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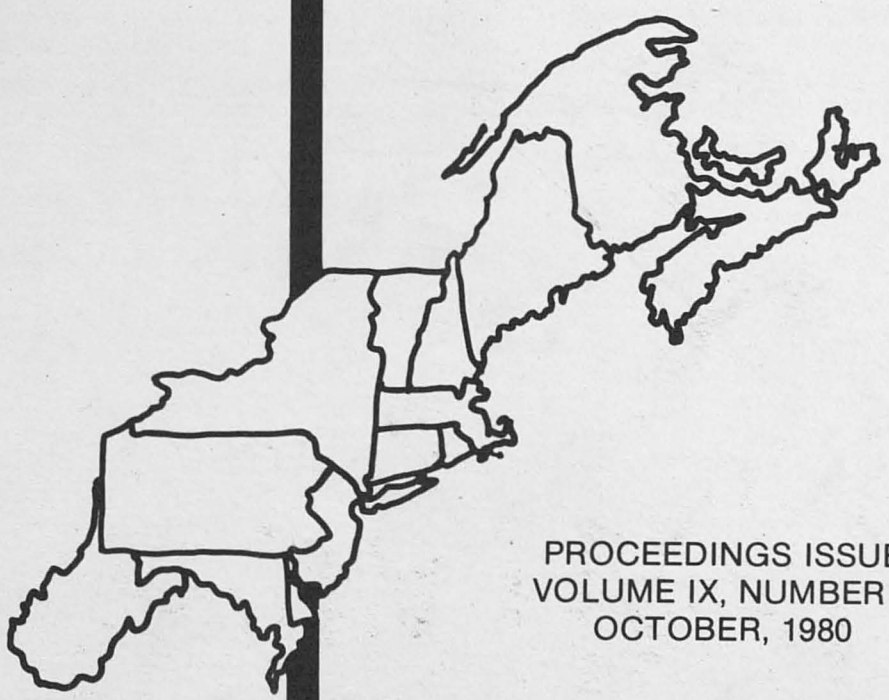

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WASTE RECYCLING—FACTORS AFFECTING THE RESIDENTIAL MARKET FOR ORGANIC BASED FERTILIZERS

Donn A. Derr, Michael C. Varner, and Gregory J. DiLalo

INTRODUCTION

Economic activity producing primary goods and services often generates secondary "products" or residuals. For those residuals that are highly toxic, the only alternatives are complete destruction or long-term storage in some safe and efficient manner. But for certain residuals that are biodegradable, such as animal wastes and sewage sludges (relatively free of heavy metals), recycling is possible, particularly through soil incorporation and eventual plant uptake. These residuals, on a dry weight basis, will normally contain some nitrogen, phosphorus and potash (less than 10 percent total), and organic matter of at least 50 percent.

Through recycling, the need for virgin material is reduced, the pressure on existing landfills is modified, and, in some cases, energy consumption can be lowered. But the market for recycled materials has met with varying success over time. The "scrap" iron market has been in existence for decades. The collection of aluminum cans for sale is common with civic groups, but reflecting perhaps a social environmental commitment as much as an economic motivation. Sporadic markets for wet sludges have emerged in certain rural regions of the country but are unacceptable in metropolitan areas. Composted sewage sludge, which is more acceptable in metropolitan regions, appears to be establishing limited markets, mainly on the West Coast. Dehydrated poultry and other animal waste products are popular among gardeners who are organically oriented. Current prices for the latter products are approximately fifteen to thirty cents per pound of product and two to four dollars per pound of plant nutrient (DiLalo, 1979).

This paper explores the potential of expanding the residential gardening market in New Jersey for organic based fertilizers, primarily for products like dehydrated animal waste and composted sewage sludges. Discussion includes current gardening patterns, the role of gardening knowledge, and the factors that most influence organic-based fertilizer use and nonuse.

The use of organic fertilizers was expected to be influenced by a number of factors, economic and otherwise. In terms of price, organic fertilizers are generally more expensive than inorganic fertilizers per amount of N, P, and K. Thus, the use of organic fertilizers was expected to be positively related to income.

Other types of factors expected to be related to the use of organic fertilizers were knowledge of gardening both general and organic, the degree of interest and involvement in gardening, whether the home was owned or rented, and the need for the soil improvement attributes of organic fertilizers. These factors were all expected to be positively related to organic fertilizer usage. It was also expected that the more rural the community in which the household resided, the more likely the use of organic fertilizers.

The demographic aspects of age and education were also thought to be possible factors. In view of the renewed interest in nature and natural products, particularly among younger people, age was expected to be indirectly related to organic fertilizer usage. The possible influence of education could not be postulated.

RESEARCH PROCEDURES

Data was secured by subcontracting with the Eagleton Institute of Politics, Rutgers-The State University of New Jersey. Data collection was divided into two phases: (1) a random sample of the household population in New Jersey, and (2) a stratified random sample of gardening households from the first phase. The surveys were conducted by telephone. The initial survey included 2,211 households and the second 335. The results of the second survey serve as the data base for this paper.

From the initial 2,211 households, data were obtained regarding (1) types of gardening activity, (2) the number of house plants, and (3) days spent on outside gardening activities. Household demographics were also collected. Upon completion, the 2,211 were stratified by number of days spent on outside gardening as light, medium, and heavy gardeners, and apartments. To be included, an apartment resident had to possess at least ten house plants.

From the 335 respondents interviewed, data regarding (1) current gardening activity, (2) size of lot and vegetable garden, (3) equipment used or available for gardening, (4) time spent gardening, (5) gardening products used, (6) gardening knowledge, (7) sources of information, (8) attitude toward organic fertilizer products, and (9) household demographics were collected. The principal household gardener was interviewed and if not present when called, the interviewer made an appointment for a later time.

Except for size of lot and vegetable garden, nominal and ordinal levels of measurement were used. Also, most of the data were grouped. Chi-square and discriminant analysis were used to identify variables associated with gardening patterns, gardening knowledge and those explaining the use or nonuse of organic-based fertilizers. Two-way crosstabulations along with the chi-square statistic were used to test for association between variables. Discriminant analysis was used to select those variables that best separated users and nonusers.

RESULTS

The following discussion focuses on: (1) description of the households' demographic profile, (2) extent of gardening activity, (3) use of fertilizer and soil amendments (conditioners), (4) knowledge of gardening, and (5) factors influencing the use and nonuse of organic fertilizer products.

Demographic Profile

The sample of 335 New Jersey residents reflects the characteristics of an urbanized state. Nearly half (49 percent) of the

Donn A. Derr, Michael C. Varner and Gregory J. DiLalo are Associate Professor, Assistant Professor, and Research Associate, respectively, Department of Agricultural Economics and Marketing, Rutgers—the State University, New Brunswick, New Jersey. Paper of the Journal series, New Jersey Agricultural Experiment Station, Cook College, Rutgers—the State University, New Brunswick, New Jersey.
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respondents were in white collar occupations, followed by 21 percent in blue collar jobs. About one in ten was self employed or retired. One in three possessed a college degree and 24 percent "some college." Twenty percent were high school graduates and the balance, 15 percent, had less than a high school education.

One in five earned at least $30 thousand annually, 27 percent between $20 and $30 thousand, and 40 percent $10 to $20 thousand. Fourteen percent earned less than $10 thousand annually. Eighty-two percent resided in the suburbs; 59 percent in the new areas, and 23 percent in the older suburbs. Only one in five resided in the central city, and 13 percent in rural areas.

By stratifying the 335 sample towards the more intensive gardeners, these households were older, more educated, had higher incomes, and were more likely to own than rent, compared to the 2,211 sample. Geographically, the 335 households were more typically located in newer suburbs in the central portion of the state.

Overall Gardening Activity

Data were secured on both inside and outside activities, but the emphasis was on the latter. Eighty-four percent of the households indicated the presence of a lawn (Table 1). For vegetable and flower gardening activity, the rate was lower at about 58 percent each. Shrub care was 63 percent and composting of residue 30 percent. Interest and care of houseplants was indicated by 91 percent of the respondents. On average, each household was involved in 3.5 different gardening activities (exclusive of composting).

Use of Fertilizers and Soil Conditioners

Two-thirds of the households caring for lawns themselves applied some fertilizer. Typically, one or two applications were made in a year's time (56 percent). Of those applying plant nutrients, one-fourth used an organic source (Table 2).[1] Thus, for the 251 households maintaining their lawn themselves, 18 percent indicated using an organic fertilizer. For the other gardening activities, fertilizer or soil conditioner use was most prevalent for vegetable gardening followed by flower care. A similar pattern was indicated for the rate of usage of organic based fertilizer.

A total of 184 gardeners had used fertilizer on lawns. Of these, 55 percent indicated that they were familiar with organic fertilizer. For those familiar with organic fertilizer, only 48 percent had ever used the product. Of those who had used organic fertilizer, 81 percent indicated they planned to continue using it.

Gardening Knowledge

It was generally hypothesized that basic gardening knowledge, i.e., knowledge of factors contributing to soil fertility and tilth, would greatly affect the use and market potential for organic based fertilizers. Since these products normally contain less than 10 percent plant nutrients (N, P, and K) and at least 50 percent organic matter, they are used both as a source of plant food and for improved soil tilth. If the gardener is not aware of the role of organic matter, the market potential of organic based fertilizers will be constrained. Assuming that this is true, then how might an educational program be conducted so that understanding could be expanded? For example, should such information be available on the bag's label, through pamphlets and newspapers, or some other media? To test the gardening knowledge hypothesis, three questions were asked. Two questions required self-evaluations of gardening knowledge (general gardening and organic gardening) and the third was an open ended question used to verify the stated level of organic gardening. It asked the respondents to define organic gardening. The respondents were evaluated by comparing their response to the latter question with accepted principles of organic gardening.

The stated level of general gardening knowledge was much higher than for organic gardening. Only those indicating at least a minimal level of general gardening knowledge were asked to state their level of organic gardening knowledge. The stated levels of knowledge are indicated below:

Stated Level of Knowledge	*Types of Gardening*			
	General Gardening		Organic Gardening[a]	
	(No.)	(%)	(No.)	(%)
Good Deal	72	21.5	27	8.6
Some	171	51.0	93	29.6
Not very much	72	21.5	107	34.1
Nothing	20	6.0	87	27.7
Total	335	100.0	314	100.0

[a]Those indicating no knowledge of general gardening were not asked to state their knowledge of organic gardening. One respondent indicating some knowledge of general gardening did not respond to the organic gardening knowledge question.

In evaluating the organic definition question, the responses were classified as (1) consistent with accepted principles, (2) indeterminate, or (3) misunderstanding. Eighty-five percent were considered consistent, 5 percent indeterminate and 10 percent represented misunderstanding. Thus, 72.3 percent of those respondents who stated they had at least minimal knowledge of general gardening indicated they had some knowledge of organic gardening and 85 percent of these households defined the concept correctly. This suggests the stated levels of organic gardening knowledge are reliable.

The factors believed to be associated with knowledge were analyzed by a set of crosstabulations and summarized by chi-square analysis (Tables 3 and 4). The more important variables associated with general gardening knowledge were: (1) vegetable garden activity and garden size, (2) size of lot, (3) flower gardening, (4) overall gardening effort (days spent gardening), and (5) sources of information (gardening books). Organic gardening knowledge was found to be associated with vegetable gardening, on-site composting, and sources of gardening information (gardening books and magazine subscriptions). Use of organic fertilizer was also associated with organic gardening knowledge.

Respondents were also asked to indicate sources of gardening information. Sources most frequently mentioned were: (1) friends, (2) labels, (3) newspapers, (4) gardening books, and (5) television/radio. Alternatively, the sources they considered to be most important were (1) friends, (2) gardening books, (3) gardening magazines, (4) newspapers, and (5) county agents, in that order.

Factors Influencing Use and Non-Use of Organic Fertilizers

The results indicate that a number of factors were associated with stated knowledge of organic gardening. It was expected that the same was true with respect to the actual usage of organic fertilizers. Discriminant analysis was used to evaluate factors possibly influencing the use and nonuse of organic fertilizers and to identify that set of factors that best predicted membership in the user and nonuser groups. This analysis was restricted to homeowners because renters were few in number and had heterogeneous housing situations.

[1]Some fertilizers are blends of organic and inorganic products. Some respondents may have considered these products to be organic fertilizers and included themselves among the users of organic fertilizers.

Table 1.
Gardening Activity

	Lawn[a]		Vegetable Garden		Flower Garden		Shrub Care		House Plants		Compost Pile[b]	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Yes	281	83.9	197	58.8	190	57.2	209	62.8	303	90.7	99	52.9
No	54	16.1	138	41.2	142	42.8	124	37.2	31	9.3	88	47.1
Total[c]	335	100.0	335	100.0	332	100.0	333	100.0	334	100.0	187	100.0

[a]Includes seven rentals with a lawn.

[b]Includes only those reporting a vegetable garden. Four respondents indicated "don't know" and 6 responses were missing.

[c]Missing responses: flower gardening (3), shrub care (2), house plants (1).

Table 2.
Fertilizer or Soil Conditioner (Amendment) Use

User	*Lawn*				*Vegetable Garden*				*Flower Garden*			
	Fertilizer[a]		Organic Fertilizer[b]		Fertilizer or Conditioners		Organic Fertilizer		Fertilizer or Mulch		Organic Fertilizer	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Yes	184	73.3	46	25.0	156	81.7	64	41.0	135	71.8	40	29.6
No	67	26.7	138	75.0	35	18.3	92	59.0	53	28.2	95	70.4
Total	251	100.0	184	100.0	191	100.0	156	100.0	188	100.0	135	100.0

User	*Shrubs*				*House Plants*			
	Fertilizer or Mulch		Organic Fertilizer		Fertilizer or Conditioner		Organic Fertilizer	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Yes	112	53.8	26	23.2	188	62.0	27	14.4
No	96	46.2	86	76.8	115	38.0	161	85.6
Total	208	100.0	112	100.0	303	100.0	188	100.0

[a]A total of 281 lawns reported; 251 households maintained the lawn themselves, and 27 used an outside service. Lawn maintenance was defined as care other than mowing.

[b]Eighty-eight of the 138 nonusers of organic fertilizers on lawns, as reported here, are assumed to be nonusers. They had reported they did not know what organic fertilizer is, but were not actually asked if they had used it.

In linear discriminant analysis a function is formed as follows (Morrison, 1974:2-443):

$$Z_i = b_0 + b_1X_{1i} + b_2X_{2i} + \ldots = b_nX_{ni}$$

where

Z_i = the ith individual's discriminant score

b_j = the discriminant coefficient for the jth variable

X_{ji} = the ith individual's value for the jth independent variable

The discriminant analysis of the Statistical Package for the Social Sciences (SPSS) was used in this analysis.[2] In this program all independent variables are screened by use of the partial multivariate F ratio. "The partial F ratio measures the discrimination introduced by the variable after taking into account the discrimination achieved by the other selected variables" (Klecka, 1974:448). Variables meeting a minimum F (1.0) ratio were then evaluated for inclusion in a stepwise manner on the basis of Rao's V. This brings in the variable which adds the most to the separation of the groups (Klecka, 1974:448). To avoid removal, the variables previously entered were required to maintain the minimum F ratio.

Prior to conducting the survey for this study it was felt that there were basic differences in the possibilities of using organic fertilizers on lawns as compared to the possibilities for their use in other gardening activities. Other gardening activities were vegetable gardens, flower gardens, shrubs and potted plants. Use of the product on existing lawns requires that it be uniform, whereas in other gardening activities in which the product can be worked into the soil it can be somewhat nonuniform. Because of these differences, respondents were asked, in separate questions, whether they used organic fertilizers in lawns and whether they used organic fertilizers in gardening activities other than lawns. The routine used

[2]Technically linear discriminant analysis is not the optimal procedure when, variables have nonnormal distribution (Goldstein and Dillon, 1978:1-10). However, after reviewing several studies that examined the consequences of applying linear discriminant analysis to nonnormal data, Lachenbruch (1975:45) concluded "the linear discriminant function performs fairly well on discrete data of various types." In the present analysis the relative and absolute values of the standardized discriminant coefficients remained quite stable across several specifications of the functions.

Table 3.
Influence of Selected Factors on Stated Knowledge of General Gardening

Variable	N	Chi-Square Statistic	Degrees of Freedom	Probability Level
Region of the State[a]	335	10.74	6	>.05
Residential Community[b]	335	16.40	9	>.05
Age of Respondent[c]	324	12.68	6	<.05
Income[d]	291	6.72	9	>.05
Formal Education[e]	333	5.75	9	>.05
Tenure Status[f]	333	21.13	3	<.001
Presence of Vegetable Garden[g]	335	28.34	3	<.001
Size of Vegetable Garden[h]	186	22.94	6	<.001
Size of Lot[i]	243	29.98	6	<.001
Presence of Flower Garden[g]	278	17.20	3	<.001
Presence of Shrubs[g]	279	7.85	3	<.05
Presence of House Plants[g]	334	1.03	3	>.05
Presence of Compost Pile[g]	187	12.27	3	<.01
Number of Gardening Days[j]	276	58.84	15	<.001
Use Gardening Books[g]	280	35.03	3	<.001
Gardening Magazine Subscription[g]	279	14.40	3	<.01
Use Organic Fertilizer[g]	221	11.37	3	<.01

[a]North, Central or South
[b]Center City, City/Older Suburbs, Newer Suburbs, Rural
[c]Under 30, 30-50, Over 50
[d]Under $10,000, $10,000-$20,000, $20,000-$30,000, over $30,000
[e]Less than high school, high school graduate, some college, college degree
[f]Own or rent
[g]Yes or no response
[h]100 sq. ft. or less, 101-400, more than 400.
[i].25 acres or less, .26-.75, more than .75.
[j]None, 1-2, 3-5, 6-10, 10-20, over 20.

Table 4.
Influence of Selected Factors on Stated Knowledge of Organic Gardening

Variable	N	Chi-Square Statistic	Degrees of Freedom	Probability Level
Region of the State[a]	314	2.01	6	>.05
Residential Community[b]	314	4.56	9	>.05
Age of Respondent[c]	304	15.93	6	<.05
Income[d]	271	5.91	9	>.05
Formal Education[e]	313	9.26	9	>.05
Tenure Status[f]	312	3.66	3	>.05
Presence of Vegetable Garden[g]	314	35.39	3	<.001
Size of Vegetable Garden[h]	183	10.36	6	>.05
Size of Lot[i]	237	14.51	6	<.05
Presence of Flower Garden[g]	267	7.67	3	>.05
Presence of Shrubs[g]	268	4.78	3	>.05
Presence of House Plants[g]	313	5.54	3	>.05
Presence of Compost Pile[g]	183	22.69	3	<.001
Number of Gardening Days[j]	265	23.26	15	>.05
Gardening Magazine Subscriptions[g]	260	35.17	3	<.001
Use of Gardening Books[g]	269	21.59	3	<.001
Use of Organic Fertilizers[g]	215	31.14	3	<.001

[a]North, Central or South
[b]Center City, City/Older Suburbs, Newer Suburbs, Rural
[c]Under 30, 30-50, Over 50
[d]Under $10,000, $10,000-$20,000, $20,000-$30,000, over $30,000
[e]Less than high school, high school graduate, some college, college degree
[f]Own or rent
[g]Yes or no response
[h]100 sq. ft. or less, 101-400, more than 400.
[i].25 acres or less, .26-.75, more than .75.
[j]None, 1-2, 3-5, 6-10, 10-20, over 20.

to ask these questions resulted in far fewer (94) responding to the use in lawns questions compared to those (208) responding to the use in other gardening activities. The difference, therefore, is not necessarily attributable to the incidence of each type of gardening.

The two dependent variables and the possible discriminating or independent variables considered were:[3]

LAWN Use of organic fertilizers on lawns
1: Yes 0: No

GARD Use of organic fertilizers in other gardening activities
1: Yes 0: No

AGE Age of respondent
1: Younger than thirty
2: Thirties and forties
3: Fifty and older

ED Respondent's level of formal education
1: Less than high school
2: High school graduate
3: Some college
4: College degree

IN Annual family income
1: Less than $10,000
2: $10,000-$20,000
3: $20,000-$30,000
4: More than $30,000

NORTH North New Jersey residents
1: Yes 0: No

CENTRAL Central New Jersey residents
1: Yes 0: No

SOUTH South New Jersey residents
1: Yes 0: No

CENCTY Central city residents
1: Yes 0: No

OLDSUB Older suburbs residents
1: Yes 0: No

NEWSUB Newer suburbs residents
1: Yes 0: No

RURAL Rural residents
1: Yes 0: No

DAYS Days spent working in garden activities during previous two months
1: None
2: 1 or 2
3: 3-5
4: 6-10
5: 10-20
6: Over 20

LOT Size of respondent's lot
1: Not more than ¼ acre
2: More than ¼ acre, but not more than ½ acre
3: More than ½ acre, but not more than ¾ acre
4: More than ¾ acre, but not more than 1 acre
5: More than 1 acre

PLOT Size of vegetable garden
1: 100 sq. ft. or less
2: 101-400 sq. ft.
3: More than 400 sq. ft.

KGG Stated level of knowledge of general gardening
1: A good deal
2: Some
3: Not very much
4: Nothing at all

KOG Stated level of knowledge of organic gardening (coding same as KGG)

BOOKS Use of gardening books as a source of gardening information
1: Yes 0: No

LABELS Use of product labels as an important source of gardening information
1: Yes 0: No

MAG Respondent subscribed to gardening magazines
1: Yes 0: No

NEWS Use of newspapers as an important source of gardening information
1: Yes 0: No

CUTS Respondent started new potted plants from cuttings
1: Yes 0: No

Dividing the X_j independent variables by their standard deviations produces standardized coefficients, which indicate the relative importance of each variable (Morrison, 1974:2-450). The sign of the coefficient indicates the direction of effect. The discriminant function for use of organic fertilizers on lawns along with the standardized coefficients was:

LAWN = .727 SOUTH - .516 KGG - .397 KOG -
.255ED - .306LOT + .229 DAYS

The variables are listed in the order in which they entered the function in the stepwise routine. The group centroid for users was .691 and for nonusers -.663. These are the average values for the discriminant function for users and nonusers, respectively (Klecka, 1975:443).

The canonical correlation was .565; the square of this (.319) gives an indication of the amount of variation in the use and nonuse of organic fertilizers in lawns explained by the function (Klecka, 1975:442). The function correctly classified 77 percent of the cases.

Respondents in South New Jersey were more likely to be users than were respondents in Central and North New Jersey. A possible explanation for this is that gardeners in that region may feel the poorer, more sandy soils there require the addition of more organic matter, whereas the gardeners in Central and North New Jersey, where the soils are heavier, see less need for adding organic matter. Thus, region may be representing soil type.

Stated general gardening knowledge and stated organic gardening knowledge were the second and third most important factors, respectively. The Spearman correlation coefficient for these variables was .467. Thus, they explain somewhat different aspects of users and nonusers. They indicate that gardeners with low personal appraisals of their gardening knowledge were less likely to use organic fertilizers on lawns.

Higher levels of education were associated with nonuse of organic fertilizers on lawns. Given the lower N-P-K level of organic fertilizers, higher educated gardeners may be more likely to feel organic fertilizers are too expensive. Alternatively, the opportunity

[3]BOOK, LABELS, NEWS, and CUTS were excluded from the LAWN function because they pertained to other gardening activities and were ascertained in that context. Singularity was not a problem since not all parts of the dummy variable sets for region or residential community attempted to enter the functions simultaneously.

cost of the additional application time(s) required for organic fertilizers would be higher in most instances for the more educated individual.

The least important variables in the equation reflect the level of gardening activity. The larger the lot the less likely the gardener was to use organic fertilizers. This may also be a result of the lower N-P-K levels of organic fertilizers increasing application amount and time as lot size increases. In contrast, the likelihood of using organic lawn fertilizers was shown to rise with the number of days spent gardening in the previous two months. This is a measure of gardening interest and intensity.

Somewhat different relationships were found to have explained the usage of organic fertilizers in other gardening activities. The discriminant function with the variables listed in the order of entry and the standardized coefficients was:

GARD = - .570DAYS + .412KOG - .476NEWS +
.325OLDSUB - .358MAG - .228SOUTH +
.262CUTS - .178BOOKS + .140PLOT

The group centroid for users was - .796 and for nonusers .458. Reversal of the signs of the centroids explains the reversal of the signs of the variables common to both functions.[4] The canonical correlation squared was .269. Seventy-five percent of the cases were correctly classified.

Days spent in gardening activities also had a positive relationship with the use of organic fertilizers in other gardening activities. Being the most important factor, however, implies that gardening interest and intensity are more important in other gardening activities than in lawns.

Stated knowledge of organic gardening was positively related to the use of organic fertilizers. It should also be noted that the stated knowledge of general gardening apparently did not have a measurable bearing on the use of organic fertilizers in other gardening activities, whereas it was the second most important factor in the LAWN function.

Gardeners using newspapers as an important source of gardening information were more likely to be users of organic fertilizers. Articles by county and state Extension personnel as well as special feature articles appear regularly in local New Jersey newspapers. Some of these articles seem to favor organic gardening practices. The relationship of the use of organic fertilizers and the use of newspapers as an important source of information may either result from the nature of these articles or the types of gardeners who use newspapers as an important source of information.

Subscriptions to gardening magazines and the use of books as an important source of gardening information were also characteristic of users. Using these sources of information reflects an interest in gardening. They were, however, less important than newspapers.

Type of residential community and geographic location had some bearing. Respondents living in older suburbs were likely to be nonusers. This was consistent with the expectation that use of organic fertilizers and the degree the residential community was rural would be positively related. Most of this relationship was apparently captured by the older suburbs variable since none of the other residential community variables entered the function. As with the lawn function, residence in South New Jersey was positively related to usage.

[4]The location of the user and nonuser groups in the discriminant space is determined by the influence and coding of the first variable to enter the function. DAYS, which entered the GARD function first, and SOUTH, which entered the LAWN function first, both were positively related to use, but SOUTH and DAYS were coded in opposite ways.

Propagation of potted plants by cutting and garden plot size were both negatively related to usage. Propagation reflects an interest in gardening. Thus, the negative relationship with usage was unexpected. The availability of inexpensive, odor-free, synthetic propagation mediums such as perlite and vermiculite may have a bearing on the association between propagation by cuttings and the use of organic fertilizers. The relationship of garden plot size was consistent with that of lot size in the lawn function. They suggest that those caring for large areas find the use of organic fertilizers inconvenient.

Variables with limited discriminatory power were LOT and DAYS, which entered the LAWN function with more than a 10 percent probability that the additional separation of the user groups they provided could be due to chance. The same was true for CUTS, PLOT, and BOOKS in the GARD function. Removal of these variables changed only the absolute values of the remaining variables in each function. Also, AGE, IN, and LABELS did not enter either function.

Product Acceptance

Consumer acceptance would seem to be a possible major obstacle to the marketing of organic waste products. The origin of these products might be expected to be unattractive to some gardeners. This possibility was, however, not supported. Only three percent of nonusers of organic fertilizers in gardening activities other than lawn care indicated their reason for nonuse was that it was unpleasant to use (Table 5). Altogether, about 18 percent found something objectionable about the product. Over 70 percent reported they never thought of it. This supports the results of the discriminate analysis by indicating that increasing knowledge of the product will have more positive effects than efforts directed at overcoming consumer resistance of the product.

Table 5.
Reasons for Nonuse of Organic Fertilizers in Gardening Activities Other than Lawn Care

Reason for Nonuse	*Respondents* (No.)	(%)
Unpleasant to use	3	3.4
Too expensive	6	6.9
Too difficult to obtain	5	5.7
Too bulky	1	1.1
Does not apply well in a spreader	1	1.1
No benefit	8	9.2
Never thought of it	63	72.4
Total nonusers responding	87	99.8[a]
Nonusers not responding	51	
Total nonusers	138	

[a]Percentages do not sum to 100 due to rounding.

IMPLICATIONS

Organic fertilizers are used by less than half of the active gardeners in New Jersey. Most nonusers do not find the product objectionable, but rather report that they just never thought of it. Usage is primarily related to region, the amount of time spent in gardening activities, and stated levels of general and organic gardening knowledge. Time spent in gardening activities was most important in gardening activities other than lawn care, whereas region was most important in lawn care.

Educational and promotional efforts to increase the market for organic fertilizers should focus on increasing interest and degree of involvement in gardening, as well as knowledge of organic gardening practices. Respondents situated in South New Jersey, which is characterized by poor soil structure, were more likely to be users. This finding suggests that promotional and educational efforts may be more successful in areas with soil structure problems.

Organic product use is related to reliance upon newspapers for gardening information and gardening magazine subscriptions and not to the use of product labels. Thus, marketing initiatives may be most productive if directed through newspapers and magazines rather than relying on point of purchase promotion.

The findings also suggest that gardeners caring for large areas tend to be nonusers. This implies that some effort should be made to produce organic fertilizers that are more convenient to use. Pelletization is a possibility.

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