

**Package of Practice**

# **Stevia Cultivation**



**ADVANCING**  
**NORTH EAST**

**An Initiative of North Eastern Council (NEC)**

**Implemented by North Eastern Development Finance Corporation Limited (NEDFi)**

## Stevia



Figure 1 : Stevia products

**SOURCE: GOOGLE IMAGE**

### SCOPE OF THE CROP:

- Global stevia market is rapidly increasing. In 2014, the global consumption of stevia as food ingredient was estimated at 5,100 tonnes, and it is projected to reach 8,507 tonnes by 2022.
- Though, Japan and Korea are the main consumers of stevia, China is the largest producer in the world. In India, CSIR-IHBT has successfully introduced stevia as commercial crop with standardized agro-technology package for better productivity and quality.
- Stevia is grown in states like Punjab, Haryana, Uttar Pradesh, J&K, Himachal Pradesh, Karnataka and Uttarakhand.

### BACKGROUND OF THE CROP:

**Scientific name:** *Stevia rebaudiana*, Bertoni

**Family:** Asteraceae

It is a perennial herb belonging to the Asteraceae family. It is native to South America and is known as sweet herb of Paraguay. The plant is widely known for the presence of sweet-tasting and low-calorie diterpene steviol glycosides (SGs) present in its leaves. Amongst the known SGs, the most abundant glycosides in stevia leaf are “stevioside” and several types of rebaudiosides, which are about 300 times sweeter than sucrose.

**ESSENTIAL PARTS:** Leaves

## **STEVIA: USED IN FOOD PRODUCTS**

- Diabetic diets
- Table top sweetener for tea, coffee etc.
- Soft drinks, cordials, fruit juices, sherbets
- Ice-creams, yoghurts, jams, jellies, sauces, pickles
- Cakes, biscuits, pastries, pies, desserts
- Chewing gum, toothpaste, mouthwashes

## **MEDICINAL USES:**

- Hypertension treatment
- Blood pressure control
- Source of antioxidants
- Anti-tooth decay
- Anti-obesity and weight loss programs
- Pill and capsule additive to improve taste

## **CHALLENGES:**

- Herb is sensitive to day-length , frost and water-logging
- Less resistant to drought
- Initial growth is slow
- Affected by weed in the initial stages
- Seed germination slow
- The plant is less tolerant to high pH

## **PLANTATION AND MANAGEMENT:**

- **SOIL:** Stevia grows well in sandy loam soil with pH range of 5.0-7.5, and requires a warm and sunny weather. Soils should be well drained but with reasonable water holding capacity.
- **CLIMATE:** Stevia is a short-day plant grown under tropical and sub-tropical conditions. Long day-length is helpful for higher leaf yield. Relative humidity of 65-80% is suitable for proper growth and development.
- **PROPAGATION:** Stevia can be propagated by seeds, division of suckers, vegetative cuttings and tissue culture. Propagation through seeds is easy and economically more viable. Clonal propagation through cuttings and tissue culture provides uniform quality of produce, but the cost of planting material is high.
- **PLANTING TIME:** Generally, 50-60 days old seedlings with about 15 cm height, or rooted cuttings or tissue culture raised hardened plants are transplanted in the field during the months of March-April or June-July avoiding the periods of extreme temperatures.

- **FERTILIZER:** Stevia requires a moderate level of nutrients. Therefore, among agronomic practices, nutrient management is the most important factor for higher leaf yield and quality of stevia. Organic manures and chemical fertilizers are applied for maintaining soil fertility. Fertilizer dose of 100-120 kg nitrogen, 40-50 kg phosphorus and 50-60 kg potassium per hectare should be applied. For organic farming, well rotten farm yard manure @ 20-30 tonnes/ hectare is required. The requirement of manure and fertilizer doses depend upon cropping mode and soil fertility status.
- **IRRIGATION:** First irrigation is given immediately after transplanting and subsequently after three to five days interval till establishment of the plants. Thereafter, watering up to a depth of 5 cm is done weekly until monsoon rains commence. Frequent irrigation is required to maintain soil moisture during hot summer.
- **PEST AND DISEASES:** Young leaves and buds are occasionally attacked by caterpillars, which can be controlled with the spray of cypermethrin / deltamethrin / quinalphos @ 1.5-2.0 ml /L of water at 15 days interval.  
Spray of bavistin and dithane M-45 alternatively @ 2.0 g/L of water controls the spread of leaf diseases. For the control of root rot, drenching with bavistin @ 2.0 g/L of water is recommended.
- **HARVESTING AND YIELD:** Time of harvesting depends on growing season and region. Harvesting should be done manually at 10-15 cm height from the ground level. First harvest is taken at 90-110 days after transplanting. Subsequently, second harvest is taken after 50-65 days of the first harvest before the onset of flowering. In case of late transplanting, single cut is taken after 3-4 months. Since, stevia is a perennial crop, the production may be taken up to 4-5 years from the same plantation.
- In the first year, average fresh biomass yield of 2.0-2.5 tonnes/acre is obtained out of two harvests and increased in subsequent years up to 4.0-4.5 tonnes/acre. On an average dry leaf yield of stevia is 3.0-3.5 tonnes/acre/year. Maximum quantity of leaf is produced in 3rd or 4th year of planting. The average net income from stevia cultivation has been observed to be 2.0-2.5 times higher than traditional crops.

#### FARM ECONOMICS,

	FARM ECONOMICS OF STEVIA CULTIVATION IN 1 ACRE	
	FARM ECONOMICS OF STEVIA CULTIVATION IN 1 ACRE LAND AREA	
	CAPITAL INVESTMENT	
SL NO	PARAMETERS	APP
A	INITIAL EXPENSES	
1	LAND HOLDING	

2	LAND DIGGING	
3	FENCING	
4	COST OF POWER TILLER (SELF DRIVEN)	
5	SOIL LEVELLING, TILLERING INCLUDING DIESEL COST	
6	STOREHOUSE CONSTRUCTION COST 100SQ FT@200/-PER SQ FT	
7	PROCESSING UNIT	
	<b>TOTAL</b>	
B	IRRIGATION AND IMPLEMENTS	
1	TUBEWELL/SUBMERSIBLE PUMP COST	
2	PUMP AND ELECTRICAL INSTALLATION	
3	AGRICULTURAL EQUIPMENTS	
	<b>TOTAL</b>	
	<b>TOTAL CAPITAL INVESTMENT</b>	
	<b>RECURRING COST</b>	
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, 4. HARVESTING(IN A YEAR)--12 MANDAYS@350/-PER MANDAYS PER HARVESTING , 5.Extraction -- 12 MANDAYS@350/-PER MANDAYS	
2	FERTILISER AND OTHER CHEMICALS	
D	<b>TOTAL</b>	
1	RS.3/SEEDLING , 20,000 SEEDLINGS/ACRE	
2	MULCHING BY USING BLACK POLYTHENE MULCH	
3	MISCELLANEOUS LUMPSUM	
	<b>TOTAL</b>	
	<b>TOTAL RECURRING COST</b>	
	<b>GRAND TOTAL(CAPITAL COST+ RECURRING COST)</b>	
	<b>INCOME STATEMENT</b>	
SL NO	PARAMETERS	AP
1	TOTAL PRODUCTION OF DRY LEAVES - 3000KG/ACRE , SELLING PRICE- Rs 225/KG	
	<b>PROFIT AND LOSS STATEMENT</b>	
SL NO	PARAMETERS	AP

## Model Project Profile

<b>1</b>	CAPITAL INVESTMENT	
<b>2</b>	RECURRING COST	
<b>3</b>	TOTAL INVESTMENT UPTO 1 YEAR	
<b>4</b>	TOTAL INCOME	
<b>5</b>	TOTAL PROFIT AFTER 1 YEAR	
	NOTE: First harvest is taken at 90-110 days after transplanting. Subsequently, second harvest is taken 60-70 days of the first harvest before the onset of flowering. In case of late transplanting, single cut is taken after 3-4 months. Since, stevia is a perennial crop, the production may be taken up to 4-5 years from the start.	

## MEANS OF FINANCE

Particulars	Amount In Rs.....
Margin Money ( 25%)	108950
Bank Loan (75%)	326850
Total Project Cost	435800

## PROJECTED PROFITABILITY STATEMENT

(Amount in Rs....)

	PARTICULARS/YEAR	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR
<b>A</b>	<b>INCOME</b>				
<b>A-1</b>	TOTAL PRODUCTION OF DRY LEAVES - 3000KG/ACRE , SELLING PRICE- Rs 225/KG (20% IN 1ST YEAR)	135000	6,75,000	6,75,000	6,75,000
	TOTAL INCOME	135000	6,75,000	6,75,000	6,75,000
<b>B</b>	<b>EXPENDITURE</b>				
<b>B-1</b>	RS.3/SEEDLING , 20,000 SEEDLINGS/ACRE	60,000			
<b>B-2</b>	MULCHING ( USING BLACK POLYTHENE MULCH)	10,000			
<b>B-3</b>	MISCELLANEOUS	5,000	10000	10000	10000

## Model Project Profile

B-4	LABOUR 1. 1. LAND PREPARATION -- MANDAYS 2. PLANTING-12 MANDAYS , 3.FENCING-12 MANDAYS, 4. HARVESTING ( 2 TIME IN 1ST YEAR/4-5 TIME IN REST YEARS )-12 MANDAYS PER HARVESTING , TOTAL-48 MANDAYS @Rs.350 /- FOR 1ST YEAR) 5. OIL EXTRACTION-12 MANDAYS @ 350/-PER MAN DAYS (96 MANDAYS FOR REST YEARS)	16,800	33600	33600	33600
B-5	FERTILISER AND OTHER AGRO CHEMICALS LUMPSUM	30,000	30,000	30,000	30,000
	TOTAL EXPENDITURE	1,21,800	73600	73600	73600
C	GROSS PROFIT (A-B)	13,200	6,01,400	6,01,400	6,01,400
D	Interest on bank loan	0	55565	18522	9261
E	Depreciation (10%-wdvm)	27400	24660	22194	19975
F	Total D+E	27400	80225	40716	29235
G	Net profit (C-F)	-14200	521176	560685	572165

## FINANCIAL ANALYSIS

(Amount in Rs....)

Particular / Year	1st year	2nd year	3rd year	4th year
Expenses				
Initial Cost	3,14,000			
Recurring cost	1,21,800	73600	73600	73,600
TOTAL COST	435800	73600	73600	73600
BENEFIT				
TOTAL BENEFIT	13200	601400	601400	601400
NET BENEFIT	-422600	527800	527800	527800
DF @ 15 %	0.87	0.76	0.66	0.57
PWC	379146	55936	48576	41952
PWB	11484	457064	396924	342798
<b>NPW</b>	<b>682660</b>			
<b>BCR (@15%DF)</b>	<b>2.3:1</b>			
DF@50%		0.44	0.3	0.2
PWC		32384	22080	14720
PWB		264616	180420	120280
<b>NPW</b>	<b>212990</b>			
<b>IRR (%)</b>	<b>65.87</b>			

## Model Project Profile

### REPAYMENT SCHEDULE

PROJECT PERIOD : 4 YEARS

MORATORIUM PERIOD : 1 YEAR INCLUDING PROJECT PERIOD

BANK ROI : 8.5%

(Amount in Rs....)

Particulars	1st year	2nd year	3rd year	4th year
Opening Balance	326850	326850	217900	108950
Interest @8.50 p a		27782	18522	9261
Deferred 1st yr interest to 2nd yr		27782		
Principal		108950	108950	108950
Total Return (Principal + Interest)	0	164514	127472	118211
Closing Balance	326850	217900	108950	NIL



DEBT SERVICE COVERAGE RATIO

(Amount in Rs....)

PARTICULARS/ YEAR	1ST	2ND	3RD	4TH
(A) Total Income:				
Net Profit	-14200	521176	560685	572165
Depreciation	27400	24660	22194	19975
Interest on loan	0	55565	18522	9261
Total=	13200	601400	601400	601400
(B) Total Commitment:				
Bank Loan	0	108950	108950	108950
Interest loan	0	55565	18522	9261
Total =	0	164515	127472	118211
DSCR (A/B)=	0.00	3.66	4.72	5.09
Average DSCR=	3.37			

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)	274000	246600	221940	199746
Depreciated value (10%-WDVM)	27400	24660	22194	19975
Closing value	246600	221940	199746	179771