VERMICOMPOST

1.0 INTRODUCTION

Vermicomposting is defined as the production of compost with the use of worms. It is a fast way to convert organic farm waste into organic fertilizer. It degrades waste as vermi or earthworm feed on and digests waste materials. Vermicomposting results in a better quality product that is produced in only 75 days as compared to ordinary compost that is produced in 8-12 weeks.

Vermicompost is an excellent soil enhancer and bioactive fertilizer for organic farming. Earthworms can also be made into feed for fish or other domesticated animals.

This project profile on Vermicompost is based on HDPE Vermi Beds and Sheds, which are light in weight and can be transported cheaply and makes it easy to set them up in remote locations. The installation cost is much cheaper without any requirement for expensive earthwork, digging and concrete works.

2.0 MARKET POTENTIAL

Organic solid waste management by employing earthworms has multifarious role to play. Firstly, it makes way for utilization of available organic wastes to produce the rich source of organic manure of high quality, which is superior to other types of organic manures in its physico-chemical and biological properties. Secondly, the manure is produced in a short duration of time and is a fully matured, homogenous matter. Thirdly, the programme provides job opportunities for the unskilled labour force. Finally, it is the best way of safeguarding the environment. Vermicompost has been adjudged as the best source of organic amendments to soil. Using vermicompost can fulfill the requirements for organically grown products, which are becoming popular in the modern society.

3.0 PROCESS DETAILS

(a) Collect and shred biodegradable materials/agricultural wastes such as fruit/vegetable trimmings, peelings, and dry leaves and stem.

(b) Mix old animal manure such as cow dung and chicken droppings with shredded agricultural vegetable waste. This will improve the nutrient content of the finish product. Do not use fresh manure for the ammonia, or else will give discomfort to the worms.

(c) Sun-dry these materials for at least three days and let them undergo partial fermentation.

(d) Weigh the shredded grinded materials before putting in the compost bed to determine ratio of compostables and worms.

(e) Before stocking the earthworms, make sure that all materials in the vermi bed are prepared. Moisten the bedding with water and cover it with black plastic garbage bag, old sacks, net, or banana leaves to start “anaerobic process”, which is completed after 1-2 weeks.

(f) After the anaerobic process, remove the cover and stock the vermi bed with earthworms.

(g) Maintain the vermi beds' moisture content and temperature through regular checking. Protect the worms from predatory animals.

(h) Vermicompost is harvested when most of the

materials have been consumed by the worms. This takes about 8-10 weeks depending on the environment and culture conditions.

(l) In harvesting, separate the "vermi" from the vermicompost either manually (handpicking) or using a strainer/sifter.

(j) Properly pack vermicompost in sacks and store in a cool dry place.

(k) Harvested/sifted vermi from the vermi beds may either be used for the next vermicomposting cycle or for expansion by constructing additional vermi beds.

4.0 COST OF THE PROJECT

The estimated project cost is given below.

Particulars	Amount (Rs lacs)
Land and Site Development	-
Vermi Beds	3.00
Implements & Equipment	0.83
Misc. Fixed Assets	0.88
Preliminary & pre-operative expenses	0.35
Contingencies & Escalation @ 3%	0.14
Working capital	1.14
TOTAL	6.35

4.1 Land & Site Development: No cost has been considered for land & site development. It is assumed that the project will be set up in existing land.

4.2 Vermi Beds: Details of expenses on Vermi Beds is below.

Particulars	Unit	Quantity	Rate (Rs)	Amount (Rs)
HDPE Vermi Beds (3.6 x 1.5 x 0.6 cum)	Nos	50	3500	175000
Shed for Vermi Beds	Sqm	280	350	98000
			Sub total	273000
Add: Installation, transportation, etc @ 10%				27300
			TOTAL	300300
			Say (Rs. in lacs)	3.00

4.3 Implements & Equipment: Details of expenses on implement & equipment are given below.

Particulars	Qty	Rate (Rs)	Amount (Rs)
Power Shredder	1	25000	25000
Sieving Machine	1	40000	40000
Miscellaneous Implements	LS	LS	10000
		Sub total	75000
Add: Installation, transportation, etc @ 10%			7500
		TOTAL	82500
		Say (Rs. in lacs)	0.83

4.4 Misc. Fixed Assets: Details of expenses on miscellaneous fixed assets are given below.

Particulars	Qty	Rate (Rs)	Amount (Rs)
Water supply system (STW with 3 HP pump set, storage, pipes & fittings)	1	75000	75000
Miscellaneous items	LS	LS	5000
		Sub total	80000
Add: Installation, transportation, etc @ 10%			8000
		TOTAL	88000
		Say (Rs. in lacs)	0.88

4.5 Preliminary & Pre-operative Expenses: Details of preliminary & pre-operative expenses are given below.

Particulars	Amount (Rs)
Travelling expenses	15000
Professional & other fees	10000
Interest during implementation	5144
Miscellaneous expenses	5000
TOTAL	35144
Say (Rs. in lacs)	0.35

4.6 Contingencies & Escalation: Contingencies & escalation has been assumed at 3% of the cost of vermi beds, implements & equipments and miscellaneous fixed assets.

4.7 Working Capital: Details of working capital margin is given below.

	Period (days)	Amount (Rs lacs)		
		Yr 1	Yr 2	Yr 3
Raw Materials & Consumables	75	0.10	0.11	0.13
Power & fuel	75	0.37	0.39	0.41
Salary	75	0.68	0.78	0.87
Total		1.14	1.28	1.42
Working capital margin in Year 1 (100%)	1.14			

5.0 MEANS OF FINANCE

The means of finance for the project is estimated as below.

Particulars	Percent	Amount (Rs lacs)
EQUITY		
A. Equity from Promoters	40%	2.54
B. Subsidy from Central/State Govt.	-	
DEBT		
Term Loan from Banks/FIs	60%	3.81
TOTAL	100%	6.35

6.0 PROFITABILITY STATEMENT

(Rs. in lacs)

Particulars	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
A. INCOME					
Production capacity (kg/annum)	94608	94608	94608	94608	94608
Capacity utilisation	70%	80%	90%	90%	90%
Total production at capacity utilisation	66226	75686	85147	85147	85147
Price/kg of compost (Rs)	5.00	5.00	5.00	5.00	5.00
Income from sales	3.31	3.78	4.26	4.26	4.26
B. OPERATING EXPENSES					
Raw Materials & Consumables	0.48	0.55	0.62	0.62	0.62
Power & fuel	0.08	0.09	0.10	0.10	0.10
Salary	1.08	1.09	1.10	1.11	1.12
Repair & Maintenance	0.09	0.10	0.11	0.13	0.14
Miscellaneous Expenses	0.07	0.08	0.09	0.09	0.09
Total Operating Expenses	1.80	1.91	2.02	2.04	2.06
Less: Working expenses capitalised	1.15	0.00	0.00	0.00	0.00

Operating profit	2.66	1.88	2.24	2.22	2.19
C. FINANCIAL EXPENSES					
Depreciation	0.26	0.26	0.26	0.26	0.26
Interest on Term Loan	0.30	0.25	0.18	0.11	0.04
Net Profit	2.09	1.36	1.79	1.84	1.89
Net cash accruals	2.36	1.62	2.06	2.11	2.15
Principal Repayment	0.22	0.90	0.90	0.90	0.90

6.1 Production capacity: Total production capacity per annum is estimated as below.

Volume/Vermi Bed (cum)	3.24
No. of Vermi Beds	50
Total capacity of vermibeds (cum)	162
Proportion of agriculture waste by weight (320 kg/cum)	51840
Proportion of cowdung by weight (80 kg/cum)	12960
Total quantity of raw materials by weight (kg)	64800
Recovery of vermicompost from raw materials (%)	30%
Production of vermicompost/cycle (kg)	19440
Duration of cycle (Days)	75
Days/annum	365
Total production of vermicompost per annum at 100% capacity (kg)	94608

6.2 Raw Materials & Consumables: Expenses on raw materials & consumables is estimated as below.

Particulars	kg/cum	Rate (Rs/kg)	Amount (Rs)
Agricultural waste/cum/cycle	320	0.10	32
Cowdung/ cum/ cycle	80	0.15	12
Earthworms/cum/cycle (350/cum; 500 worms/kg)	0.70	50.00	35
Expenses on raw materials/ cum/ cycle			79
Total capacity of vermibeds			162
No. of cycles/annum			5
Expenses on raw materials per annum (Rs)			62284
Add: Expenses on packing materials, etc. @ 10%			6228
Expenses on raw materials & consumables per annum at 100% capacity (Rs)			68512

6.3 Power: Expenses on power is estimated as below.

Particulars	Quantity	Power (Kw)	Total (Kw)	Hrs/ day	kwh/ day
Pump set (3 HP)	1	2.24	2.24	1.00	2.24
Power Shredder	1	0.20	0.20	1.00	0.20
Sieving Machine	1	0.20	0.20	1.00	0.20
General Lighting	7	0.10	0.70	5.00	3.50
Total power requirement/day (Kwh)					6.14

Days/annum	365
Rate per unit (Rs)	5.00
Expenses on power per annum at installed capacity (Rs)	11202

6.4 Salary: Expenses on salary in the 1st year is estimated as given below. It is assumed that expenses on salary will increase @ 1% every subsequent year.

Particulars of Employees	Numbers	Salary/Month (Rs)	Cost/annum (Rs)
Manager (Self)	0	0	0
Helpers	3	3000	108000
Expenses on salary in the 1st year (Rs)			108000

6.5 Repair & Maintenance: Expenses on repair & maintenance in the 1st year is estimated as given below. It is assumed that expenses on repair & maintenance will increase @ 10% every subsequent year.

(Rs. in lacs)

Particulars	Cost (Rs)	Rate	Amount
Vermi Beds	3.00	2%	0.06
Implements & Equipment	0.83	2%	0.02
Misc. Fixed Assets	0.88	2%	0.02
Expenses on repair & maintenance in the 1st year (Rs)			0.09

6.6 Miscellaneous Expenses: Miscellaneous expenses have been assumed at 2% of sales.

6.7 Depreciation: Depreciation has been calculated by straight line method. The details of calculation are given below.

(Rs in lacs)

Description	Cost (Rs)	Rate	Amount/ annum (Rs)
Vermi Beds	3.00	5.00%	0.15
Implements & Equipment	0.83	7.07%	0.06
Misc. Fixed Assets	0.88	6.23%	0.05
TOTAL			0.26

6.8 Interest on Term Loan & Principal Repayment: Interest rate has been assumed at 8%. Duration of Loan repayment has been considered for a period of 5 years including moratorium period of 9 months with equal monthly instalments. The details of calculation are given below.

(Rs in lacs)

	Year	1	2	3	4	5
Month 1	Opening balance	3.81	3.59	2.69	1.79	0.90
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest (8%)	0.03	0.02	0.02	0.01	0.01
	Closing balance	3.81	3.51	2.61	1.72	0.82
Month 2	Opening balance	3.81	3.51	2.61	1.72	0.82
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.02	0.01	0.01
	Closing balance	3.81	3.44	2.54	1.64	0.75
Month 3	Opening balance	3.81	3.44	2.54	1.64	0.75
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.02	0.01	0.00
	Closing balance	3.81	3.36	2.47	1.57	0.67
Month 4	Opening balance	3.81	3.36	2.47	1.57	0.67
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.02	0.01	0.00
	Closing balance	3.81	3.29	2.39	1.49	0.60
Month 5	Opening balance	3.81	3.29	2.39	1.49	0.60
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.02	0.01	0.00

	Closing balance	3.81	3.21	2.32	1.42	0.52
Month 6	Opening balance	3.81	3.21	2.32	1.42	0.52
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.02	0.01	0.00
	Closing balance	3.81	3.14	2.24	1.34	0.45
Month 7	Opening balance	3.81	3.14	2.24	1.34	0.45
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.01	0.01	0.00
	Closing balance	3.81	3.06	2.17	1.27	0.37
Month 8	Opening balance	3.81	3.06	2.17	1.27	0.37
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.01	0.01	0.00
	Closing balance	3.81	2.99	2.09	1.20	0.30
Month 9	Opening balance	3.81	2.99	2.09	1.20	0.30
	Repayment	0.00	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.01	0.01	0.00
	Closing balance	3.81	2.91	2.02	1.12	0.22
Month 10	Opening balance	3.81	2.91	2.02	1.12	0.22
	Repayment	0.07	0.07	0.07	0.07	0.07
	Interest	0.03	0.02	0.01	0.01	0.00
	Closing balance	3.73	2.84	1.94	1.05	0.15
Month 11	Opening balance	3.73	2.84	1.94	1.05	0.15
	Repayment	0.07	0.07	0.07	0.07	0.07
	Interest	0.02	0.02	0.01	0.01	0.00
	Closing balance	3.66	2.76	1.87	0.97	0.07
Month 12	Opening balance	3.66	2.76	1.87	0.97	0.07
	Repayment	0.07	0.07	0.07	0.07	0.07
	Interest	0.02	0.02	0.01	0.01	0.00
	Closing balance	3.59	2.69	1.79	0.90	0.00
Principal Repayment		0.22	0.90	0.90	0.90	0.90
Interest		0.30	0.25	0.18	0.11	0.04

7.0 DEBT SERVICE COVERAGE RATIO (DSCR)

(Rs. in lacs)

Year	1	2	3	4	5	TOTAL
Profit After Tax (Net Profit)	2.09	1.36	1.79	1.84	1.89	
Depreciation	0.26	0.26	0.26	0.26	0.26	
Interest	0.30	0.25	0.18	0.11	0.04	
Total	2.66	1.88	2.24	2.22	2.19	11.19
Interest	0.30	0.25	0.18	0.11	0.04	
Loan repayment	0.22	0.90	0.90	0.90	0.90	
Total	0.53	1.15	1.08	1.01	0.94	4.70
DSCR	5.04	1.63	2.07	2.20	2.34	

Average DSCR = 2.38

8.0 BREAK EVEN POINT (BEP)

(Rs. in lacs)

Year	1	2	3
A. Net sales	3.31	3.78	4.26
B. Variable cost			
Raw Materials & Consumables	0.48	0.55	0.62
Power & fuel	0.08	0.09	0.10
Miscellaneous expenses	0.07	0.08	0.09
Total variable cost	0.62	0.71	0.80
C. Contribution (A-B)	2.69	3.07	3.45
D. Fixed & Semi-fixed Costs			
Salary	1.08	1.09	1.10
Repair & maintenance	0.09	0.10	0.11
Interest on Term Loan	0.30	0.25	0.18
Depreciation	0.26	0.26	0.26
Total fixed cost	1.74	1.71	1.66
E. BREAK EVEN POINT	64.81%	55.76%	48.10%
F. BEP at operating capacity	45.37%	44.61%	43.29%
G. Cash BEP	38.50%	37.74%	36.42%

9.0 INTERNAL RATE OF RETURN (IRR)

(Rs. in lacs)

Year	0	1	2	3	4	5
CASH OUTFLOW						
Capital Expenditure	4.71	0.00	0.00	0.00	0.00	0.00
Working Capital	0.00	1.15	0.13	0.13	0.00	0.00
Total (A)	4.71	1.15	0.13	0.13	0.00	0.00
CASH INFLOW						
Profit After Tax		2.09	1.36	1.79	1.84	1.89
Add: Depreciation		0.26	0.26	0.26	0.26	0.26
Add: Interest		0.30	0.25	0.18	0.11	0.04
Add: Salvage Value (10%)						
Total (B)	0.00	2.66	1.88	2.24	2.22	2.19
NET FLOW (B-A)	-4.71	1.51	1.74	2.11	2.22	2.19

IRR = 28%

MACHINERY SUPPLIERS

(a) Oasis Irrigation Equipment Company Limited
P - 6, Scheme - 6, M. S., C. I. T., Kolkata - 700054, West Bengal, India

(b) United Sales Agency
No. 174/C, Jamunalal Bajaj Street, Ground Floor, Kolkata - 700007, West Bengal, India

(c) Hansin Bio-Infra India Pvt. Ltd.
Plot No. 16, Ecotech III, Udhyog Kendra I, Gautam Budh Nagar, Noida - 201 306, Uttar Pradesh, India