

Composting FACTSHEET



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ECONOMICS OF COMPOSTING

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In order to develop a cost-effective composting facility, a number of factors must be carefully analyzed. The cost of a facility is largely dependent on three factors:

- the compost system chosen;
- the amount and type of manure composted; and
- the buildings constructed.

Compost Systems

The size and sophistication of a composting system are the basic factors affecting total investment cost. Sophistication is generally defined in terms of efficiency (length of active composting period), monitoring systems (ability to measure temperature, oxygen, and leachate), odour control mechanisms, labour requirements, and quality of buildings. Capital costs for a passive windrow system can be very low if an existing loader-equipped farm tractor is available. For a turned windrow system, an appropriate tractor and turner could easily cost \$50,000 to \$60,000. For aerated static pile systems, the cost of the aeration system including ducting, motors, fans and monitoring equipment represents a major capital cost; however, little costs are incurred for turning machinery. In-vessel systems have relatively high capital costs, given a typical requirement for buildings, concrete, internal agitation/aeration systems, and monitoring equipment.

Manure Type and Quantity

The capital investment and annual operating costs of a compost facility are directly related to both the type and quantity of manure composted. As the dry matter

content of the manure increases, the amount of bulking agent that is required decreases. As a result, both capital and operating costs decrease. Operating costs decrease due to reduced need for bulking agent, labour and fuel. Capital costs decrease because smaller work areas and building sizes are required. Since bulking agents such as sawdust, can cost \$12.00 to \$13.00 per tonne of manure composted, any reduction in the amount used or price paid will have a significant affect on compost production costs. In cases where the dry matter content of the manure is low as in liquid manure systems, an additional investment in solid/liquid separators will be necessary.

Buildings

Compost operations are characterized by four distinct activities: mixing, composting, curing and storage. In many cases, all compost-related activities are completed in the open. However, for environmental and quality considerations, concrete pads and/or simple pole-type buildings may be required. For example an operation composting 1,000 tonnes of manure annually needs a work area of approximately 1,900 square metres (15,000 square ft.). If buildings are constructed for all four activities, total construction costs could be \$125,000 to \$150,000 for an operation of this size.

COMPOST PRODUCTION COSTS

Compost production costs can vary considerably, depending upon the total capital investment, price of bulking agents and labour, and annual production levels. As indicated in **Table 1**, production costs can range from \$18.86 to \$39.14/m³ (\$36.00 to \$70.00 per tonne), for a facility composting 2,000 tonnes of manure annually.

TABLE 1
COMPOST PRODUCTION COSTS

Windrow Composting System	Basic Windrow ^a	Deluxe Windrow ^b
Manure Composted (tonnes) ^c	2,000	2,000
Sawdust Required (tonnes)	1,360	1,360
Compost Produced (tonnes)	1,800	1,800
Total Investment	\$40,000	\$190,000
Production Cost (per cubic metre)		
Low Efficiency ^d	\$20.16	\$39.14
Low Efficiency ^e	\$18.86	\$31.72

^a Basic windrow system consists of a tractor and turner only.

^b Deluxe windrow system consists of a tractor, turner, hard surface area and buildings for composting, curing and storage.

^c 20% dry matter.

^d Active compost period is 49 days.

^e Active compost period is 21 days.

Compost production costs and related sensitivity analysis is summarized in **Table 2**. Based upon various operational assumptions incorporated within a base case scenario, compost production costs for the different options range from **\$13.96/m³ to \$24.56/m³**.

COMPOST MARKETING

Significant potential appears to exist for a composted manure product positioned as an organic soil conditioner in the bulk and retail markets.

The strong market potential reflects a need for substitute products in several market segments including retail sales, (nurseries, department grocery and hardware stores), agriculture (including the potentially large organic producer sector) and other bulk sales such as landscape contractors, wholesale nurseries, silviculture operations, and golf courses. An increasing emphasis by society on non-synthetic, environment-friendly products suggests a favourable growth trend in the markets identified.

In terms of volume of soil conditioners purchased on an annual basis, the largest retail market is the nursery segment, while the largest bulk market is the landscape contracting sector. Both of these groups indicate an interest in trying or evaluating proposed products.

In terms of accessibility, the market with the greatest potential is the B.C. market, particularly the Lower Mainland region. Composting plants located in the

Fraser Valley area could market approximately 27.8 million litres of product by 1997.

In order to penetrate the markets identified, the finished composted product would have to be priced competitively with the leading soil conditioners presently available. Therefore, prices of 6.3 cents per litre and 5.3 cents per litre can be charged in the retail and bulk markets, respectively.

The marketing costs of the compost product are significant. The largest cost item would be transportation and handling, which is expected to absorb about 35% of the sales revenue generated each year. Bagging costs would also be significant, totalling about 30% of sales revenue. Other charges include sales force, advertising, and promotion costs.

For more information on the economics and marketing of the finished product, copies of the following reports may be obtained from the Resource Management Branch.

- *Economic Feasibility of Alternative Composting Systems*, by Dan Fullerton, Dobbins Farms Ltd., July 1991.
- *Market Study and Strategic Plan for Composted Hog Manure*, by Don Ference & Associates Ltd., September 1989.

TABLE 2
COST OF PRODUCTION AND SENSITIVITY ANALYSIS
OF ON-FARM COMPOSTING METHODS

Base Case Scenario: (2050 tonnes/yr manure + 1400 tonnes/yr bulking agent) Operational Coefficients and Values		Windrow		Aerated Static Pile	
		Passive	Turned		
Compost Produced	(m ³ /year) (tonnes/year)	3,254 1,806	3,254 1,806	3,254 1,806	
Labour	(hours/year)	271	745	596	
Investment Level:					
Equipment		\$50,000	\$80,000	\$60,000	
Buildings ^a	Mixing	\$0	\$0	\$0	
	Compost	\$0	\$0	\$54,911	
	Curing	\$0	\$16,687	\$16,687	
	Storage	\$0	\$12,760	\$12,760	
Aeration System		\$0	\$0	\$26,590	
Total Investment		\$50,000	\$109,447	\$170,948	
Annual Operating Expenses ^b		\$45,423	\$68,918	\$79,920	
Compost Production Costs	\$/m ³	\$13.96	\$21.18	\$24.56	
	\$/tonne	\$25.15	\$38.16	\$44.25	
Sensitivity Analysis	Change	New Level			
Bulk Prices (Sawdust)	+ 25%	\$5.43 /m ³	\$15.97	\$23.17	\$26.53
	- 25%	\$3.26 / m ³	\$11.95	\$19.16	\$22.55
Manure Volume	+ 25%	3,125 t/year	\$13.25	\$20.30	\$23.78
	- 25%	1,875 t/year	\$14.77	\$22.19	\$25.45
Labour Rate	+ 25%	\$15.00 /hour	\$14.21	\$21.87	\$25.11
	- 25%	\$ 9.00 /hour	\$13.71	\$20.50	\$24.01
Fuel Price	+ 25%	\$0.75 /litre	\$14.26	\$22.01	\$25.22
	- 25%	\$0.45 /litre	\$13.66	\$20.36	\$23.90
Manure-Dry Matter Content		30 %	\$14.20	\$22.30	\$25.23
		40 %	\$14.66	\$24.48	\$26.51
Price Range		High	\$15.97	\$24.48	\$26.53
		Average	\$14.06	\$21.63	\$24.83
		Low	\$11.95	\$19.16	\$22.44

^a Pole-type buildings with open walls/galvanized steel roof.

^b Includes bulking material, labour, fuel, electricity and investment costs (interest, depreciation, repair, and maintenance.)

This is one of a series of Factsheets on Composting. A list of references used in producing this series is included in the Composting Factsheet "[Suggested Reading and References.](#)"

COMPOSTING FACTSHEET SERIES PREPARED BY:

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