomfortable.** Trade-standard practice earns ₹3.34cr against ₹1.37cr, and **the largest component of the gap is not the safety spending but 14% of own-crop yield given up by spraying within a discipline rather than on demand.** **That 14% is the least certain assumption in this plan and is stated openly so that a reader can argue with it.**
- **Compliance and professional advice.** Spices Board registration as grower and exporter and its residue monitoring programme; **the Insecticides Act 1968 and Rules 1971, under which the pre-harvest and re-entry intervals are printed on every label**; FSSAI Contaminants, Toxins and Residues Regulations domestically and importing-country MRLs for export, which are materially tighter on several actives routine in cardamom; **the Factories Act and Plantations Labour Act, which require protective equipment and medical examination for workers handling hazardous substances but DO NOT NAME THE TEST — so a general duty is discharged annually by every estate and finds nothing**; EPF, ESI and Minimum Wages; Water and Air consents; empty-container disposal under the Insecticides Rules; section 10(1) treatment of agricultural income and GST on processed spice. Professional advice should be taken on lease and Spices Board registration, the agricultural-income split, occupational health record-keeping and its employment-law consequences, and export residue documentation.

▶ Use these tools now — free on AiSevak

Every tool referenced in this plan is available on **aisevak.in**. Open the **Plantation and Estate Agriculture toolkit** to browse and use them all at **https://aisevak.in/verticals/plantation** — or go straight to any specific tool at **https://aisevak.in/service/<tool-name>**. No signup needed to explore; each tool guides you step by step.