



Activity 6.4.1

Business Plan

for Solid Waste Management in
Shefa-Amr, Israel



جمعية الجليل
The Galilee Society
אגודת הגליל



Executive Summary:

This business plan examines the economic feasibility of implementing a project to handle the organic waste in the city of Shefa-Amr through the placement of composters in a work area near the city and the operation of a composting process to produce compost. The compost can be used for the maintenance of parks (green areas) and agricultural lands by the municipality of Shefa-Amr. Additionally, the project aims to protect the city's environment, and the overall environment of the country, by reducing the amount of mixed waste that is currently being disposed of in landfills, while receiving benefits from organic waste.

The plan evaluates the costs associated with establishing the system to achieve the project's goals. In the initial stage, the plan examines the feasibility of implementing a pilot program (only 10 businesses), and presents the expected picture for expanding the project by adding more selected businesses. The forecast is built using sensitivity tables that allow for future projections.

The evaluation includes two alternatives:

- 1) Self-purchase of composters from abroad and placing them in the required work area, including the purchase of all accompanying equipment.
- 2) Leasing the purchase of composters through financial leasing from an Israeli company operating in the Israeli market, in addition to self-purchasing all the accompanying equipment.

The results of the evaluation of the two alternatives above demonstrate the positive feasibility of implementing the project.

Furthermore, the results indicate an economic advantage in terms of savings that the municipality can achieve in Alternative 1 compared to Alternative 2. However, it should be emphasized that importing composters from abroad (Alternative 1) carries a greater risk than the risk associated with financial leasing from an experienced Israeli company in this field (Alternative 2).

Replicating the business model (the project) to other cities worldwide:

The construction of the plan is divided into four main components:

- a) Start-up and capital costs of the project.



- b) Monthly/yearly repayments of the loan taken for project funding, according to the financing terms in Israel.
- c) Ongoing operational costs of the project.
- d) Cumulative savings resulting from the avoidance of organic waste disposal and the utilization of a portion of the tree cutting waste for the composting process.

Replicating the plan in another city requires necessary modifications in the four components mentioned above, and compliance with the regulations in the relevant city or country, such as financing terms and interests in that country or city, the application of supporting legislation for waste separation, and direct or indirect costs in the economic environment of the country or city.

Market Overview:

Many countries around the world have already implemented similar environmental projects, but in Israel, this field is still underdeveloped. Furthermore, residents are not sufficiently aware of the risks associated with improper waste separation, and treatment that does not compromise environmental quality.

On the demand side, based on an extensive survey conducted on businesses in Shefa-Amr, there is a big demand for this important project. Large quantities of organic waste were found to be generated by the ongoing activities of many businesses in Shefa-Amr.

On the supply side, in terms of a viable solution, which primarily involves the purchase of a composting device capable of containing and processing organic waste, many manufacturers abroad produce and sell composters worldwide. Additionally, four main companies in the Israeli market import composters from abroad, install them for their customers, and provide ongoing annual services.

Business Plan:

The business plan is designed to assess the economic feasibility of implementing composters in the city of Shefa-Amr for the purpose of managing organic waste, after its separation from mixed waste generated by selected businesses. These businesses are characterized by high organic waste production, such as fruit and vegetable shops and restaurants, and that all of them are in the same commercial axis.



The mapping of selected businesses was conducted based on the "Pareto" principle, where approximately 20% of the businesses generate about 80% of the daily organic waste in Shefa-Amr, which currently averages around 14 tons per day.

The business plan examines the economic feasibility of a number of businesses as a pilot, with the potential to expand and include additional businesses that meet specific criteria. This expansion will be carried out after implementation, integration, and evaluation of the concrete results from the field, based on measurement and assessment criteria.

The economic assessment presented in the business plan compares the current situation, where mixed waste is collected and disposed of (as much as possible) using waste compactors operated by a waste contractor in cooperation with the municipality of Shefa-Amr, with a new situation where specially designated waste containers are provided to the selected businesses for the separate collection of organic waste and the remaining mixed waste.

The economic assessment takes into account the costs of both the current and new situations:

- 1) Existing costs in the current situation of mixed waste disposal and landfilling.
- 2) Costs of treatment after separating the waste, as described above:
 - a) Treatment of mixed waste through regular waste compactors for disposal and landfilling, following the separation of organic waste.
 - b) Treatment of organic waste - transferring it to composters located in a designated area near Shefa-Amr (hereinafter referred to as the "work area").
 - c) Implementing the composting process to produce compost that the municipality can use for landscaping public green areas in the city.
 - d) Utilizing a portion of the tree cutting waste produced in Shefa-Amr by transferring it to the work area for shredding and preparation for use in the composting process.

The assessment includes a cost analysis for the composting process (Section 2(c)), comparing the option of purchasing a composter from abroad to leasing it from one of the experienced companies in Israel.

It should be noted that the cost estimations mentioned above are approximate, and are necessary for the construction of the plan and for the municipality to make a decision. The following steps are required:



- a) In the case of purchasing from abroad: a thorough engineering assessment of the composter before purchasing, including its compliance with suitable ISO standards for Israel.
- b) In the case of leasing: conducting a public tender according to the laws and regulations of public tenders in Israel.

Data and Assumptions in Building the Plan:

- This plan is based on cost estimates gathered from various sources and on the principle of conservatism regarding these costs. It should be noted that the plan does not include costs for raising awareness among the residents of Shefa-Amr regarding waste separation and proper disposal.
- Number of selected participating businesses in the pilot: 10 businesses.
- Average daily mixed waste per selected business: 1.5 tons per day.
- Average percentage of organic waste in mixed waste: 40%.
- Average daily organic waste per selected business: $40\% * 1.5 = 0.6$ tons per day.
- The cost of disposal and landfilling of one ton of mixed waste is currently estimated at approximately 682 ILS including VAT (338 ILS for disposal and 344 ILS for landfilling).
- Estimated cost for disposing of one ton of organic waste from businesses to the working area: 250 ILS.
- Estimated cost for disposing of one ton of compostable waste from Shefa-Amr to the waste treatment company in the Krayot area (Deshanim area): 350 ILS.
- The daily average mixed waste in Shefa-Amr amounts to approximately 35 tons, of which around 14 tons are organic waste.
- The daily production of organic waste from the 10 selected businesses constitutes approximately 43% of Shefa-Amr's total organic waste ($10 * 0.6 = 6$ tons per day out of 14 tons).
- Shefa-Amr municipality has allocated approximately 2.5 dunams of land for the project. The land will serve as a working area where composters will be placed. The area will be fenced, including an entrance and exit gate.



- Shefa-Amr municipality is responsible for collecting the tree cutting waste on a daily basis using trucks, and transporting it to a designated company that crushes it and turns it into flammable material. In our plan, we assume that part of the cutting waste can be diverted to the working area for crushing to be usable for the composting process. The percentage of crushed waste used for the process is approximately 20% of the organic waste being processed in the composters.
- The plan takes into account the purchase of a waste shredder that can handle all the cutting waste generated in Shefa-Amr. This data can significantly contribute to the project's success due to the potential cost savings associated with self-handling of the cutting waste instead of transporting it for distant treatment.
- The plan does not take into account the implementation and enforcement of the Surplus Waste Law (according to the Local Authorities Law in Israel), considering the low chance of its enforcement in Shefa-Amr. It should be noted that this law was intended to encourage businesses producing organic waste in Shefa-Amr to collaborate effectively with the municipality for the project's success. Nevertheless, after reviewing the performance of the selected businesses, we concluded that they would cooperate for the project's success for their own reasons, such as maintaining cleanliness around their premises and saving costs and time currently invested in self-disposal of mixed waste.
- The plan does not consider income from compost sales since the idea is based on using the produced compost for greening the municipality's open spaces and/or for agricultural purposes, without charge.

Table 1: Costs of Disposal and Landfilling in the Current Situation:

Section	Quantity / Cost / Weight per ton	Notes / Associated calculations
Number of selected businesses for the project	10	Based on the selection criteria explained in the plan
Average mixed waste per business per day	1.5	Tons
Total daily mixed waste generated by the selected businesses	15	Tons
Total annual mixed waste for all selected businesses	4,680	Tons, Based on the assumption of 6 business days per week. 52 weeks a year: (15*6*52)



Cost of disposal and landfilling per ton of mixed waste	682	ILS
Total annual cost of disposal and landfilling	3,191,760	ILS (Marked as A)

Table 2: Savings from Separation of Organic Waste and Continued Treatment of Mixed Waste:

Section	Quantity / Cost / Weight per ton	Notes / Associated calculations
Total daily mixed waste generated by the selected businesses	15	Tons
Among them - organic waste	6	Tons, Based on an average percentage of 40%, In annual calculation: 1,872 Tons
Among them - mixed waste	9	Tons In annual calculation: 2,808 Tons
Total annual cost of disposal and landfilling after separation	1,915,056	ILS (Marked as B) The amount of mixed waste remains for treatment after separation (60% of the amount in the original state) * Removal and landfill price per ton: (2,808 * 682)
Total annual savings after separation and before calculating the costs of treating the organic waste	1,276,704	ILS Marked as C = A - B

For the purpose of calculating the economic viability of the project, we will subtract organic waste treatment costs from this savings (**C**).

If the saving after the subtraction remains greater than 0, the project will be financially viable.



Costs of Project Establishment and Operation:

Alternative 1: Self-Purchase of Composter:

Table 3: Establishment Costs:

Section	Cost (ILS)	Notes / Associated calculations
Purchase of composter	600,000	<p>Importing a composter from China, costing approximately \$120,000, including delivery and installation at an additional 35% of the purchase price.</p> <p>Daily capacity stands at an average of approximately 12 tons per day.</p> <p>The composter was selected after examining around 50 different types from around the world.</p> <p>The chosen composter is the most suitable both in terms of engineering and economics.</p>
Ground preparation of the working area	400,000	<p>The estimated cost of this section includes primarily: leveling the ground, preparing operational infrastructure, preparing a concrete or asphalt surface for placing the composters, installation of cameras and other protective measures that will ensure regular and proper operation of the work area.</p>
Purchase of loaders / shovels	140,000	<p>For loading organic waste and tree cuttings into the composters.</p> <p>These will be required for a few hours a day, so the municipality can use this equipment during the remaining hours of the day at other locations in the city as needed.</p>
Purchase of a tree cutting waste shredder	117,000	<p>The cost estimate includes either a large used shredder or a small new shredder.</p> <p>The final choice will be based on the quantity of material that will be processed by the shredder, according to the municipality's decision if it wants to</p>



		make the process for the full amount of tree cuttings in Shefa-Amr.
Purchase of containers for organic waste separation	20,000	10 containers for the use of organic waste to be placed next to each selected business within the scope of this project.
Total establishment costs	1,277,000	

Project Funding:

The project holds great importance for government offices such as the Ministry of Environmental Protection the Ministry of Development of the Periphery, Negev and Galilee, and the Ministry of Health. Furthermore, in recent years, we have witnessed an increasing number of tenders from various government offices in relation to the project field of interest.

The possible funding sources are as follows:

- 1) Government support / philanthropic donation - In this case, the establishment costs of the project will be reduced by the amount received from the support or donation.
- 2) Loan from a financial institution / bank - In this case, interest (financing expenses) will be imputed on the funded amount from this entity.
- 3) Private investment - In this case, we will examine the maximum annual return that the project can provide to the investor.
- 4) Self-funding, such as an extraordinary budget from the Municipality of Shefa-Amr - In this case, similar to case number 1 above, this amount will be deducted from the establishment costs of the project.

In our analysis, we will consider the combination of the above sections, and examine their impact on the business plan through a sensitivity analysis of:

- a) The impact of the percentage of funding received from government support / philanthropic donation or self-funding (sections 1 and 4 above) on the final savings of the project.



b) The impact of the percentage of funding received as a private investment (section 3 above), how it affects the final savings of the project, and the maximum annual return that the investor can receive.

In both cases above, we assume that the remaining funding for the establishment costs of the project (after receiving government support and/or philanthropic donation and/or other private funding) will be obtained through a loan from a financial institution / bank (section 2 above).

The loan details for the purpose of the plan are:

- The loan repayment will be done through equal monthly installments.
- Annual interest rate of 8% (due to conservatism and in light of recent increases in interest rates by the Bank of Israel!)
- Repayment period - 10 years.

For the business plan, and given that the plan follows a conservative approach, we assume a funding percentage of 0%, meaning the full establishment investment of the project will be funded through a loan under the mentioned terms.

The annual repayment of the loan (including interest) amounts to approximately 186 thousand ILS.

Table 4: Ongoing Operational and Funding Costs:

Section	Cost (ILS)	Notes / Associated Calculations
Costs of organic waste disposal from selected businesses to the work area	468,000	Cost of organic waste disposal per ton = 250 ILS. Annual quantity of organic waste from selected businesses = 1,872
Annual manpower cost for operating the composter, cuttings waste shredder, and work area in general	93,600	Part-time dedicated worker for the project (50%). Gross salary: 6,000 ILS for 50%.
Annual service contract for the composter, shredder, and loader / shovel	102,840	Assuming that the annual cost of the service agreement, including spare parts, is 12% of the purchase price of the equipment.



Annual utilities (electricity, water, sewage, property tax)	72,000	Estimated at 6,000 ILS per month.
Cost of purchasing an annual insurance policy	50,000	
Total ongoing operational costs	786,440	
Loan repayment including interest	185,922	
Total operational and funding costs	972,362	Marked as D - Cost of handling organic waste for the 10 selected businesses

Table 5: Savings from Diverting a Portion of the Cuttings Waste by the Municipality:

Section	Number / percentage	Notes / Associated Calculations
Percentage of cutting waste required for the composting process	20%	Percent cutting waste of the organic waste input into the composter
Annual quantity of organic waste in the project	1,872	Tons
Total annual quantity of ground yard waste	374	Tons. This quantity generates savings being transferred to the shredder instead of regular disposal and landfilling.
Removal and landfill cost per ton of cuttings waste	350	ILS. A conservative estimate
Annual savings in the conversion of cuttings for the benefit of the project	131,040	ILS. Marked as - E

Table 6: Annual savings summary for Alternative 1 - Self-purchase of composting equipment:

Section	Amount in NIS	Notes / Associated Calculations
Total annual savings after separation and before calculating organic waste treatment costs	1,276,704	C



Cost of organic waste treatment for the selected 10 businesses	(972,362)	D Includes loan repayment taken for project funding
Annual savings from diverting part of the cuttings waste for the benefit of the project	131,040	E
Total annual savings for the project	435,382	These savings indicate the viability of the project

Sensitivity Analysis Tables for Alternative 1:

Table S1: Sensitivity Analysis for the **Purchase** alternative - Annual savings as a function of:

a) Percentage change in organic waste from total mixed waste (values in the column)

b) Average daily amount of mixed waste (values in the row)

435,382	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
%40	(347,738)	(191,114)	(34,490)	122,134	278,758	435,382	592,006	748,630	905,254	1,061,878	1,218,502	1,375,126
%42.5	(337,949)	(171,536)	(5,123)	161,290	327,703	494,116	660,529	826,942	993,355	1,159,768	1,326,181	1,492,594
%45	(328,160)	(151,958)	24,244	200,446	376,648	552,850	729,052	905,254	1,081,456	1,257,658	1,433,860	1,610,062
%47.5	(318,371)	(132,380)	53,611	239,602	425,593	611,584	797,575	983,566	1,169,557	1,355,548	1,541,539	1,727,530
%50	(308,582)	(112,802)	82,978	278,758	474,538	670,318	866,098	1,061,878	1,257,658	1,453,438	1,649,218	1,844,998
%52.5	(298,793)	(93,224)	112,345	317,914	523,483	729,052	934,621	1,140,190	1,345,759	1,551,328	1,756,897	1,962,466
%55	(289,004)	(73,646)	141,712	357,070	572,428	787,786	1,003,144	1,218,502	1,433,860	1,649,218	1,864,576	2,079,934
%57.5	(279,215)	(54,068)	171,079	396,226	621,373	846,520	1,071,667	1,296,814	1,521,961	1,747,108	1,972,255	2,197,402
%60	(269,426)	(34,490)	200,446	435,382	670,318	905,254	1,140,190	1,375,126	1,610,062	1,844,998	2,079,934	2,314,870
%62.5	(259,637)	(14,912)	229,813	474,538	719,263	963,988	1,208,713	1,453,438	1,698,163	1,942,888	2,187,613	2,432,338
%65	(249,848)	4,666	259,180	513,694	768,208	1,022,722	1,277,236	1,531,750	1,786,264	2,040,778	2,295,292	2,549,806
%67.5	(240,059)	24,244	288,547	552,850	817,153	1,081,456	1,345,759	1,610,062	1,874,365	2,138,668	2,402,971	2,667,274
%70.0	(230,270)	43,822	317,914	592,006	866,098	1,140,190	1,414,282	1,688,374	1,962,466	2,236,558	2,510,650	2,784,742
%72.5	(220,481)	63,400	347,281	631,162	915,043	1,198,924	1,482,805	1,766,686	2,050,567	2,334,448	2,618,329	2,902,210
%75.0	(210,692)	82,978	376,648	670,318	963,988	1,257,658	1,551,328	1,844,998	2,138,668	2,432,338	2,726,008	3,019,678

This table provides the annual savings (or losses) of the project under the assumptions taken in the above plan.

In the Y-axis column, we have taken a range of percentages of organic waste from the total mixed waste, starting from 40%, which was the percentage used for the program, and going up to 75%.



In the X-axis row, we have taken values for the average daily amount of mixed waste that each selected business can generate, ranging from 0.25 to 3.

The border between the red and white cells indicates the breakeven points in the project. Although the savings are almost zero at these points, this is still acceptable from an environmental standpoint.

The values in red indicate losses, making the project not feasible to implement.

The annual savings according to our assumptions are highlighted in yellow in the table. It can be seen that there is significant room for improving the project's feasibility as a function of the two parameters analyzed.

The annual savings increase as:

- The percentage of organic waste from total mixed waste increases - moving downwards in the cells of the table.
- The average daily amount of mixed waste per selected business increases - moving towards the left in the cells of the table.

*Table S2: Sensitivity Analysis for the **Purchase** alternative - Annual savings as a function of:*

a) Variation in the number of businesses in the target area (values in the column)

b) Average daily quantity of mixed waste (values in the row)

435,382	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
5	(424,594)	(346,282)	(267,970)	(189,658)	(111,346)	(33,034)	45,278	123,590	201,902	280,214	358,526	436,838
6	(409,223)	(315,249)	(221,274)	(127,300)	(33,326)	60,649	154,623	248,598	342,572	436,546	530,521	624,495
7	(393,852)	(284,215)	(174,578)	(64,942)	44,695	154,332	263,969	373,606	483,242	592,879	702,516	812,153
8	(378,481)	(253,182)	(127,882)	(2,583)	122,716	248,015	373,314	498,614	623,913	749,212	874,511	999,810
9	(363,110)	(222,148)	(81,186)	59,775	200,737	341,698	482,660	623,622	764,583	905,545	1,046,506	1,187,468
10	(347,738)	(191,114)	(34,490)	122,134	278,758	435,382	592,006	748,630	905,254	1,061,878	1,218,502	1,375,126
11	(332,367)	(160,081)	12,206	184,492	356,778	529,065	701,351	873,638	1,045,924	1,218,210	1,390,497	1,562,783
12	(316,996)	(129,047)	58,902	246,850	434,799	622,748	810,697	998,646	1,186,594	1,374,543	1,562,492	1,750,441
13	(301,625)	(98,014)	105,598	309,209	512,820	716,431	920,042	1,123,654	1,327,265	1,530,876	1,734,487	1,938,098
14	(286,254)	(66,980)	152,294	371,567	590,841	810,114	1,029,388	1,248,662	1,467,935	1,687,209	1,906,482	2,125,756
15	(270,882)	(35,946)	198,990	433,926	668,862	903,798	1,138,734	1,373,670	1,608,606	1,843,542	2,078,478	2,313,414
16	(255,511)	(4,913)	245,686	496,284	746,882	997,481	1,248,079	1,498,678	1,749,276	1,999,874	2,250,473	2,501,071
17	(240,140)	26,121	292,382	558,642	824,903	1,091,164	1,357,425	1,623,686	1,889,946	2,156,207	2,422,468	2,688,729

18	(224,769)	57,155	339,078	621,001	902,924	1,184,847	1,466,771	1,748,694	2,030,617	2,312,540	2,594,463	2,876,387
19	(209,397)	88,188	385,774	683,359	980,945	1,278,531	1,576,116	1,873,702	2,171,287	2,468,873	2,766,459	3,064,044
20	(194,026)	119,222	432,470	745,718	1,058,966	1,372,214	1,685,462	1,998,710	2,311,958	2,625,206	2,938,454	3,251,702

This table shows the change in savings as a function of the two parameters in the header.

The difference from the previous table is that the values in the column (Y-axis) are the numbers of selected businesses in the project's target area.

Once again, the savings are highlighted in yellow according to the assumptions in the program. It is evident that as the number of selected businesses increases, the savings also increase, making the project more worthwhile.

This point is important in light of the fact that the project can be expanded after its initial implementation and more businesses can be added for even greater success. In Shefa-Amr, it is possible to add at least 10 more businesses to the project (total of 20), which will result in significantly higher savings compared to only 10 businesses. This is mainly because the initial investment made in the pilot can accommodate the additional businesses and serve all 10 additional businesses as well.

*Table S3: Sensitivity Analysis for the **Purchase** alternative - Annual savings as a function of:*

a) Variation in the price of mixed waste disposal and landfilling (values in the column).

b) Variation in the price of organic waste disposal (values in the row).

435,382	150	175	200	225	250	275	300	325	350	375	400
400	94,678	47,878	1,078	(45,722)	(92,522)	(139,322)	(186,122)	(232,922)	(279,722)	(326,522)	(373,322)
425	141,478	94,678	47,878	1,078	(45,722)	(92,522)	(139,322)	(186,122)	(232,922)	(279,722)	(326,522)
450	188,278	141,478	94,678	47,878	1,078	(45,722)	(92,522)	(139,322)	(186,122)	(232,922)	(279,722)
475	235,078	188,278	141,478	94,678	47,878	1,078	(45,722)	(92,522)	(139,322)	(186,122)	(232,922)
500	281,878	235,078	188,278	141,478	94,678	47,878	1,078	(45,722)	(92,522)	(139,322)	(186,122)
525	328,678	281,878	235,078	188,278	141,478	94,678	47,878	1,078	(45,722)	(92,522)	(139,322)
550	375,478	328,678	281,878	235,078	188,278	141,478	94,678	47,878	1,078	(45,722)	(92,522)
575	422,278	375,478	328,678	281,878	235,078	188,278	141,478	94,678	47,878	1,078	(45,722)
600	469,078	422,278	375,478	328,678	281,878	235,078	188,278	141,478	94,678	47,878	1,078
625	515,878	469,078	422,278	375,478	328,678	281,878	235,078	188,278	141,478	94,678	47,878
650	562,678	515,878	469,078	422,278	375,478	328,678	281,878	235,078	188,278	141,478	94,678



675	609,478	562,678	515,878	469,078	422,278	375,478	328,678	281,878	235,078	188,278	141,478
700	656,278	609,478	562,678	515,878	469,078	422,278	375,478	328,678	281,878	235,078	188,278
725	703,078	656,278	609,478	562,678	515,878	469,078	422,278	375,478	328,678	281,878	235,078
750	749,878	703,078	656,278	609,478	562,678	515,878	469,078	422,278	375,478	328,678	281,878
775	796,678	749,878	703,078	656,278	609,478	562,678	515,878	469,078	422,278	375,478	328,678
800	843,478	796,678	749,878	703,078	656,278	609,478	562,678	515,878	469,078	422,278	375,478

This table demonstrates the change in savings as a function of the two parameters:

- Prices of mixed waste disposal and landfilling per ton (values in the column - Y-axis).
As the price increases, the savings from diverting and composting the organic waste instead of disposing it in the landfill also increase, resulting in greater overall project savings.
- Prices of organic waste disposal (values in the row - X-axis).
As the price decreases, the savings of the project increase since it represents a cost incurred in the business plan for the collection of organic waste and its transfer to the working area.

*Table S4: Sensitivity Analysis for the **Self-Purchase** alternative - Annual savings as a function of the percentage change in support/investment from project establishment costs.*

Support/Investment Amount - U	0	63,850	127,700	191,550	255,400	319,250	383,100	446,950	510,800	574,650	638,500
Support/Investment Percent of Establishment Costs* - V	%0	%5	%10	%15	%20	%25	%30	%35	%40	%45	%50
Annual Savings - W	435,382	444,678	453,974	463,270	472,566	481,862	491,158	500,454	509,751	519,047	528,343
Investor's Share of Savings - X	0	22,234	45,397	69,490	94,513	120,466	147,347	175,159	203,900	233,571	264,171
Maximum Annual Return - Y	0	%35	%36	%36	%37	%38	%38	%39	%40	%41	%41
Return on Investment (in years) - Z	-	2.87	2.81	2.76	2.70	2.65	2.60	2.55	2.51	2.46	2.42

* Reminder: Project establishment costs amounted to 1,277,000 ILS.

U	702,350	766,200	830,050	893,900	957,750	1,021,600	1,085,450	1,149,300	1,213,150	1,277,000
V	%55	%60	%65	%70	%75	%80	%85	%90	%95	%100
W	537,639	546,935	556,231	565,527	574,823	584,120	593,416	602,712	612,008	621,304
X	295,701	328,161	361,550	395,869	431,118	467,296	504,403	542,441	581,407	621,304
Y	%42	%43	%44	%44	%45	%46	%46	%47	%48	%49
Z	2.38	2.33	2.30	2.26	2.22	2.19	2.15	2.12	2.09	2.06



This table provides insights into the impact of each of the three funding factors, mentioned under the "Project Funding" section above (excluding the option of taking a loan), on the annual savings of the program. It also offers additional insights that facilitate decision-making, as explained below. We will divide the explanations according to the nature of the funding source:

A) Government support/philanthropic donation or self-funding:

The table demonstrates the influence of the support amount or self-funding source on the annual savings of the project. As the percentage of overall support increases relative to the establishment costs, the savings also increase. This is because a higher percentage of support reduces the need for taking a loan, which decreases loan expenses and increases the final project savings (Refer to rows U, V and W in the table).

In our program's assumption, the support/investment percentage is 0%, resulting in the savings indicated in yellow.

B) Private investment:

In addition to the explanation provided in section A above, this situation involves the calculation of the amount invested by the private investor (X), which is equal to $V * W$. In other words, the percentage of investment received from the investor (relative to the total establishment costs) is multiplied by the annual project savings.

Row Y in the table represents the percentage of the investor's share (X) out of their investment ($Y = X / U$). It can be observed that this percentage increases as the investor's investment in the project grows, encouraging them to invest a larger amount.

Row Y is labeled "Maximum Annual Return" because the project can potentially return to the investors their share of the savings (based on their investment percentage - X) each year. However, this does not imply that the financial model must adopt this return method. It provides flexibility to create a suitable financial model for different potential investors.

For example, offering an investor who intends to invest 30% of the project costs (i.e., 383,100 ILS) an annual return of 20% (even though the maximum return from the table is 38%), allows the investor to recoup his investment within 5 years. From the sixth year onwards, the return rate can be reduced to 10% (which is still considered high compared to alternative returns in the Israeli market).



Another example is giving the same investor a fixed annual return of 10% for 5 years, and pay him back his investment at the end of the 5th year, thus after 5 years, he returns his investment including a cumulative return of 50% (first 5 years * 10% each year).

Row Z in the table indicates the number of years after which the investor can recoup their investment assuming the maximum annual return. As the investor increases the investment in the project, the likelihood of recouping their investment in fewer years also increases ($Z = U/X$).

Alternative 2: Leasing the Purchase of Composters from an Israeli Company:

This alternative is different from the self-purchase alternative mainly because it involves composters that are already in operation in Israel, and have a capacity of 2 tons per composter. This emphasizes the importance of proper planning for placing the composters in the work area as a function of the expected daily amount of organic waste from the selected 10 businesses.

Daily Organic Waste (tons)	2	4	6	8	10	12
Number of Composters	1	2	3	4	5	6

Since the project pilot was conducted with only 10 businesses, and assuming each of them produces an average of 1.5 tons of mixed waste per day, of which 40% is organic waste, these assumptions were conservative and realistic after field tests. It is reasonable to assume that the starting point of the plan is to place 3 composters in the area from the first day to handle 6 tons of organic waste per day.

Additional composters will be added to the work area after a concrete examination of the pilot project following its activation. This will allow for the placement of more composters after including more businesses in the program until reaching a level of multiples of the average daily amount of 2 tons of organic waste. It should be noted that until the additional composter is placed, work can be done on the seventh day (the basic assumption was 6 working days per week) to handle the excess organic waste that arrives at the area until the additional composters are set up.

• Establishment, Funding, and Ongoing Operational Costs:

In this case, the establishment costs of the project will amount to 677,000 NIS as a result of leasing the composters with financing, which saves the cost of purchasing the composters from abroad, which would have been 600,000 NIS.

Similarly, the basic assumption of the plan is that the establishment costs will be funded through a loan under the conditions mentioned in the plan.



Further the monthly financing leasing cost will be added, totaling approximately 324,000 NIS per year for three composters.

The ongoing operational costs will vary due to the fact that instead of a service agreement for the composter from abroad, there will be an annual service cost of approximately 11,000 NIS per year (instead of the assumed cost of 48,000 NIS per year in the self-purchase alternative).

Below is a summary table of the annual savings generated from this alternative:

Item	Amount (ILS)	Notes / Associated Calculations
Total annual savings after deducting organic waste treatment costs	1,276,704	C - No change from alternative 1.
Annual leasing financing payment	(324,000)	Specific expenditure for this alternative only.
Ongoing operational cost for organic waste of the selected 10 businesses	(742,760)	Slightly lower than the cost of alternative 1, which was 786,440 NIS, due to the difference in the annual service agreement.
Loan repayment including interest	(98,567)	Compared to 185,922 NIS in alternative 1, as establishment costs decreased to 677,000 NIS, resulting in a smaller loan.
Annual savings from diverting part of the cuttings waste for the benefit of the project	131,040	E - No change from alternative 1.
Total annual savings for the project	242,417	Compared to a savings of 435,382 according to alternative 1. The project still meets the economic viability criterion.

Sensitivity Analysis Tables for Alternative 2:

In this section, we present the same sensitivity analysis tables as in alternative 1. It can be seen that the trend remains the same, as the more composters are set up and larger quantities are processed in the composting process, the annual savings of the program increase accordingly.

The annual savings resulting from the financing leasing alternative are lower than the annual savings of alternative 1, but the economic viability of the project is maintained.

*Table S5: Sensitivity Analysis for the **Leasing** alternative - Annual savings as a function of:*

a) Percentage change in organic waste from total mixed waste (values in the column)

b) Average daily amount of mixed waste (values in the row)

	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
%40	(183,703)	(146,079)	10,545	48,169	204,793	242,417	399,041	436,665	593,289	630,913	787,537	825,161
%42.5	(173,914)	(126,501)	39,912	87,325	253,738	301,151	467,564	514,977	681,390	728,803	895,216	942,629
%45	(164,125)	(106,923)	69,279	126,481	302,683	359,885	536,087	593,289	650,491	826,693	883,895	1,060,097
%47.5	(154,336)	(87,345)	98,646	165,637	351,628	418,619	485,610	671,601	738,592	924,583	991,574	1,177,565
%50	(144,547)	(67,767)	128,013	204,793	281,573	477,353	554,133	630,913	826,693	903,473	1,099,253	1,295,033
%52.5	(134,758)	(48,189)	157,380	243,949	330,518	536,087	622,656	709,225	914,794	1,001,363	1,206,932	1,412,501
%55	(124,969)	(28,611)	67,747	283,105	379,463	475,821	691,179	787,537	883,895	1,099,253	1,314,611	1,529,969
%57.5	(115,180)	(9,033)	97,114	322,261	428,408	534,555	640,702	865,849	971,996	1,197,143	1,422,290	1,647,437
%60	(105,391)	10,545	126,481	242,417	477,353	593,289	709,225	825,161	1,060,097	1,295,033	1,529,969	1,764,905
%62.5	(95,602)	30,123	155,848	281,573	526,298	652,023	777,748	903,473	1,148,198	1,392,923	1,637,648	1,882,373
%65	(85,813)	49,701	185,215	320,729	456,243	710,757	846,271	981,785	1,236,299	1,490,813	1,745,327	1,999,841
%68	(76,024)	69,279	214,582	359,885	505,188	650,491	914,794	1,060,097	1,324,400	1,588,703	1,853,006	2,117,309
%70.0	(66,235)	88,857	243,949	399,041	554,133	709,225	864,317	1,138,409	1,412,501	1,686,593	1,960,685	2,234,777
%73	(56,446)	108,435	273,316	438,197	603,078	767,959	932,840	1,216,721	1,500,602	1,784,483	2,068,364	2,352,245
%75.0	(46,657)	128,013	302,683	477,353	652,023	826,693	1,001,363	1,295,033	1,588,703	1,882,373	2,176,043	2,469,713

*Table S6: Sensitivity Analysis for the **Leasing** alternative - Annual Savings as a function of:*

a) Variation in the number of businesses in the target area (values in the column)

b) Average daily quantity of mixed waste (values in the row)

	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3
5	(260,559)	(182,247)	(103,935)	(144,623)	(66,311)	12,001	90,313	49,625	127,937	206,249	284,561	243,873
6	(245,187)	(151,213)	(57,239)	(82,264)	11,710	105,685	80,659	174,633	268,608	243,582	337,557	431,531
7	(229,816)	(120,179)	(129,543)	(19,906)	89,731	80,368	190,005	299,641	290,278	399,915	509,552	500,189
8	(214,445)	(89,146)	(82,847)	42,453	48,752	174,051	299,350	305,649	430,949	437,248	562,547	687,846
9	(199,074)	(58,112)	(36,151)	104,811	126,773	267,734	289,696	430,657	452,619	593,581	734,542	756,504
10	(183,703)	(146,079)	10,545	48,169	204,793	242,417	399,041	436,665	593,289	630,913	787,537	825,161
11	(168,331)	(115,045)	57,241	110,528	282,814	336,101	508,387	561,673	733,960	787,246	840,533	1,012,819
12	(152,960)	(84,011)	103,937	172,886	241,835	429,784	498,733	686,681	755,630	824,579	1,012,528	1,200,477

13	(137,589)	(52,978)	150,634	235,245	319,856	523,467	608,078	692,690	896,301	980,912	1,184,523	1,388,134
14	(122,218)	(21,944)	78,330	297,603	397,877	498,150	717,424	817,698	917,971	1,137,245	1,356,518	1,575,792
15	(106,846)	9,090	125,026	240,962	475,898	591,834	707,770	823,706	1,058,642	1,293,578	1,528,514	1,763,450
16	(91,475)	40,123	171,722	303,320	434,918	685,517	817,115	948,714	1,199,312	1,449,910	1,700,509	1,951,107
17	(76,104)	71,157	218,418	365,678	512,939	660,200	926,461	1,073,722	1,339,982	1,606,243	1,872,504	2,138,765
18	(60,733)	102,190	265,114	428,037	590,960	753,883	916,806	1,198,730	1,480,653	1,762,576	2,044,499	2,326,422
19	(45,362)	133,224	311,810	490,395	668,981	847,566	1,026,152	1,323,738	1,621,323	1,918,909	2,216,494	2,514,080
20	(148,990)	45,258	239,506	433,754	628,002	822,250	1,135,498	1,448,746	1,761,994	2,075,242	2,388,490	2,701,738

*Table S7: Sensitivity Analysis for the **Leasing** alternative - Annual Savings as a function of:*

a) Variation in the price of mixed waste disposal and landfilling (values in the column).

b) Variation in the price of organic waste disposal (values in the row).

	150	175	200	225	250	275	300	325	350	375	400
400	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)	(332,287)	(379,087)	(425,887)	(472,687)	(519,487)	(566,287)
425	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)	(332,287)	(379,087)	(425,887)	(472,687)	(519,487)
450	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)	(332,287)	(379,087)	(425,887)	(472,687)
475	42,113	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)	(332,287)	(379,087)	(425,887)
500	88,913	42,113	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)	(332,287)	(379,087)
525	135,713	88,913	42,113	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)	(332,287)
550	182,513	135,713	88,913	42,113	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)	(285,487)
575	229,313	182,513	135,713	88,913	42,113	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)	(238,687)
600	276,113	229,313	182,513	135,713	88,913	42,113	(4,687)	(51,487)	(98,287)	(145,087)	(191,887)
625	322,913	276,113	229,313	182,513	135,713	88,913	42,113	(4,687)	(51,487)	(98,287)	(145,087)
650	369,713	322,913	276,113	229,313	182,513	135,713	88,913	42,113	(4,687)	(51,487)	(98,287)
675	416,513	369,713	322,913	276,113	229,313	182,513	135,713	88,913	42,113	(4,687)	(51,487)
700	463,313	416,513	369,713	322,913	276,113	229,313	182,513	135,713	88,913	42,113	(4,687)
725	510,113	463,313	416,513	369,713	322,913	276,113	229,313	182,513	135,713	88,913	42,113
750	556,913	510,113	463,313	416,513	369,713	322,913	276,113	229,313	182,513	135,713	88,913
775	603,713	556,913	510,113	463,313	416,513	369,713	322,913	276,113	229,313	182,513	135,713
800	650,513	603,713	556,913	510,113	463,313	416,513	369,713	322,913	276,113	229,313	182,513

*Table S8: Sensitivity Analysis table for the **Leasing** alternative - Annual Savings as a function of the percentage change in support/investment from project establishment costs.*



Support/Investment Amount - U	-	33,850	67,700	101,550	135,400	169,250	203,100	236,950	270,800	304,650	338,500
Support/Investment Percent of Establishment Costs * - V	%0	%5	%10	%15	%20	%25	%30	%35	%40	%45	%50
Annual Savings - W	242,417	247,346	252,274	257,202	262,131	267,059	271,987	276,916	281,844	286,772	291,701
Investor's Share of Savings - X	0	12,367	25,227	38,580	52,426	66,765	81,596	96,921	112,738	129,048	145,850
Maximum Annual Return - Y	0	%37	%37	%38	%39	%39	%40	%41	%42	%42	%43
Return on Investment (in years) - Z		2.74	2.68	2.63	2.58	2.54	2.49	2.44	2.40	2.36	2.32

U	372,350	406,200	440,050	473,900	507,750	541,600	575,450	609,300	643,150	677,000
V	%55	%60	%65	%70	%75	%80	%85	%90	%95	%100
W	296,629	301,557	306,486	311,414	316,342	321,271	326,199	331,127	336,056	340,984
X	163,146	180,934	199,216	217,990	237,257	257,017	277,269	298,015	319,253	340,984
Y	%44	%45	%45	%46	%47	%47	%48	%49	%50	%50
Z	2.28	2.25	2.21	2.17	2.14	2.11	2.08	2.04	2.01	1.99