J. ENVIRONMENTAL SYSTEMS, Vol. 20(1) 71-90, 1990-91

THE IMPLEMENTATION OF LOCAL SOLID WASTE POLICIES IN FLORIDA

JONATHAN P. WEST

M. MARGARET HALEY

STEPHANIE J. LEE

Department of Political Science
University of Miami

RICHARD C. FEIOCK
Department of Public Administration
Florida State University

ABSTRACT

In coming years, America's waste management problem will become critical. As local landfills approach capacity, new efforts to cope with garbage must be developed. This study assesses current practices and policies for managing solid waste, as well as the attitudes of managers through a statewide survey of local solid waste managers in Florida. Specifically, the research reports the state of the art in solid waste management (SWM) in Florida; assesses the attitudes of Florida's solid waste managers on SWM issues; identifies the rationale and program design features of effective recycling programs; and identifies state mandates for SWM which shape local policies and practices. The article also details some of the problems confronting local SW managers and the lessons to be learned from successful experiences in managing garbage.

Concern about solid waste disposal is increasing rapidly. The United States can no longer ignore the "crisis" involving what to do with all of its waste. Americans generated 160 million tons of garbage in 1988 and this figure is expected to rise to 200 million tons by the year 2000. Florida alone generates more than 15.8 million tons of waste per year [1], and this figure is projected to increase to more than 30

doi: 10.2190/37A2-W0VB-TN8E-MH9Q
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million tons by the turn of the century [2]. But, Florida is in the early stages of responding to what the Secretary of the Department of Environmental Regulation (DER) has called "the most neglected problem in the State" [1].

The state's policy response took the form of the 1988 Solid Waste Management Act (SWMA) which has been called "the most ambitious assault on solid waste yet attempted in any state" by the *Wall Street Journal*. This Act provides a general framework for state and local actions in dealing with solid waste. Florida's solid waste strategy, like that followed nationwide, relies heavily on landfills, waste-to-energy plants, and recycling.

Landfills are still the predominant means of disposing of solid waste. Nationally, approximately 90 percent of trash is buried in landfills. In Florida, landfills account for 75 percent of waste disposal [1]. The landfills that are currently used in this country, however, are costly and closing at a rapid rate. The average cost of a landfill in the United States increased by more than 50 percent between 1986 and 1987 [3] and the number of landfills has dropped from an estimated 10,000 in 1980 to 6,500 in 1988. The EPA projects that more than half of the nation's existing landfills will reach their capacity within five years [4]. In Florida, the number of landfills has decreased from 500 in 1975 to about 170 today. At current landfill usage rates, 64,000 acres of land would be needed within the next seven years for additional landfills in Florida alone [5]. The siting of new landfills is oftentimes very difficult. It is an especially arduous task in Florida due to the presence of aquifers just below the surface. Over 90 percent of the state's drinking water comes from groundwater [1]. Using landfills as the primary means of disposing of waste increases the risk of groundwater contamination. An environmentally aware and aroused public compounds siting problems because most people do not want landfills located near their neighborhood (the "not in my backyard" or NIMBY syndrome).

Waste-to-energy (WTE) plants offer a second way to cope with solid waste. Such plants reduce trash while simultaneously providing steam and electricity. Approximately 155 incinerators are currently operating nationwide, twenty-nine more are currently being built [6], and by 1995 there may be about 300 of these plants [7]. In Florida, 21 percent of waste is burned in twelve WTE facilities (three others are under construction). These facilities are attractive to public officials because they can reduce the flow of waste by at least 60 percent [8]. The public, in general, tends to oppose WTE plants, mainly because of the fear that they will pollute the air with dioxins and threaten the underground water resources when the ashes are placed in landfills [8]. It is not coincidental that sixty-four plants throughout the country have been delayed, canceled, or blocked.

Recycling is a third strategy for managing garbage. To succeed, recycling programs require the support and compliance of affected citizens. Currently thirty states have laws encouraging recycling, ten require it. One indication of the increased emphasis given to recycling is that $900 million is being budgeted in

twenty states to fund recycling programs in the next two years [9]. Around 10 percent of the nations's trash is being recycled; in Florida the figure is 4 percent. The EPA has set a goal of recycling 25 percent of the nation's waste by 1992. Florida's 1988 SWMA makes recycling mandatory in all sixty-seven counties and sets a recycling goal of 30 percent to be achieved by 1994. Counties can decide how to implement a recycling program–whether at a central facility or via curbside collection. While each county has begun developing a recycling program, none is near either the 25 percent or 30 percent goal as of yet.

Our study examines the design and implementation of local solid waste management policies in Florida. This exploratory research focuses on four fundamental questions:

1. How is garbage managed by Florida's local jurisdictions?;
2. What are the implementation strategies and program design features for local solid waste management (SWM)?;
3. How are local solid waste managers responding to state-mandated SWM programs?; and
4. What are the attitudes and opinions of solid waste managers on waste disposal issues?

METHODS

The data for this study were collected from the membership of Florida's Government Refuse Collection and Disposal Association (GRCDA). GRCDA is the world's largest association for solid waste management professionals. Florida has the largest single statewide chapter of GRCDA in the United States. It is composed principally of local government officials in the solid waste field. Representative job titles of those surveyed include: directors of city or county public works departments, managers of local solid waste departments, heads of sanitation divisions, SWM consultants/contractors from the private sector, environmental regulators in state government, and supervisors of municipal or county landfills.

Each of the 468 GRCDA members and selected county officials received a mailing containing a cover letter, a twelve-page questionnaire, and a postage paid return envelope. The initial mailing was sent in December 1989. Two additional follow-up mailings were sent as was necessary. Two-hundred-forty-two usable surveys were returned, representing a response rate of 52 percent. Responses were received from GRCDA members residing in a majority of Florida's sixty-seven counties. A breakdown of the sample by respondent groups shows that 50 percent work for county government, 29 percent for municipal government, 3 percent for state government, and 18 percent for private SWM employers.

The questionnaire was comprised of several sections, the first of which asked about the way garbage was managed in the respondent's local jurisdiction (with

specific follow-up questions on landfills, WTE plants, and recycling). Other sections asked about:

1. Program design characteristics and local SWM implementation strategies;
2. The extent and type of local compliance with and participation in state-mandated SWM programs (e.g., development of solid waste plans, state-funded grants); and
3. Attitudes and opinions of GRCDA members on a series of SWM issues.

FINDINGS

Landfill

Nine of ten (96%) respondents said their community buried its garbage. Most of these respondents say their community had landfills that are lined (72%), with a system for controlling leachate (91%), and a groundwater monitoring system in place (99%). Despite ominous warnings in the popular press that landfills are closing around the country, only one in seven (14%) say such closures have occurred in their community and a slight majority (52%) indicate that their area is experiencing a shortage of landfill space. Respondents say that their landfills will be out of space in about fourteen-and-one-half years. Nationwide localities are expected to run out of landfill capacity in ten years. Our respondents estimate that about 70 percent of their community's solid wastes are currently sent to landfills.

As noted previously, one of the oft-mentioned problems associated with landfills is the water pollution that can occur from landfill seepage. While only three in ten say their jurisdiction faces a *serious* groundwater pollution problem, twice as many (62%) do indicate underground sources of water have been contaminated with chemicals or other pollutants. Furthermore, the overwhelming majority (90%) thinks even greater attention should be given to monitoring waste brought to landfills in order to reduce the intake of toxic and hazardous materials. Indeed, the health risk from landfills is perceived to be greater than that from waste-to-energy (WTE) plants. This is indicated by seven in ten agreeing with the statement: "landfills, with a potential for groundwater contamination, are a greater health hazard than emissions from waste-to-energy plants." However, this concern does not prevent two-thirds (64%) from supporting the construction of new landfills in their community.

Waste-to-Energy Plants

Less than half (49%) of our respondents said their community burns garbage in WTE facilities. In all but a few cases, respondents report WTE plants are *built* (95%) and *operated* (90%) by contract with a private company. A lower proportion of our sample (80%) said such plants are *owned* by the government jurisdiction. Seven in ten indicate that financing for WTE plants is usually by industrial

Table 1. Ranking of Disposal Alternatives

Alternative	Most	Desirable 1	2	3	4	Least
Recycling		36%	48%	11%	5%	
Resource recovery (i.e., waste-to-energy facilities)		23%	21%	30%	25%	
Landfills		15%	15%	25%	45%	

revenue bonds, with a higher proportion (86%) saying that tipping fees (the cost of disposal) and electricity are typically tied to bond repayments. Opposition to WTE plants from environmental groups concerned about pollution emissions and by neighborhood groups with NIMBY concerns has been a major obstacle to this SWM option. Eighty percent of Florida respondents said there was citizen opposition to the environmental consequences of a WTE facility and the same proportion identified such opposition as present during site selection for WTE plants. Nevertheless, approximately the same percentage that supported the construction of new landfills (64%) also supported the construction of new WTE plants in their community (60%).

Recycling

Eight in ten of our sample (79%) said their jurisdiction had a recycling program. While recycling is the second most frequently used alternative (landfill is first; WTE plants are third), it is the preferred approach when respondents rank disposal alternatives from "most desirable" to "least desirable." Table 1 shows the distribution of responses from "one" (most desirable) to "four" (least desirable). Since recycling is considered to be a more desirable alternative than the other two combined, we will discuss this option in greater detail than the previous two alternatives.

Those designing a local recycling program need to choose from a set of design parameters. Such parameters describe the physical and operational characteristics of the program [10]. The design parameters for a residential recycling program can be grouped into several categories: choice of materials, area to be served, incentives for participation, mandatory or voluntary participation, drop-off or urbside collection, curbside parameters, and public education activities. Our initial findings regarding recycling will be presented using these categories.

With respect to the materials to be recycled, Florida's SWMA singles out four commodities for special attention. These "big four" materials include aluminum,

glass, newspaper, and plastic bottles. At a minimum, the law requires a majority of the "big four" materials to be separated and offered for recycling by 1994. What is the recycling experience with these and other items to date? Eighty-five percent of respondents said their jurisdictions have devised ways to save newspapers. A similar proportion (82%) save aluminum cans, seven in ten recycle glass in their locales, and a slight majority (54%) say their community recycles plastics. The best recycling progress up to now has been with these "big four" items. Respondents indicate lower recycling levels for other commodities with four in ten (39%) saving ferrous cans, one in four (27%) recycling yard waste, and one in six (16%) saving corrugated cardboard. One in five citizens are credited with composting yard waste, and less than a third report that the community has a composting facility. These findings on recycling activity in Florida communities indicate the considerable potential of recycling for reducing the volume of material in the solid waste stream.

Despite the potential of recycling, only half the respondents say the service area for the recycling program covers the entire jurisdiction. In communities where less than the entire jurisdiction is served by a program, our GRCDA respondents estimate that one-fourth (24%) of the area is typically served. Furthermore, respondents estimate that a third of the eligible population is participating in recycling, and only about 8 percent of solid wastes are being recycled.

A diversity of approaches can be used in implementing a local recycling program, but there are some common features which emerge from the Florida experience. First, there appear to be limited financial incentives to induce communities or citizens to recycle. Nine of ten respondents see recycling as a net revenue loser for the community. Less than a third (31%) report that recycling generates any revenue for the jurisdiction. Similarly, only one in seven (14%) indicate citizens are encouraged to participate in recycling by appeals to their pocketbooks, a finding partially confirmed by the fact that only 7 percent say citizens are provided with financial recycling incentives. Respondents do say citizens are encouraged to participate in recycling by appeals to their environmental conscience (97%), if not to their pocketbooks.

There is consensus among respondents (95%) that in most Florida jurisdictions citizen participation in the recycling program is voluntary.

There are essentially two options for collection of recycled materials–drop-off collection and curbside collection. Drop-off programs require residents to take recyclable materials to a central location or to one of several drop-off locations from which they will be collected. Curbside pickup involves residents placing recyclable materials at the curbside with a collection stop at each home to collect the material. The advantage of the drop-off approach is lower costs but the downside is lower citizen participation rates, while curbside pick up may elicit higher participation rates but impose higher costs. Collection scheduling in curbside pickup programs is more convenient and less confusing to residents if recycled material are collected the same day as regular waste pickup. Our sample

indicates that both curbside pickup and drop-off methods of collecting recyclables are used in Florida. Slightly more than half of our respondents indicate that recyclables are picked up at the curbside on the same day as regular trash; and a similar proportion indicate that citizens source separate materials and transport them to collection centers where they are dropped off. Seven in ten (72%) report that residents are provided with containers for recyclable materials.

Eight in ten (85%) concur with the statement: "Recycling is a constructive solution to the waste disposal problem." However, they were more cautious in gauging public readiness to comply with the federal EPA goal that 25 percent of all trash be recycled after 1992: only half say the typical U. S. citizen is ready for a large-scale source-separation recycling program. One way to increase "public readiness" to recycle is to provide a source of motivation for citizens (e.g., a "pocketbook interest"). While neither positive nor negative monetary inducements are much in evidence in Florida recycling programs, the potential of such incentives should not be underestimated. There is some indication in our attitudinal data suggesting that the "carrot" would be more useful than the "stick" as a motivator to recycle. Seven in ten (72%) think cash incentives (e.g., a five-cent return deposit on a bottle or can) would be *more* effective than monetary penalties (e.g., a $500 fine) in encouraging citizens to separate their trash. Similarly, six in ten (59%) advocate offering discounts on the garbage collection fee for those who pre-separate recyclable materials.

Other strategies that might be used to increase public readiness to recycle are educational campaigns and convenient ways for citizens to become involved. Virtually all (96%) respondents agreed that a voluntary recycling program can increase its citizen participation level through a well planned, diversified educational campaign. Seven of ten (72%) of our Florida sample gave their own jurisdiction's recycling program high marks, saying it made participation easy, convenient and informative in order to attract participation.

Respondents were asked about the public education strategies which had been used in their jurisdiction to gain acceptance for various waste-disposal options such as recycling. Respondents report that their communities:

1. Use the media to focus on a few key points important to citizen voters (66%); and
2. Point out the benefits to the residents (e.g., cost savings, reduced environmental problems, job creation) of the jurisdiction's preferred SWM option (72%).

Half said direct mail was used to target audiences such as interest groups, public officials, and community residents. The four least popular approaches to public communications were:

1. Pointing out the weak points of the least desirable solid waste management options (26%);

2. Using statements from the scientific and medical community to show support for preferred solid disposal options (26%);
3. Indicating to the public the negative consequences for jobs, business, tourism, environment, and the tax base of doing nothing or doing the wrong thing (19%); and
4. Hiring a professional advertising firm to develop a public information campaign (20%).

We are not only interested in the reasons citizens participate in recycling activities, but also in the reasons communities have for developing and implementing local recycling programs. A factor analysis was performed to determine whether thirteen items pertaining to the reasons for recycling could be organized according to some underlying structure. A principle components factor analysis extracted five factors, which were then rotated to the varimax criterion. These factors accounted for 71 percent of the variance in respondents' ratings of the "reason" items. The factor loadings for each individual item as well as the interpretation of these factors is presented in Table 2.

We labeled the first factor "Waste/Cost Reduction" because the items loading on this factor represent the individual's concern for reducing both costs and solid waste problems. The second factor is labeled "Job/Organizational Opportunities" because it consists of items that indicate fund raising and employment opportunities. We labeled the third factor "Regulatory/Environmental Pressures" because both items dealing with responding to such pressures from government and industry loaded on this factor. The four factor is labeled "Anti-WTE Plants" because the items loading on it indicate an aversion to the costs of resource recovery facilities. The fifth factor is labeled "Anti-Tax/Litter" because the items loading on this factor indicate concern for limiting taxes, budgets, and litter.

An enhanced understanding of why communities institute recycling can be achieved by explaining the five factors presented in Table 2. In the analysis that follows, ordinary least squares (OLS) regression techniques are used to examine the characteristics of jurisdictions and their reasons for recycling. The dependent variables for this analysis are the factor scores for the five factors identified by the principal components analysis.

Six variables are regressed on these scores. The first variable (PRIVATE) indicates whether the respondent worked as a public official or for a private firm. A large body of literature suggests that the attitudes of public sector managers differ from private managers [11]. The second variable (GRANTS) is an index of recycling grant activity. In addition to providing opportunities through enhanced program support, grants may shape managers' program priorities by providing funding for specific activities. The index was constructed by summing the grant program applications presented in Table 3 for each jurisdiction.

The extent to which recycling has been implemented in a jurisdiction (RECYCLE) is likely an important factor in shaping local officials' views of those

Figure 2. Factor Loadings on the Orthogonal Factors of the Reasons for Recycling

Items	*Waste/Cost Reduction*	*Job/Organizational Opportunities*	*Regulatory/Environmental Pressures*	*Anti-WTE Plants*	*Anti-Tax/Litter*
Reduce Solid Waste Flow	.87	-.10	.06	.20	.12
Reduce waste at landfills	.85	-.13	.06	.18	.10
Avoid landfill costs	.77	.09	.13	-.18	.10
Reduce materials/disposal costs	.67	.49	-.13	-.07	.05
Save Natural Resources	.61	.08	-.21	.14	.25
Create employment opportunities	.01	.83	-.04	.11	.16
Provide fund raising opportunities	-.13	.63	.27	.11	-.25
Respond to regulatory pressure	-.15	-.08	.86	.12	.03
Respond to environmental pressure	.25	.37	.66	.02	-.03
Avoid cost of resource recovery facilities	.16	.17	.13	.92	.06
Reduce litter	.12	.07	-.00	-.00	-.86
Save tax money	.22	.36	-.06	.10	.69
Respond to budget pressures	.30	.49	.30	.03	.54
UAF %	24.00	15.00	11.00	8.00	13.00
					(Total = 71%)
Eigenvalue	3.17	1.91	1.43	1.02	1.69

Table 3. Percentage of Respondents Saying Their Jurisdiction Applied For (or Intends to Apply For) State-Funded Grants

Grant Program	*Percentage*
Recycling grants	88
Education grants	79
Used oil grants	72
Waste tire grants	72
Keep Florida beautiful litter control grants	34
Recycling awards for existing programs	30
Innovative technology grants	15
Small county grants	7

programs. The scope of recycling programs is measured here as an index of the types of materials collected for recycling. Because recycling is often viewed as an alternative to landfills, the extent to which landfill space is limited is included (LANDFILL). This variable is an index constructed from responses to questions regarding whether the landfill is closed and whether there is a shortage of landfill areas. Next, whether the jurisdictions have cooperative arrangements or undertake joint action with other jurisdictions to manage solid wastes (COOPERATE) is included. When joint action is undertaken, administrators are confronted with more complex management tasks which may shape program priorities. Finally, the median income for each county (INCOME) is examined as a measure of fiscal capacity.

The results of regressing these six variables on the factor scores are presented in Table 4, which reports the coefficients and *t*-scores (in parentheses). The goodness of fit for these equations is relatively low with the value of R^2 exceeding .2 only for the Waste/Cost Reduction factor, the Job/Organizational Opportunities factor, and the Anti-Tax/Litter factor. Nevertheless, examination of the effects of specific variables yields some interesting insights. Whether respondents were from the private sector predicted anti-tax and job/organizational opportunity reasons for recycling. The coefficients for PRIVATE are positive and statistically significant for each of these factors. The coefficient for GRANTS was significant for the job/organizational opportunities factor.

Somewhat surprisingly, whether jurisdictions had implemented recycling previously was generally unrelated to the reasons given for recycling by local administrators. On the other hand, consistent with our expectations, limited landfill space was the best predictor of the waste cost factor. Limited landfill space was also negatively related to the job/organizational opportunities factor. The

Table 4. OLS Regression for Each of Five Factors

Independent Variable	*Waste/ Cost Factor*	*Job/ Organizational Opportunities Factor*	*Regulatory Environment Factor*	*Anti-WTE Plants Factor*	*Anti-Tax/ Litter Factor*
CONSTANT	-.387 (-3.34)	-1.22 (-1.04)	.709 (.64)	.397 (.34)	-1.216 (-1.10)
PRIVATE	1.81 (.64)	3.96* (1.77)	-.303 (-1.10)	-.026 (-.09)	.434** (1.98)
GRANTS	-.161 (1.37)	1.68* (1.69)	.120 (.30)	-.047 (-.69)	-.005 (-.07)
RECYCLE	.472 (1.00)	.351 (.73)	-.067 (-1.40)	-.005 (-.11)	.011 (.23)
LANDFILL	.341** (2.16)	-.315* (-1.77)	-.133 (-.73)	-.271 (-1.57)	.076 (.43)
COOPERATE	-.027 (-.09)	1.27 (.56)	-.45* (-1.88)	.039 (.16)	.163 (.73)
INCOME	-.001 (.49)	.001 (.50)	-.002 (-.90)	-.000 (.06)	.003* (1.78)
R^2	.22	.24	.10	.05	.20
F	2.88	3.01	1.61	.88	2.69

* Significant at the .10 level.
** Significant at the .05 level.

cooperation factor was negatively related to regulatory and environmental pressures. Finally, median county income was related to the anti-tax/litter factor score.

Plans, Funds, and State Role

Regardless of whether a jurisdiction relies on one or a combination of the three waste disposal alternatives discussed, the effectiveness of their SWM effort is partially contingent on their receipt of state funds and their compliance with state requirements. We asked respondents about the status of their solid waste plans and their efforts in applying for SWM state funds/ most respondents (87%) reported that their community has a multi-year solid waste plan. Such plans typically contained: projections of *how much* (98%) and *what types* (94%) of waste the community will generate in coming years; the disposal options the community has selected (92%); the capital expenditures necessary to implement disposal options

(92%); technical evaluations of the disposal options (88%); fund raising methods to be used (77%); and operating budgets necessary to implement disposal options (74%).

If counties fail to comply with state recycling requirements, they may not be eligible for state-funded grants and the state may act to withhold funds to non-conforming local governments which would normally be payable from the general revenue fund. Currently there are eight types of grants that counties may apply for: recycling, education, waste tires, small county base grants, and litter grants are annual grants; used oil, awards for existing recycling programs, and private sector innovative technologies grants are one-time grants. Together, these grants award $38 million per year. Respondents were asked which of these grants the jurisdictions have applied for (or intend to apply for). Their replies are reported in Table 3.

Managers were asked not only about compliance with state planning requirements and applications for state funding, but also about their attitudes regarding the state's role in SWM. Findings were mixed with both positive and negative assessments expressed. On the positive side, seven in ten (69%) thought state legislated mandates regarding SWM were reasonable. Negatives included the widespread sentiment (80%) that "politics" plays a significant role in decisions regarding permits or closure of landfills; a majority (53%) agreed that existing SWM laws are *not* enforced adequately by state agencies; and a majority (52%) *disagreed* that financial assistance from the state to local governments for SWM is adequate.

Local Implementation Strategies

In addition to selecting among three major disposal options and negotiating compliance and support from the state, other local implementation strategies are also crucial to the success of SWM efforts. Officials and administrators must decide whether to act alone or engage in joint action with other local jurisdictions; to implement projects immediately or phase them in over time; to employ limited pilot projects or start jurisdiction-wide; and whether to allow competition between private sector contractors in waste collection.

Findings indicate a mixed picture with communities attempting to rely on intergovernmental cooperation, to "make haste slowly," to learn from trial and error, and to use multiple service providers. These choices are consistent with what we would expect based on the implementation literature [12, 13] in that such strategies provide ample opportunities for error detection and correction. This enables SW managers to learn what works, what doesn't work, and to make adjustments accordingly. For example, if there are problems in the early stages of implementation, or with an inter-local agreement or pilot project, or with a specific service provider, such implementation strategies allow for continual adjustments between programs and their consequences. By contrast, officials who

decide their community will act alone to immediately implement jurisdiction-wide programs where they are the sole service provider are less likely to benefit from "policy learning" and to avoid the pitfalls of implementation [14].

Three-fourths of our sample (77%) note that their areas have engaged in joint action with other local jurisdictions to seek solutions to their garbage problem. An even more popular approach (87%) is to phase in SWM strategies slowly over time. There is greater diversity of behavior on the last two options with a majority (55% and 60%, respectively) saying their jurisdictions started their SWM projects with a limited pilot project rather than starting citywide, and allowed competition between private sector companies who contract with local government to collect solid waste.

Another decision facing local SWM managers is whether to make unilateral decisions or encourage citizen participation. Zeiss' study of the differences in values between community residents and technical SWM officials found that expert decision makers tended ". . . to undervalue impacts (losses) and overvalue (benefits). . . " from certain waste reduction strategies (e.g., construction of WTE facilities) [15]. He suggests that decision makers should be aware of their own biases and that in the early planning stages of such strategies it is important to "obtain and incorporate value judgments of personally affected persons. . . " [15]. One way to incorporate diverse perspectives is to insure broad representation on local solid waste task forces. When asked about this strategy, a majority of our sample (59%) said their community had consulted with a variety of stakeholders via establishment of task forces on reductions in the waste flow with members drawn from government, industry, and environmental groups.

Public vs. Private Sector Involvement

The area of SWM is clearly one where both the public and private sectors can work together effectively. The shared division of labor is seen in our sample where in solid waste *collection*, seven of ten (71%) said their community contracts with the private sector, 55 percent said it relies on in-house collection by a government department (some communities used both sectors), and 5 percent said their community contracts with another governmental jurisdiction. In solid waste *disposal*, the preference for the public sector is evident with one-third (35%) reporting that their community contracts with the private sector, seven in ten (71%) stating that in-house services are provided by a government department, and one in six (17%) indicating that contractual arrangements with another governmental institution exist in their community.

How do respondents perceive the role of the public vs. the private sector in SWM? Respondents had a widely-shared (80%) perception that the role of the private sector in SWM is growing relative to that of the public sector; and that the private sector is able to control labor costs more than the public sector (58%). Respondents were divided equally in response to the statement: "The private

sector has the advantage of being relatively removed from political influence." Further, nearly three-fourths (71%) *disagreed* with the statement: "Public sector management is more competent than private sector management." Respondents say the public sector is:

1. Being hurt by cutbacks in financial support from federal and state sources (60%); and
2. Desiring to be rid of the headaches of SWM (64%).

Nevertheless, Florida respondents think the competition from the private sector has made local governments more efficient and businesslike (64%). Furthermore, they almost universally agree that there is a continuing role for the public sector in SWM (96%).

Problems and Lessons

Respondents were asked an open-ended question: "What are the biggest problems your area faces in managing its garbage?" Most of the responses displayed in Table 5 fall into eight broad categories. The category receiving the most responses (forty-three) pertained to "costs." Those mentioning some form of cost-related problems were primarily solid waste administrators concerned about escalating capital and operating costs for collection and disposal. Several of these cost-conscious administrators mentioned the rising landfill tipping fees, the need for financial incentives to promote recycling, and the high cost of a totally integrated SWM system.

The next most frequently mentioned problem(s) were equally distributed (twenty-six mentions each) across three separate categories: "inadequate education of the public," "hazardous waste collection/disposal," and "politics." Managers citing problems with "public education" mentioned the importance of convincing the public of the need to "reduce, reuse, and recycle." Managers commented that education efforts should address misconceptions of the public, seek to alter public attitudes and behavior regarding garbage disposal, and inform citizens of the factual/technical issues regarding SWM as well as the new legal mandates and the consequences of noncompliance with government directives. In addition to education of the general public, respondents mentioned the need to educate elected officials and the news media on all aspects of SWM.

Regarding "hazardous waste," managers were concerned about pollution of the waste stream; unavailability, declining capacity, and inaccessibility of disposal sites; and illegal dumping. Other problems in this area included processing and disposal of specific commodities/byproducts (e.g., tires, waste water sludge) and dealing with disposal problems in specific locales (e.g., outer islands).

Those viewing "politics" as a problem were concerned with the short-term time horizons of elected officials and their lack of technical sophistication on SW

Table 5. Problems Faced in Managing Garbage

Problems Faced[a]	*Number of Responses*
Cost	43
Inadequate education of the public	26
Hazardous waste collection/disposal	26
Politics	26
Siting problems	24
Managerial/implementation problems	24
Construction of landfills/WTE plants	22
Public compliance with goals/procedures	21
Insufficient funds	14
Ineffectiveness of recycling	11
Enforcement of regulations	9
Lack of source reduction	9
Permitting problems	8
Absence of integrated SWM strategies	7
Finding recycling markets	7
Growing population	6
Citizen Opposition	5
Poorly trained regulators/staff	5

[a] The information reported in this table was obtained from responses to the following open-ended question: "What are the biggest problems your jurisdiction faces in managing its garbage?"

issues. They also pointed to the reluctance of elected officials to make politically unpopular decisions (e.g., pay per bag, mandated source reduction) and the difficulties in arriving at consensus among politicians on SW options. Three specific instances of "politics as a problem" were noted on the questionnaires of individual respondents: "political decisions made to artificially 'deflate' the true cost of disposal," the "not-in-my-term-of-office attitude," and the observation that "SW is now big bucks business and decisions are often made without regard to the public good."

Four other problem areas were identified by at least twenty respondents: siting problems, managerial/implementation problems, construction of landfills/WTE plants, and public compliance with goals and procedures. The problems with siting and NIMBY-related obstacles (twenty-four) are well known. Locating new and replacement solid waste facilities is a continuing challenge for managers in this field.

Managerial/implementation problems (twenty-four) was a catch-all category for a diversity of concerns. Among them were difficulties in dealing with state-level regulators (e.g., unrealistic deadlines, unilateral approach to problem solving, uncooperative, inaccessible), ambiguities in statutory language, and administrative regulations which allowed substantial bureaucratic discretion in implementation, staffing problems, and contractual variations with private haulers. There were also concerns about implementation of SW policies in rural vs. urban settings and in single vs. multiple dwelling settings.

Problems relating to construction of landfills/WTE plants (twenty-two) largely revolved around the lack of capacity and scarcity of suitable space. Public compliance with goals and procedures (twenty-one) was the final category of problems. Two themes stand out in this area: first is the difficulty in obtaining compliance when dealing with a turbulent regulatory environment with ever-changing state and federal rules; second is the complexity involved in enforcing ordinances designed to implement statewide goals.

In addition to their assessment of problem areas, managers were asked a second open-ended question concerning lessons to be learned from their successful experiences in managing garbage. Responses to this question are reported in Table 6. Most lessons fall into one of seven broad groupings. The most frequently mentioned lesson (eighteen) related to "improved planning and enforcement." Several managers cited careful, thorough, innovative long-range planning (more than five years) was required for capital and facility expansion. Anticipatory planning for more stringent rules in the future was considered important as was the need for good daily operational planning to guide action. The need for imagination and consistency of enforcement was also stressed by managers. A few favored the imposition of strong penalties for noncompliance with mandatory recycling programs.

Another frequently mentioned lesson dealt with sound fiscal management (fourteen). Many of the comments in this area pointed to the need to follow good business management practices, such as minimizing costs, monitoring finances, doing as much as possible in-house, and leasing rather than purchasing equipment. A second theme from comments in this area concerned the need for adequate funding. Managers credited their success to receipt of state and federal grants, creation of a system that pays for itself via surcharge revenues and user fees, and use of transfer stations as "money makers."

Improved program design and management was a third lesson (twelve). The main theme expressed by comments in this category was the importance of effective intergovernmental relations and inter-group linkages. Inter-local collaboration between municipalities and between cities and counties was stressed as well as the need to establish credibility and lines of communication with local and state-level regulators. The inter-group linkages referred to those between public and private service providers and those between local government and crucial environmental groups or non-profit organizations interested in SW issues.

Eleven respondents identified lessons related to two broad categories: "mandatory garbage collection" and "integrated SWM." Managers referring to the former "lesson" were really providing a policy prescription–the state should set a policy mandating garbage collection for all cities and counties with a population over 5,000. Those referring to the latter "lesson" emphasized the need for a comprehensive approach to SWM including source reduction, recycling, WTE plants, and landfill. These managers had experienced success with an integrated, multi-faceted approach to the SWM problem that was tailored for the needs of their particular community. They stressed that one approach alone (e.g., recycling) will not "solve" the SWM problem and that too often it (or some other single approach) has been promoted as "the" answer.

The final two lessons learned (ten responses each) related to two specific SW options: recycling and landfill. In the first instance, respondents had praise for recycling programs which were convenient (e.g., curbside pickup), voluntary, and comprehensive. While comprehensive programs were preferred, one manager discussed the value of initial pilot projects to help "get the bugs out." Regarding landfills, managers highlighted the importance of purchasing a lot of land early on to allow for future expansion, and the need to insure a safe landfill operation by lining cells and providing both a leachate pond and storm water ponds.

SUMMARY AND CONCLUSIONS

Several themes stand out from the findings. Solid waste managers are concerned about landfills and see WTE plants as a less risky alternative. However, citizen opposition based on environmental and NIMBY concerns make site selection and construction of WTE plants controversial. Managers continue to support construction of WTE plants, but they see recycling as a more desirable alternative. Recycling efforts include a wide range of commodities, but the "big four" materials top the list and the largest waste components (newspaper, cardboard, mixed paper, yard waste) are not being recycled in some communities. Financial incentives take a back seat to environmental appeals as inducements for citizens to participate. There is broad support for voluntary recycling, but public readiness lags behind support. Various approaches to educational campaigns have been tried and monetary incentives are endorsed as a way to increase "public readiness." Communities that participate in recycling do so to avoid costs and other SWM problems, promote fund-raising and employment opportunities, respond to environmental and regulatory pressures, reduce taxes and litter, and avoid expenses associated with developing WTE plants. Among the variables which affect reasons for recycling are whether respondents are employed in the private sector, the extent of recycling grant activity, the extent to which landfill space is limited, whether joint action with other jurisdictions is undertaken, and median income for each county.

Local managers are complying with state requirements for multi-year solid-waste planning and applying for state-funded grants, especially those dealing with recycling and recycling promotion (education). While state mandates are considered to be reasonable by local managers, state-level decisions regarding waste are thought to be "political" and both enforcement of solid waste laws as well as financial assistance to county and municipal governments are viewed as inadequate. Clearly state initiatives and resources are helping to shape local responses in solid waste; however, there is also ample opportunity for discretion at substate levels. Despite variation in the program design features, local implementation activities in SWM frequently involve joint intergovernmental action, phased programs, pilot projects, citizen participation via task forces, and private sector competition. The private and public sectors both have a role to play in local SWM with the private sector currently more involved in garbage collection and the public sector in disposal. Managers see the private sector role in SWM to be increasing relative to the public sector in part due to its ability to control labor costs, avoid undue political influence, and to manage competently. The public sector, while viewed as weakened by cutbacks and desirous to shed onerous SWM responsibilities, is believed to have enhanced its efficiency as a result of private sector competition and to be assured of a lasting role in the solid waste field.

When asked to identify major problems encountered in managing garbage, Florida's SW administrators said heading the list were such things as costs, inadequate public education, hazardous waste collection/disposal, and politics. Among the key lessons learned from the Florida experience in managing garbage, according to our respondents, were the potential gains to be realized from improved planning and enforcement, sound fiscal management, improved program design, mandatory garbage collection, and integrated solid waste management plans.

One of the interesting findings from this study is that in spite of what many have labeled a "national crisis" in solid waste management, the solid waste managers we surveyed in Florida do not find it to be that much of a crisis. While problems have been encountered in Florida (see Table 6), they seem to be manageable, and the "crisis" may be more evident elsewhere. The relatively benign view reported here may be due to the composition of our sample. Since most of those surveyed are responsible for the local implementation of an ambitious statewide policy, they may think that it is in their interest to say things that are not that bad. Or, they may down-play the seriousness of the problem because they genuinely feel that an adequate policy response and set of implementation strategies for dealing with the "crisis" are in place. On the other hand, one might expect that those charged with the responsibility of dealing with a "crisis" like solid waste would be more likely to inflate the importance and severity of the problems on which they are working. It would be helpful to know how the results reported for Florida compare to those from other states. State-by-state comparative studies or national survey data would enable scholars to put the Florida findings in a broader context and to assess

Table 6. Lessons Learned from Successful Experiences in Managing Garbage

Lessons Learned[a]	*Number of Responses*
Improved planning and enforcement	18
Sound fiscal management	14
Improve program design and management	12
Mandatory garbage collection	11
Integrated SWM plan	11
Comprehensive/convenient recycling program	10
Landfill construction/expansion/closure	10
Improve privatization	9
Interlocal cooperation	8
Public involvement	8
High service level at low cost	7
Education of public and officials	7
Courageous political decision making	6
Efficient WTE plants	6
Need for policy/ordinances	6
Rely on in-house services	2

[a] The information reported in this table was obtained from responses to the following open-ended question: "What are some lessons other jurisdictions could learn from your successful experiences in managing garbage?"

the generalizability of our findings to other states and locales. As with most research, our study leads to a call for future research with expanded samples.

A major challenge for the future in Florida is to insure by careful program planning that the "most ambitious assault on solid waste yet attempted by any state" is effective in attacking "the most neglected problem in the state." A key to success is coordinated policy implementation at the substate level. This requires an integrated strategy involving a mix of landfills, WTE plants, and especially recycling while drawing on the strengths of both the public and private sectors.

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Direct reprint requests to:

Professor Jonathan P. West
Department of Political Science
P. O. Box 248047
University of Miami
Coral Gables, FL 33124