Package of Practice

Pipli Cultivation

ADVANCING NORTH EAST

An Initiative of North Eastern Council (NEC)

Implemented by North Eastern Development Finance Corporation Limited (NEDFi)

PIPLI

Figure 1 : Pipli

SOURCE: GOOGLE IMAGE

SCOPE OF THE CROP:

- (Pipli) *Piper longum* a perennial climber is a valuable source of active substances of medicinal value and spice.
- The principal pharmacological constituents are piperine and piplartine.
- Its root, stem and leaves are used in the treatment of diseases of respiratory tract like bronchitis, asthma and cough.
- It is a shade loving plant often grown as intercrop with coffee, coconut
- and areca nut.
- It is cultivated through planting material such as suckers, stem cuttings and rooted vine cuttings.
- Many companies export a large quantity of dried/powdered fruits and roots of *Piper longum* to Europe, USA, Australia, Canada and South East countries.

BACKGROUND OF THE CROP :

Scientific name: *Piper longum*

Family : Piperaceae

ESSENTIAL PARTS: roots , inflorescences(dried spikes) , fruit

It is a native of the Indo-Malayan region. South Asia is also considered native of the plant. It is widely distributed in the tropical and subtropical regions of the world. It is found growing wild in India, Nepal, Indonesia, Sri Lanka, Malaysia, Singapore, Bhutan, Myanmar and Philippines. In India, it is found throughout the hotter parts from central to the north-eastern Himalayas, the lower hills of West Bengal and the evergreen forests of the Western Ghats. The main supply of long pepper is from wild plants growing in **Assam, West Bengal and Uttar Pradesh.** It is of immense pharmaceutical importance commonly known as **pipli,**

pippali, papal, long pepper or Indian long pepper. The plant is a perennial, slender climber with woody roots.

CHEMICAL CONSTITUENTS :

- The compound of medicinal interest in pipli is present in the female spike(inflorescence) of Piper longum.
- The fruit contains alkaloids piperine, piperidine and piperlongumine.
- It's piperine content is slightly higher than that in black pepper.
- Other active ingredients present are various amides.
- Volatile oil and resins are also present in the fruit.
- Roots contain the alkaloids piperlonguminine, piperlonguimine and piperine.
- The fruits also contain calcium, phosphorus and iron.

MEDICINAL USES:

- The roots, stems and fruits of P. longum are medicinally used, especially in the treatment of diseases of respiratory tract like bronchitis, cough and asthma.
- It also cures dyspnoea, ascites, leprosy, diabetes, piles, indigestion, anemia, cardiac and spleen disorders, chronic fever and loss of appetite.
- The roots and fruits are used in palsy, gout and lumbago.
- It is also useful for fever, leucoderma, urinary discharges, insomnia, jaundice, hiccups and joint pains.
- Long pepper is widely used as a general tonic and rejuvenator in Ayurveda.
- It is known to enhance bio-availability of food and drugs. Therefore, to make more effective it is taken along with quinine.
- The extract is locally applied to counter-irritant and act as analgesic for muscular pains and inflammation.
- It is used as an antidote to snake-bite and scorpion sting.
- It forms a major ingredient of many Ayurvedic medicines.

CHALLENGES :

- It cannot withstand cold temperature
- It requires less irrigation
- It doesn't grow well in water-logged condition
- As it is a shade-loving plant so it cannot tolerate direct sunlight
- Seeds are rarely used for propagation of the crop as it takes around 3-4 years to bear fruits
- It is sensitive to drought

PLANTATION AND MANAGEMENT:

- **SOIL:** It does well on organic matter rich, fertile, well drained loamy soil of pH range 5.5 to 8.5.

- **CLIMATE:** Pipli plants grow well in tropical humid climate where temperature ranges between 30-40ºC in summer and 4-10ºC in winters with an average rainfall of 2000 – 3500 mm. It is a shade loving plant. It can be cultivated successfully in heavy rainfall areas with high relative humidity.

- **PROPAGATION:** Conventionally, ***P. longum*** is cultivated through planting materials such as suckers, stem cuttings or rooted vine cuttings.

- **PLANTING TIME:** In the month of March-April and later on transplanted in June at the onset of monsoon. Two rooted stem cuttings or suckers (8 -10 cm long) are planted in each pit.

- **FERTILIZER:** 20 tonnes of cow-dung or FYM is required for 1 ha. of land. Since the crop will give economic yield for 3 years, the manuring has to be done each year. During the first year organic manure can be applied in pits at the time of field planting. In subsequent years, manuring is done by spreading it in beds and covering with soil. Application of organic manure increases the water holding capacity of the beds. No chemical fertilizer is recommended.

- **IRRIGATION**: Irrigation once in a week is necessary as an intercrop and if the main crop is irrigated no additional irrigation is necessary for ***Piper longum.***

- **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:** The vines start bearing spikes six months after planting. The spikes thus will be ready for harvest after two months since formation of spikes. When the spikes are full grown but hey unripe, they are gathered. If left without picking, they ripe and their pungency is lost to a great extent. The thick parts of the stem and roots may also be harvested from 18 months after planting.

- The yield of dry spike during first year is around 400 Kg/ha, it increases up to 1000 Kg/ha in the third year. After 3 years, the productivity decreases and they should be replanted. The average yield of roots is 5 quintals/ha.

	FARM ECONOMICS OF PIPLI CULTIVATION IN 1 ACRE LAND 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	5,000
4	RENT OF POWER TILLER	15000
5	SOIL LEVELLING, TILLERING	15000
6	STOREHOUSE CONSTRUCTION COST 100SQ FT@200/-PER SQ FT	20,000
	TOTAL	75,000
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	109,000
	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, 4. HARVESTING(IN A YEAR)--12 MANDAYS@350/-PER MANDAYS PER HARVESTING , 5. WEEDING -- 12 MANDAYS @ 350/- PER MANDAYS (60 MANDAYS 1ST YEAR)	21,000
2	FERTILISER AND OTHER CHEMICALS	10,000
D	**TOTAL**	31,000
1	RE.1 / SEEDLING, 1270 SEEDLINGS /ACRE	1,270
2	MULCHING BY USING BLACK POLYTHENE MULCH	10,000
3	MISCELLANEOUS LUMPSUM	5,000
	TOTAL	16,270
	TOTAL RECURRING COST	**47,270**
	GRAND TOTAL(CAPITAL COST+ RECURRING COST)	156,270
	INCOME STATEMENT	

SL NO	PARAMETERS	APPROX AMOUNT (Rs)
1	TOTAL PRODUCTION OF DRIED SPIKES - 170KG/ACRE AFTER ONE YEAR, SELLING PRICE-Rs 700/- KG	119,000
	PROFIT AND LOSS STATEMENT	
SL NO	PARAMETERS	APPROX AMOUNT (Rs)
1	CAPITAL INVESTMENT	109,000
2	RECURRING COST	47,270
3	TOTAL INVESTMENT UPTO 1 YEAR	156,270
4	TOTAL INCOME	119,000
5	TOTAL PROFIT AFTER 1 YEAR	71,730
NOTE	The vines start bearing spikes six months after planting. The spikes thus will be ready for harvest after two months since formation of spikes. From one planting harvesting can be done upto 3 successive years	

MEANS OF FINANCE

Particulars	**Amount In Rs…….**
Margin Money ((25%)	39068
Bank Loan (75%)	117203
Total Project Cost	156270

PROJECTED PROFITABILITY STATEMENT

(Amount In Rs…)

PARTICULARS/YEAR	1ST YEAR	2ND YEAR	3RD YEAR	4TH YEAR
INCOME				
TOTAL PRODUCTION OF DRIED SPIKES - 170KG/ACRE AFTER ONE YEAR, SELLING PRICE- Rs700/KG (20% YIELD IN 1ST YR)	23800	119000	119000	119000
TOTAL INCOME	23800	119000	119000	119000
EXPENDITURE				
RE.1 / SEEDLING, 1270 SEEDLINGS /ACRE	1270			
MULCHING BY USING BLACK POLYTHENE MULCH	10,000			
MISCELLANEOUS LUMPSUM	5,000	5000	5000	5000
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. WEEDING -- 12 MANDAYS @ 350/- PER MANDAYS (Total 60 MANDAYS 1ST YR AND 72MANDAYS IN REST YEARS)	21,000	25,200	25,200	25,200
FERTILISER AND OTHER CHEMICALS	10,000	10000	10000	10000
TOTAL EXPENDITURE	47270	40200	40200	40200
GROSS PROFIT (A-B)	-23470	78800	78800	78800
Interest on bank loan	0	19924	6641	3321
Depreciation (10%-wdvm)	5400	4860	4374	3937
Total D+E	5400	24784	11015	7257
Net profit (C-F)	-28870	54016	67785	71543

FINANCIAL ANALYSIS

(Amount in Rs…)

Particular / Year	1st year	2nd year	3rd year	4th year
Expenses				
Initial Cost	109,000			
Recurring cost	47270	40200	40200	40200
TOTAL COST	156270	40200	40200	40200
BENEFIT				
TOTAL BENEFIT	23800	119000	119000	119000
NET BENEFIT	-132470	78800	78800	78800
DF @ 15 %	0.87	0.76	0.66	0.57
PWC	135955	30552	26532	22914
PWB	20706	90440	78540	67830
NPW	**41563**			
BCR (@15%DF)	**1.92:1**			
DF@50%	0.67	0.44	0.3	0.2
PWC	104701	17688	12060	8040
PWB	15946	52360	35700	23800
NPW	**-14683**			
IRR (%)	**40.86**			

REPAYMENT SCHEDUEL

Project period : 4 years

Moratorium period : 1 year including project period

(Amount in Rs…)

Particulars	1st year	2nd year	3rd year	4th year
Opening Balance	117203	117203	78135	39067
Interest @8.50 p a	0	9962	6641	3321
Deferred (1st yr Interest to 2nd yr)		9962		
Principal	0	39068	39068	39067
Total Return (Principal + Interest)	0	58992	45709	42388
Closing Balance	117203	78135	39067	NIL

DEBT SERVICE COVERAGE RATIO

PARTICULARS/ YEAR	1ST	2ND	3RD	4TH
(A) Total Income:				
Net Profit	-28870	54016	67785	71543
Depreciation	5400	4860	4374	3937
Interest on loan	0	19924	6641	3321
Total=	-23470	78800	78800	78800
(B) Total Commitment:				
Bank Loan	0	39068	39068	39067
Interest loan	0	19924	6641	3321
Total =	0	58992	45709	42388
DSCR (A/B)=	0.00	1.34	1.72	1.86
Average DSCR=	1.64			

Depreciation Table

(Amount in Rs….)

Particulars	1st yr	2nd yr	3rd yr	4th yr
Asset Value (On ITEM : A(6) & B of Capital Cost)	54000	48600	43740	39366
Depreciated value (10%-WDVM)	5400	4860	4374	3937
Closing value	48600	43740	39366	35429