

Package of Practice

Vetiver Cultivation



ADVANCING
NORTH EAST

An Initiative of North Eastern Council (NEC)

Implemented by North Eastern Development Finance Corporation Limited (NEDFi)

VETIVER



Figure 1 : Vetiver roots and oil

SCOPE OF THE CROP:

Vetiver has proven itself as a very cost-effective method to reduce soil erosion and stabilize steep slopes. The USDA Natural Resources Conservation Service has included the planting of vetiver grass as a best management practice (BMP) for Hawaii farms and is recommending usage within conservation plans. NE states of India offers immense scope for production of medicinal plants like that of vetiver. These plants can be grown in small plantations, large farms and also as single species, intercrop etc. They can also be incorporated in agro-forestry models. A large variation in climatic and soil conditions in northeastern India sustain a variety of medicinal plant species, which may be cultivated according to their niche.

BACKGROUND OF THE CROP:

Scientific name: *Vetiveria zizanioides* (Linn) Nash. (2n=20)

Family: Poaceae

Local name: *Usirah, Usira, Vira* (Sanskrit), *Khas, Khus* (Hindi); *Valo* (Gujarati); *Khas-khas* (Bengali); *Ramacham* (Malayalam); *Illamichamber* (Tamil); *Vattiveru* (Telugu); *Panni* (Punjabi); *Vala* (Marathi); *Khas* (Urdu)

ESSENTIAL PARTS: Leaves, roots, the commercial essential oil of vetiver is obtained by distillation of the roots

MAJOR PRODUCTION AREAS: Vetiver is indigenous to India, Pakistan, Bangladesh, Sri Lanka and Malaysia. Its main producers are Tropical Asia, Africa, Australia, Haiti, Indonesia, Guatemala, India, China and Brazil. Crop is also cultivated in Indonesia, Malaysia, Philippines, Japan, Angola, Belgian Congo, Dominican Republic, Argentina, British Guiana, Jamaica, Mauritius and Honduras. Worldwide production is estimated to about 250 tons per annum.

In India, it is seen growing wild throughout Punjab, Uttar Pradesh and Assam.

MARKET POTENTIAL: As its domestic demand is quite large, importers, buyers within the country, processors etc throng the markets for procurement of this plant every year. Vetiver farming is cost-effective farming that provides a high profit. Vetiver oil produced in North India is of premium quality and fetches a very high price in international market.

CHARACTERISTICS OF STRAINS FOR CULTIVATION :

- In India, two types of vetiver namely '**South Indian**' and '**North Indian**' are generally under cultivation.
- North Indian types yields superior quality oil but its rooting finds to be shallow, especially in damp ground.
- South Indian types are the cultivated types with a thicker stem, less branching roots and wider leaves.

MEDICINAL USES:

- **Vetiver** is sometimes applied directly to the skin for relieving stress, as well as for emotional traumas and shock, lice, and repelling insects.
- It is also used for arthritis, stings, and burns.

- **Vetiver** is sometimes inhaled as aromatherapy for nervousness, insomnia, and joint and muscle pain.

CHALLENGES :

- Light soils should be avoided as the roots grown in this soil produce very low percentage of vetiver oil
- Root dormancy occurs when temperature goes below 5 °C
- Under frosty conditions, shoots become dormant and purple, or even die, but the underground growing points survive and can regrow quickly if the conditions improve.
- Shading affects vetiver's growth.

PLANTATION AND MANAGEMENT:

- **SOIL:** Vetiver can be grown on almost every kind of soil. Well drained sandy loam and red lateritic soils rich in organic matter are considered to be ideal for cultivation. It can be grown in wide pH range even in saline and alkaline soils with a pH of 8.5 to 10
- **CLIMATE:** Vetiver is tolerant to a wide range of temperature ranging from -15°C to +55°C, depending on growing region. The optimal soil temperature for root growth is 25°C
- **PROPAGATION:** Vetiver can be propagated either by seeds or slips, but slips are commonly used. The cultivated accessions which are propagated through vegetative means show limited variation, whereas, seed propagation is used for breeding new varieties.
- **PLANTING TIME:** The most suitable time for planting vetiver is June – August with the onset of monsoon. In South Indian conditions, where diurnal variation in temperature is not significant and monsoon sets in early and the optimum planting time is February-April.
- **FERTILIZER:** Fertilizer application for vetiver is not practiced in fertile soils. But, on poor soils, 10 tons of FYM along with 25-50 kg/ha each of N, P₂O₅ can be applied. Care should be taken to apply N in 2-3 split doses. N:P₂O₅:K₂O dose of 60:22.5:22.5 is recommended in Kerala. Application of 60 kg P₂O₅ /ha is suggested for vetiver cultivation in Central Uttar Pradesh.
- **IRRIGATION:** In the areas where rainfall is good, well distributed over the year and humidity is high supplementary irrigation is not necessary. However, in dry areas about 8-10 irrigations will be required to get the optimum yield. Apply much to conserve soil moisture.

➤ **PEST AND DISEASES:** Leaf blight , beetles , stem borer , nematodes

HARVESTING AND YIELD: Roots are harvested after 15-24 months of planting, but to obtain good quality oil it should be harvested at 18 months. Though, early harvesting gives higher essential oil yield, oil will be of low specific gravity which also lack valuable high boiling constituents.

On an average the root yield may range from 3-4 tonnes per hectare from a two year old plantation. Oil recovery from fresh roots is 0.3-0.8% and from dried roots it is 0.5-3.0% depending upon the duration of distillation. On an average the oil recovery is around 1% on dry weight basis and 10-30 kg oil is obtained per hectare per crop.

FARM ECONOMICS OF VETIVER CULTIVATION IN 1 ACRE LAND AREA

SL NO	PARAMETERS	APPROX AMOUNT IN Rs
CAPITAL INVESTMENT		
A	INITIAL EXPENSES	
1	LAND HOLDING	Own land
2	LAND DIGGING	20,000
3	FENCING	5,000
4	COST OF POWER TILLER (self driven)	160000
5	SOIL LEVELLING, TILLERING INCLUDING DIESEL COST	15000
6	STOREHOUSE CONSTRUCTION COST 100SQ FT@200/-PER SQ FT	20,000
7	DISTILLATION UNIT	1,02,000
	TOTAL	3,22,000
B	IRRIGATION AND IMPLEMENTS	
1	TUBEWELL/SUBMERSIBLE PUMP COST	10,000
2	PUMP AND ELECTRICAL INSTALLATION	20,000
3	AGRICULTURAL EQUIPMENTS	4,000
	TOTAL	34,000
	TOTAL CAPITAL INVESTMENT	3,56,000
	RECURRING COST	
C	ESSENTIAL CREDENTIALS	
1	COST OF LABOUR (1. LAND PREPARATION COST-12 MANDAYS@350/- PER MAN DAYS, 2.PLANTING-12 MAN DAYS@350/- PER MAN DAYS, 3. FENCING-12 MAN DAYS@350/- PER MAN DAYS, SO TOTAL-36 MAN DAYS	12,600

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2	FERTILISER AND OTHER CHEMICALS	30,000
D	TOTAL	42,600
1	SLIPS COST (PER SLIP Rs 2) (81000 slips/acre)	1,62,000
2	MULCHING BY USING BLACK POLYTHENE MULCH	10,000
3	MISCELLANEOUS LUMP SUM	5,000
	TOTAL	1,77,000
	TOTAL RECURRING COST	2,19,600
	GRAND TOTAL(CAPITAL COST+ RECURRING COST)	5,75,600
	INCOME STATEMENT	
SL NO	PARAMETERS	APPROX AMOUNT (Rs)
1	TOTAL PRODUCTION OF ROOTS- 1620KG/ACRE TWO YEAR, SELLING PRICE-Rs1000/KG	16,20,000
	PROFIT AND LOSS STATEMENT	
SL NO	PARAMETERS	APPROX AMOUNT (Rs)
1	CAPITAL INVESTMENT	3,56,000
2	RECURRING COST	2,19,600
3	TOTAL INVESTMENT UPTO 2 YEAR	5,75,600
4	TOTAL INCOME	1620000
5	TOTAL PROFIT AFTER 2 YEAR	10,44,400
NOTE	Harvesting can be done from 1st year of planting until 3 subsequent years. The yield is maximum from 2 year onwards	

MEANS OF FINANCE

Particulars	Amount In Rs.....
Margin Money (25%)	143900
Bank Loan (75%)	431700
Total Project Cost	575600

PROJECTED PROFITABILITY STATEMENT

(Amount in Rs.....)

SL No	PARTICULARS/YEAR	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR
A	INCOME				

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	TOTAL PRODUCTION OF ROOTS- 1620KG/ACRE TWO YEAR, SELLING PRICE-Rs1000/KG	0	1620000	1620000	1620000
	TOTAL INCOME	0	1620000	1620000	1620000
B	EXPENDITURE				
B-1	SLIPS COST (PER SLIP Rs 2) (81000 slips/acre)	1,62,000			
B-2	MULCHING BY USING BLACK POLYTHENE MULCH	10,000			
B-3	MISCELLANEOUS LUMPSUM	5,000	5000	5000	5000
B-4	COST OF LABOUR (1. LAND PREPARATION COST-12 MANDAYS@350/- PER MAN DAYS, 2.PLANTING-12 MAN DAYS@350/- PER MAN DAYS, 3. FENCING-12 MAN DAYS@350/- PER MAN DAYS, SO TOTAL-36 MAN DAYS (for 1st yr), 30 MANDAYS IN REST YEARS	12,600	10500	10500	10500
B-5	FERTILISER AND OTHER CHEMICALS	30,000	30,000	30,000	30,000
	TOTAL EXPENDITURE	2,19,600	45500	45500	45500
C	GROSS PROFIT (A-B)	-219600	1574500	1574500	1574500
D	Interest on bank loan	0	73389	24463	12232
E	Depreciation (10%-wdvm)	31600	28440	25596	23036
F	Total D+E	31600	101829	50059	35268
G	Net profit (C-F)	-251200	1472671	1524441	1539232

FINANCIAL ANALYSIS

(Amount in Rs.....)

Particular / Year	1st year	2nd year	3rd year	4th year
Expenses				
Initial Cost	3,56,000			
Recurring cost	2,19,600	45500	45500	45500
TOTAL COST	575600	45500	45500	45500
BENEFIT				
TOTAL BENEFIT	0	1620000	1620000	1620000

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NET BENEFIT	-575600	1574500	1574500	1574500
DF @ 15 %	0.87	0.76	0.66	0.57
PWC	500772	34580	30030	25935
PWB	0	1231200	1069200	923400
NPW	2632483			
BCR (@15%DF)	5.45:1			
DF@50%	0.67	0.44	0.3	0.2
PWC	385652	20020	13650	9100
PWB	0	712800	486000	324000
NPW	1094378			
IRR (%)	74.9			

REPAYMENT SCHEDULE

Project Period : 4 years

Moratorium period : 1 year

Bank ROI: 8.5%

(Amount in Rs.....)

PARTICULARS	1st year	2nd year	3rd year	4th year
Opening Balance	431700	431700	287800	143900
Interest @8.50 p a	0	36695	24463	12232
1st Yr Interest Deferred to 2nd year		36695		
Principal	0	143900	143900	143900
Total Return (Principal + Interest)	0	217289	168363	156132
Closing Balance	431700	287800	143900	NIL

DEBT SERVICE COVERAGE RATIO

(Amount in Rs.....)

PARTICULARS/ YEAR	1ST	2ND	3 RD	4TH
(A) Total Income:				
Net Profit	-251200	1472671	1524441	1539232
Depreciation	31600	28440	25596	23036

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Interest on loan	0	73389	24463	12232
Total=	-219600	1574500	1574500	1574500
(B) Total Commitment:				
Bank Loan	0	143900	143900	143900
Interest loan	0	73389	24463	12232
Total =	0	217289	168363	156132
DSCR (A/B)=	0.00	7.25	9.35	10.08
Average DSCR=	6.67			

DEPRECIATION SCHEDULE

(Amount in Rs.....)

Particulars	1st yr	2nd yr	3rd yr	4th yr
Asset Value (On ITEM : A(4,6,7) & B of capital cost)	316000	284400	255960	230364
Depreciated value (10%-WDVM)	31600	28440	25596	23036
Closing value	284400	255960	230364	207328