

Package of Practice

Citronella Cultivation



ADVANCING
NORTH EAST

An Initiative of North Eastern Council (NEC)

Implemented by North Eastern Development Finance Corporation Limited (NEDFi)

CITRONELLA

SCOPE OF THE CROP: Essential oils have gradually treaded beyond their conventional application in therapeutics and aromatherapy. The global food sector and beverage sector is witnessing an increasing adoption of citronella oil in production of new beverages. Increasing applications of perfumery chemicals such as geraniol have a great influence on the global scales of citronella oil. As reported, by the end of 2022, more than 3/4th value of the global citronella oil market will be procured from sales of naturally-sourced citronella oil.

VARIETIES: Mandakini, Manjusha, Manjiri, CIMAP Bio-13, Java-2 and Jorhat-2

BACKGROUND OF THE CROP:

SCIENTIFIC NAME: *Cymbopogon winterianus*

FAMILY: Poaceae

It is a tufted aromatic perennial herb with fibrous roots, smooth leaves and bearing a large inflorescence.

ESSENTIAL PARTS: Citronella oil and Citronella leaves

CONSTITUENTS OF ESSENTIAL OIL: Citronella oil contains geraniol (18-20 %), limonene (9-11 %), methyl iso-eugenol (7-11 %), citronellol (6-8 %) and citronellal (5-15%).

OIL EXTRACTION: Oil can be obtained by steam distillation of dried grass for 12-24 hours. Yield is about 200 kg per hectare and average recovery of citronella oil is 1%.

USES AND HEALTH BENEFITS:

- Used as an insect repellent and antifungal agent
- Oil is used as a source of perfumery chemicals such as citronellol, citronellal and geraniol. These chemicals find extensive use in soaps, candles, perfumery, cosmetics and flavouring industries.
- Citronella provides relief from spasms, helps remove toxins, reduces fever, prevents fungal growth, helps fight depression, as a diuretic etc

CHALLENGES:

- The plant needs bright sunshine for development of essential oil
- Areas having less rainfall can provide supplemental irrigation during citronella production.
- Java citronella requires sufficient moisture for good growth and yield of leaves.

CULTIVATION AND MANAGEMENT:

- **SOIL:** Sandy loam soil with abundant organic matter is suitable with pH: 5.8-6.0

- **CLIMATE:** It requires abundant moisture and sunshine with good rainfall of about 2000-2500 mm
- **PROPAGATION:** It is propagated vegetatively by slips by splitting well-grown clumps. The clump is separated into number of slips and each slip contain 1-3 tillers
- **SEASON OF PLANTING:** Onset of monsoon
- **SPACING:** 60cm X 60 cm apart
- **IRRIGATION:** Irrigation should be provided twice a week during the first month of planting and thereafter once in 5 days.
- **MANURING:** Under Northeast India and North India, 80-120 kg N /ha/ year is recommended and 40/kg/ ha of phosphorus and potassium each.
- **HARVESTING:** Harvesting is done by a sharp sickle at about 20-45 cm above the ground. The leaves are ready for first harvest about 6 months after planting. The second and subsequent harvests can be done 2.5-3 months interval. Under favourable conditions, upto 4 harvests can be obtained in a year.
- **YIELD:** The yield of fresh leaves is about 15-20 tonnes /in first year and 20-25 tonnes /ha in second as well as third year. The yield of oil obtained during first year is about 100 kg/ha and 150 kg/ha during second and third years. Under very favourable conditions, yield of 200-250 kg/ha can be obtained.
- **DISEASES:** Generally, leaf bight and anthracnose affects citronella. Dithane M-45 or Z-78 sprays control leaf blight and anthracnose can be controlled by application of Dithiocarbamate.



FIG 1: CITRONELLA LEAVES



FIG 2: CITRONELLA OIL

SOURCE: GOOGLE IMAGE

FARM ECONOMICS:

FARM ECONOMICS OF CITRONELLA CULTIVATION IN 1 ACRE AREA		
	CAPITAL INVESTMENT	
SL NO	PARAMETERS	APPROX AMOUNT IN Rs
A	INITIAL EXPENSES	
1	LAND HOLDING	OWN LAND
2	LAND DIGGING	20,000
3	FENCING	10,000
4	COST OF POWER TILLER (SELF DRIVEN)	1,60,000
5	SOIL LEVELLING AND TILLERING INCLUDING DIESEL COST	15,000

6	STOREHOUSE CONSTRUCTION COST 100 SQ FT @ 200/-PER SQ FT	20,000
	TOTAL	2,25,000
B	IRRIGATION AND IMPLEMENTS	
1	TUBEWELL/ SUBMERSIBLE PUMP COST	10,000
2	PUMP AND ELECTRICAL INSTALLATION	20,000
3	AGRICULTURAL EQUIPMENTS	4,000
4	DRYING PLATFORM (OIL EXTRACTION)	25,000
	TOTAL	59,000
	TOTAL CAPITAL INVESTMENT	2,84,000
	RECURRING COST	
C	ESSENTIAL CREDENTIALS	
1	COST OF LABOUR (1. LAND PREPARATION COST-12 MANDAYS@ 350/-PER MANDAYS, 2. PLANTING-12 MANDAYS @350/-PER MANDAYS, 3.FENCING-12 MANDAYS @ 350/-PER MANDAYS, 4. HARVESTING (5 TIMES A YEAR /2 TIMES IN 1ST YEAR)-12MANDAYS @ 350/-PER MANDAYS PER HARVESTING, TOTAL- 60 MANDAYS, 5. OIL EXTRACTION-12 MANAYS @ 350/-PER MAN DAYS FROM 2ND YEAR	21000
2	FERTILISER AND OTHER AGRO CHEMICALS LUMPSUM	15000
	TOTAL	36,000
D	PLANTING AND MULCHING MATERIAL	
1	CITRONELLA SLIPS (20,000 SLIPS / ACRE) (3/- /SLIPS)	60,000
2	MULCHING (USING BLACK POLYTHENE MULCH)	20,000
3	MISCELLANEOUS	20,000
	TOTAL	1,00,000
	TOTAL RECURRING COST	1,36,000
	GRAND TOTAL (CAPITAL COST + RECURRING COST)	4,20,000
	INCOME STATEMENT	
SL NO	PARAMETERS	APPROX AMOUNT IN Rs
1	TOTAL PRODUCTION OF OIL - 90 KG/ ACRE AFTER 1 YEAR, SELLING PRICE-1100/ KG	99,000

2	FRESH HERB PRODUCTION, 8 TONNES/ ACRE AFTER 3-4 CUTTINGS IN A YEAR, SELLING PRICE OF HERB- 200 / KG (deduct the amount procured after sales of oil as, the total 8 ton of herbs consists of 90kg oil in it)	1501000
	TOTAL INCOME	16,00,000
	PROFIT AND LOSS STATEMENT	
SL NO	PARAMETERS	APPROXAMOUNT IN Rs
1	CAPITAL INVESTMENT	2,84,000
2	RECURRING COST	1,36,000
3	TOTAL INVESTMENT UPTO 1 YEAR	4,20,000
4	TOTAL INCOME	16,00,000
5	TOTAL PROFIT AFTER 1 YEAR	14,64,000

NOTE: Citronella can be harvested upto 3-4 times in a year under favourable conditions and first harvest can be taken 6 months after planting

MEANS OF FINANCE

Particulars	Amount In Rs.....
Margin Money (25%)	105000
Bank Loan (75%)	315000
Total Project Cost	420000

PROJECTED PROFITABILITY STATEMENT

(Amount in Rs.)

	PARTICULARS/YEAR	1ST YEAR	2ND YEAR	3RD YEAR
A	INCOME			
	TOTAL PRODUCTION OF OIL - 90 KG/ ACRE AFTER 1 YEAR, SELLING PRICE-1100/ KG	0	99,000	99,000
	FRESH HERB PRODUCTION, 8 TONNES/ ACRE AFTER 3-4 CUTTINGS FROM 2ND YEAR, SELLING PRICE OF HERB- 200 / KG (deduct the amount procured after sales of oil as, the total 8 ton of herbs consists of 90kg oil in it) (25% PRODUCTION IN 1ST YEAR)	400000	15,01,000	15,01,000

Model Project Profile

	TOTAL INCOME	400000	16,00,000	16,00,000
B	EXPENDITURE			
B-1	CITRONELLA SLIPS (20,000 SLIPS / ACRE) (3/- /SLIPS)	60,000		
B-2	MULCHING (USING BLACK POLYTHENE MULCH)	20,000		
B-3	MISCELLANEOUS	20,000	5000	5000
B-4	LABOUR (1. 1. LAND PREPARATION COST-12 MANDAYS, 2. PLANTING-12 MANDAYS 3.FENCING-12 MANDAYS , 4. HARVESTING (5 TIMES A YEAR /2 TIMES IN 1ST YEAR)-12MANDAYS PER HARVESTING TOTAL-60 MANDAYS@ RS.350/- , (1ST YEAR) 5. OIL EXTRACTION-12 MANAYS @ 350/-PER MAN DAYS FROM 2ND YEAR (TOT :72 MANDAYS FROM 2ND YR)	21,000	25200	25200
B-5	FERTILISER AND OTHER AGRO CHEMICALS LUMPSUM	15,000	15,000	15,000
	TOTAL EXPENDITURE	1,36,000	45200	45200
C	GROSS PROFIT (A-B)	2,64,000	15,54,800	1554800
D	Interest on bank loan	26775	25288	12644
E	Depreciation (10%-wdvm)	23900	21510	19359
F	Total D+E	50675	46798	32003
G	Net profit (C-F)	213325	1508003	1522797

FINANCIAL ANALYSIS

(Amount in Rs.)

Particular / Year	1st year	2nd year	3rd year
Expenses			
Initial Cost	2,84,000		
Recurring cost	1,36,000	45200	45200
TOTAL COST	420000	45200	45200
BENEFIT			
TOTAL BENEFIT	400000	1600000	1600000
NET BENEFIT	-20000	1554800	1554800
DF @ 15 %	0.87	0.76	0.66
PWC	365400	34352	29832
PWB	348000	1216000	1056000

Model Project Profile

NPW	2190416		
BCR (@15%DF)	6.1:1		
DF@50%		0.44	0.3
PWC		19888	13560
PWB		704000	480000
NPW	1137152		
IRR (%)	87.78		

REPAYMENT SCHEDULE

PROJECT PERIOD : 3 YEARS

MORATORIM PERIOD : 10 MONTHS INCLUDING PROJECT PERIOD

BANK ROI : 8.5%

(Amount in Rs.)

PARTICULARS	1st year	2nd year	3rd year
Opening Balance	315000	297500	148750
Interest @8.50 p a	26775	25288	12644
Principal	17500	148750	148750
Total Return (Principal + Interest)	44275	174038	161394
Closing Balance	297500	148750	NIL

DEBT SERVICE COVERAGE RATIO

(Amount in Rs.)

PARTICULARS/ YEAR	1ST	2ND	3RD
(A) Total Income:			
Net Profit	213325	1508003	1522797
Depreciation	23900	21510	19359
Interest on loan	26775	25288	12644
Total=	264000	1554800	1554800
(B) Total Commitment:			
Bank Loan	17500	148750	148750
Interest loan	26775	25288	12644

Model Project Profile

Total =	44275	174038	161394
DSCR (A/B)=	5.96	8.93	9.63
Average DSCR=	8.18		

DEPRECIATION SCHEDULE

(Amount in Rs.

Particulars	1st yr	2nd yr	3rd yr
Asset Value (On ITEM : A(4,6,) & B of capital cost)	239000	215100	193590
Depreciated value (10%-WDVM)	23900	21510	19359
Closing value	215100	193590	174231