Chapter 4

OVERCOMING BARRIERS TO IMPLEMENTING DECENTRALIZED WASTEWATER TREATMENT OPTIONS

Several important barriers currently inhibit the expanded use of decentralized wastewater systems, including:

- o Lack of knowledge and misperception of decentralized systems
- o Statutory and regulatory barriers at the state and local level, including:
  - Lack of enabling legislation
  - Legislative authority that is split between agencies
  - Prescriptive regulatory codes
- o Lack of adequate management programs for decentralized systems in many regions
- o Liability and engineering fee issues
- o Financial limitations

These barriers, and steps that have or can be taken to overcome them, are discussed below.

LACK OF KNOWLEDGE AND MISPERCEPTION OF DECENTRALIZED SYSTEMS

Public health officials, engineers, regulators, system designers, inspectors and developers often possess only limited knowledge of the broad range of decentralized wastewater systems because these technologies are not adequately covered in university engineering curricula. Decentralized systems are perceived to be inadequate for meeting specified public health and water quality goals. Centralized wastewater treatment facilities meet these goals by complying with regulatory and permit standards (e.g., secondary treatment standards of 30 mg/L TSS and BOD). Appropriately sited and adequately designed and maintained, decentralized wastewater systems can meet public health and water quality goals, as well.

Typically, onsite systems are perceived as the standard septic tank and leach field (referred to as conventional onsite systems in this document). However, alternative onsite systems include other types of decentralized systems, such as mound systems or sand filters. Conventional onsite systems can pose a threat to ground water, however, these systems can be

designed to alleviate the threat through retrofitting existing treatment trains or with new systems that include the appropriate unit processes (Anderson et al., 1985; Ayres, 1991; Ball, 1995; Boyle, 1995; Cagle and Johnson, 1994; Hines and Favreau, 1975; Jenssen and Siegrist, 1990; Laak, 1986; Piluk and Peters, 1994; Soltman, 1989; Tchobanoglous and Burton, 1991). Recognizing that performance standards should apply to any type of wastewater system, a few states, including Florida, North Carolina, Washington and Wisconsin, have recently begun the process of setting performance standards for decentralized systems.

Homeowners are frequently uninformed about how their conventional onsite systems work, how to maintain them, and about the potential for human health and ecosystem risks from poorly functioning systems. The prevailing public perception of conventional onsite systems is they are maintenance free. Regulators and technical professionals may have little experience with alternative systems because these technologies are not included in their educational curricula and little effective training is available.

Another factor blocking acceptance of decentralized systems is the lack of comprehensive performance and cost data, or where data is available, an evaluation of the results is needed. EPA's Innovative and Alternative Technology program yielded a limited number of technology evaluations before the program and efforts to conduct assessments ended. In 1995, EPA began to fund the assessment effort again. EPA-funded assessments and fact sheets on these technologies will be published in the near future, but these efforts will mostly cover surface water discharge technologies.

Overcoming the Lack of Knowledge Barrier. Education is critical to effective efforts to encourage the acceptance and use of decentralized systems. Those who choose, design, and use these systems need to know that they perform well if properly managed. Information on what proper management entails should be readily available and widely distributed. Professional training and certification programs should cover regulatory code requirements, system siting, soils fieldwork, design, construction, monitoring and maintenance. Federal, state, local, or private agencies can provide classroom and in-field training. Six states, Arizona, Missouri, North Carolina, Rhode Island, Texas, and Washington, currently have training programs for sanitarians and installers. Since the advent of these programs, state regulatory officials (in North Carolina, for example) have allowed the utilization of a much broader array of advanced onsite technologies under the condition that these systems are managed by professional, certified operators. Similar training and certification programs in other states are a necessary precursor to broad scale use of decentralized technologies. With the participation of nationally recognized authorities and product manufacturers and the issuance of certificates of competency, these programs could produce a well-trained field of regulators and service providers.

In addition, educational materials for homeowners should explain proper wastewater disposal and maintenance practices and the consequences of system failures. Informed, responsible homeowners would help ensure that their systems are operated and maintained

properly and they will be more likely to support new management programs. Training and education to increase awareness about decentralized wastewater systems should help reduce both the number of failing systems and adverse impacts on ground and surface water.

Establishment of testing centers for verification of decentralized wastewater treatment technologies is expected in the future and can enhance the confidence that these systems will perform as designed. States would need to agree to accept the testing results from these centers.

STATE/LOCAL STATUTORY AND REGULATORY BARRIERS

Decentralized wastewater systems are primarily governed by state and local jurisdictions. Only three states do not have specific regulations governing decentralized systems (in California, Georgia, and Michigan, decentralized systems are governed at the local level) (NSFC, 1995: This reference also provides a matrix of the components of all existing state regulations for decentralized wastewater systems.) However, existing laws and regulations can be barriers to implementing decentralized systems. In many cases, states and/or localities:

- Lack adequate enabling legislation to support proper management of decentralized systems.
- Divide the legislative authority for public health and water quality protection between two or more branches of government, resulting in inequitable consideration of centralized and decentralized wastewater options and in inadequate management of decentralized systems.
- Enact prescriptive regulatory codes that narrowly define the types of wastewater systems allowed, regardless of the fact that other types of systems can meet performance and regulatory standards.

These regulatory barriers as well as recommended changes are discussed below.

Lack of Enabling Legislation - Agencies responsible for decentralized wastewater systems must be vested with the powers necessary to effectively manage them, such as the right to access private property to inspect systems and correct system malfunctions. But state enabling legislation may not refer to decentralized wastewater systems or it may be vague or uncertain regarding legal powers to perform important management functions. Limited or unclear authority can prevent an agency from establishing a successful management program, which is a vital factor in ensuring that decentralized systems do not fail in the future.

Legislative Authority Split Between Agencies - Typically, state statutes divide legal authority for wastewater systems between state departments of health which are responsible for

state sanitary codes for decentralized wastewater systems, and state departments of environmental protection which are responsible for regulations governing surface-water discharges; issuance of NPDES permits, including those for centralized wastewater facilities; and various water quality programs. In some states , some aspects of onsite system regulation resides with state planning authorities or housing development agencies. Thus, legal authority for the two types of systems fall under separate, and confusing, legal jurisdictions at a fundamental level. Regulatory officials responsible for water quality programs historically have not considered decentralized wastewater systems as an acceptable option, and certainly not an option of equal stature with centralized facilities for protection of water quality.

Legal authority often is split between state and local governments. County governments are often delegated the task of developing and managing on-site disposal programs. Delegation of tasks to local entities from state government can and does work for wastewater management. Wastewater and water quality guidance coming from a single, centralized legal authority which clarifies responsibilities and facilitates selection and management of a centralized and/or decentralized system, whichever is most appropriate for the local circumstances.

Overcoming the Legal Barriers. Several steps can be taken to develop the requisite state enabling legislation and related legal authority. Existing legislative authority and institutional structures should be reviewed and be used, if possible, to minimize costs and simplify the regulatory process. For example, a simple local code enacted by a municipal or county health department for regular inspection and pumping might be adequate to significantly reduce onsite system failures in an area. Another example is that existing provisions for ground-water, septage, or general improvement districts could be used to establish a complete management program (Shephard, 1996).

If, however, existing legal authority is insufficient for implementing management responsibilities, state laws could be modified to extend the powers of relevant organizations (e.g., those that already manage centralized wastewater systems or other utilities) to cover the management of decentralized systems, to allow access to private property, or to create new management structures with necessary powers.

Some states or communities have developed or adopted model ordinances or legal agreements, such as the state of Iowa and the community of Kueka Lake, NY (see Appendix E). Examples include entering into service agreements with homeowners for system maintenance (conducted by either a local agency or a private contractor); obtaining property easements for inspections of decentralized systems; and establishing clear public/private ownership, inspection, operation, maintenance, and financial assurance responsibilities for cluster systems. Some cases may require special legislation that authorizes the creation of new entities (such as management districts) with explicit responsibilities for managing decentralized systems (see "Structure of the Management Program" below). Other states should use the model legislation to measure their current legislation against and make adjustments as needed.

The best way to clarify legislative authority is to consolidate programs for centralized and decentralized wastewater systems (e.g., in the state environmental protection agency or state health agency). Authority for specific management functions could then be delegated as appropriate to regional and local agencies. Such consolidation would allow for a comprehensive analysis and equitable appraisal of wastewater needs and how water quality goals could be best met. In addition, consolidating programs on the state and local levels fosters accountability and management program coordination for decentralized systems, which have heretofore not enjoyed much of either.

State and Local Codes Stifle Consideration of Decentralized Systems - State and local regulatory codes often prohibit or restrict the use of alternative onsite systems. These codes require the presence of a certain type of soil in order to build. Several factors influence the development of these codes, including inadequate performance data on alternatives, system complexity, and (most of all) lack of trained staff.

In addition, some communities have restricted decentralized wastewater systems to conventional onsite systems with large lot requirements (e.g., 2 to 5 acres) as a way to control increasing development densities and "maintain the character" of a community. These two subjects (onsite system requirements and land use) should be kept separate; land use control should be performed by zoning agencies, not public health agencies. Without the technical or financial resources to evaluate alternatives or provide necessary management, state and local governments rely on conventional septic tank/leach field systems and codify inflexible, overly conservative specifications that allow only passive, seemingly "maintenance-free" designs (Shephard, 1996). This approach continues to delay the need to address the real problem, which is the lack of a comprehensive management program for both conventional and alternative systems that would ensure their proper siting, design, construction, operation, maintenance, and monitoring. With such management, systems could be assessed and selected according to their ability to meet regional and local performance standards and their suitability for site-specific conditions.

Obtaining case-by-case variances from these restrictive regulatory codes is usually a cumbersome and expensive process. When a failing onsite septic system needs to be retrofitted or replaced quickly to protect public health and the environment, timely approval for an alternative system is unlikely. The result is continued use of an ineffective septic tank/leach field system or an expensive expansion of a centralized system.

Overcoming the Regulatory Barriers. The prescriptive regulatory approach (i.e., with state or local regulations prescribing specific types of systems and design parameters for sites meeting minimum conditions) currently followed in most states generally works only for sites with "ideal" soil and water conditions. In reality, however, most sites have less-than-ideal conditions.

To address varying site conditions, a few communities have established a combination of prescriptive- and performance-based approaches. They allow prescriptive designs for sites where conventional septic-tank/leach field systems can function properly. Performance standards are used for sites with limiting soil and water conditions (e.g., high ground-water tables, low-permeability soils, inadequate soil depth), for environmentally sensitive areas (e.g., coastal bays), in locations experiencing rapid development, and in areas where regional pollution problems already exist.

Some changes in the regulatory approval process that facilitate the use of decentralized systems have occurred or are underway. For example, a few state or local codes (e.g., in Kentucky, North Carolina and West Virginia) now include provisions allowing specific types of alternative systems, such as mounds or sand filters (although their use may be allowed only under certain conditions). A few states are also setting performance standards that would allow designers to select any type of system, as long as it is proven to meet the standards. These standards should specify the quality of the effluent discharged to the groundwater for all types of decentralized systems.

It should be noted, however, that some states attempting to set performance standards have been sued by involved parties who view the performance standards (which are equivalent to discharge standards) for new decentralized systems as too stringent. State officials and the regulated communities are currently re-evaluating specific standards. The problem has arisen because performance standards are not necessarily equivalent to effluent standards. In the case of surface discharge, where a centralized wastewater system discharges directly to surface water, the performance standards set for the facility are the same as the effluent quality standards. For decentralized systems that discharge to ground water, however, performance standards will be different from final effluent standards. The standard must account for the soil providing additional treatment before the wastewater reaches the ground water, the ground water quality and use, and the point of monitoring.

LACK OF ADEQUATE MANAGEMENT PROGRAMS

Few communities have developed organizational structures for managing decentralized wastewater systems, although such programs are required for centralized wastewater facilities and for other services (e.g., electric, telephone, water, etc.). Instead, state regulations prescribe the specifications and design of decentralized systems, and enforcement of these regulations falls to local agencies, often with limited authority, expertise, and staff. Inconsistent laws and policies have resulted in large, urban centralized wastewater facilities being effectively managed, while small, rural decentralized wastewater systems are frequently unmanaged.

The experience of many communities has shown, however, that to protect ground and surface water, decentralized systems, whether for individual or multiple dwellings, must be managed from site evaluation and design, through the life of the system. For individual

dwellings, homeowners are responsible for managing their systems. Inadequate operation and a lack of routine maintenance for these systems have led to system failures and the resulting perception that decentralized systems are less reliable than centralized facilities.

An important objective of a management program for decentralized wastewater systems is to ensure that the systems perform satisfactorily over their service lives. In the past decade, some government officials and private citizens have begun to address the problem of failing septic systems in the context of water quality protection, rather than merely as part of private real estate transactions. This shift in perspective reinforces the need for communities to develop comprehensive management programs for decentralized systems.

The incentives for establishing proactive management programs for decentralized wastewater systems include better onsite system performance and environmental protection, extended life of the system, significant cost savings, planning flexibility, assistance for individual homeowners and developers in meeting requirements, and economic benefits accruing from the use of local contractors (Shephard, 1996).

Figure 2 depicts the typical functions of a wastewater management program, which include system planning, legal and financial needs and responsibilities, program coordination, supervision, of installation, operation and maintenance requirements, public participation and education, inspection schedules and monitoring programs. The planning process for wastewater management is described in Appendix B.

Generally, operation and maintenance requirements for decentralized systems are less complex, and less costly, than operation and maintenance requirements for centralized systems.

Overcoming the Lack of Management Barriers - Management programs should be developed on state, regional, or local levels, as appropriate, to ensure that decentralized wastewater systems are sited, designed, installed, operated, and maintained properly and that they continue to meet public health and water quality performance standards.

Structure of the Management Program: Selecting a Management Agency - The structure of a management program depends on the functions to be performed and the resources of the community. The institutional structure should include mechanisms for proposing and enforcing regulations, performing system inspections and maintenance, and monitoring program performance.

Many small communities have unpaid or part-time officials with no technical knowledge in wastewater management and minimal experience working with other levels of government. Therefore, the success or failure of a management program for decentralized wastewater systems may depend significantly on the choice of a management agency. Once a community defines specific functions needed to support system operation, it has to determine whether existing

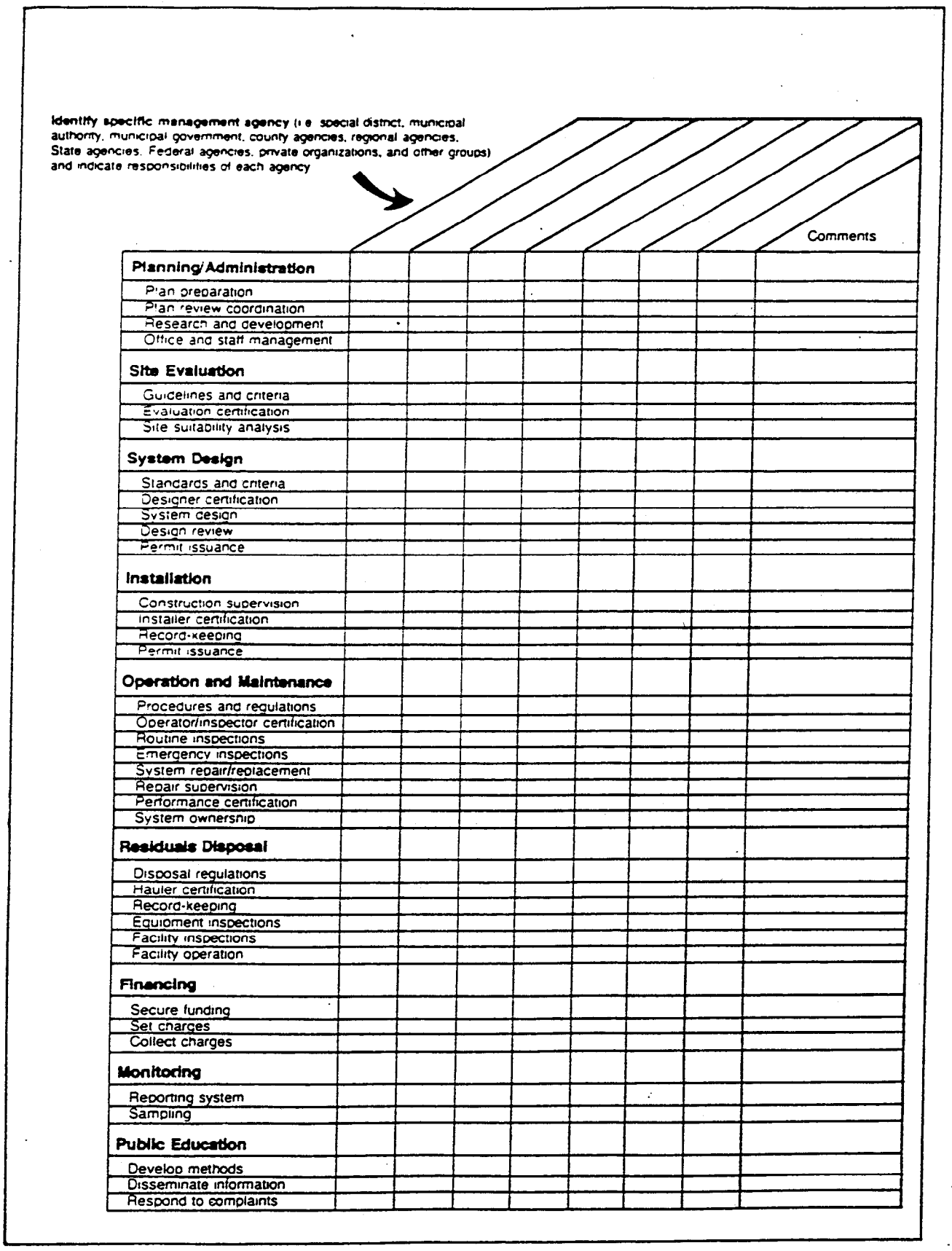

Figure 2. Management Program Functions for Decentralized Wastewater Systems

organizations have the statutory authority and resources to carry out these functions. If existing institutions lack certain legal powers, legislative modifications may be necessary (see "Regulatory Barriers" above).

Several types of management arrangements are possible, which may involve existing local agencies, private organizations, or a combination of agencies and organizations, as described in Appendix C. In some cases, such as where wastewater management crosses jurisdictional boundaries, coordinated planning and sharing of natural, financial, and human resources may be necessary, possibly through inter-jurisdictional agreements. Existing or planned water protection programs may be a logical place to incorporate wastewater management programs. Different types of entities can provide management services including local government, private industry, and in some rural areas, management by rural electric cooperatives is being considered (see Appendix F).

Financing the Management Program - Effective management will increase the cost of decentralized wastewater systems, which currently have little, inadequate, or no management in many areas. A variety of financing options commonly used by utilities and other service providers may be adapted to decentralized systems; however, not all management entities have the legal authority to implement each option. The management entity selected may determine the type of financing available (i.e., whether the program will be eligible for federal or state grants; whether taxing is an option; or whether user fees can be collected).

Commonly used financing mechanisms applicable to wastewater management systems include:

- User fees
- Service fees
- Property taxes
- Punitive fees
- Permit fees
- Connection fees
- Special tax assessments
- Federal, state, or private grants or loans
- License fees

Some states and communities are also using creative funding mechanisms for water quality protection such as tobacco taxes, lottery revenues or license plate programs that could be used to partially fund onsite programs, especially retrofitting existing systems.

The issue of eligibility for public funding is discussed below in "Financial Barriers." Management programs for decentralized wastewater systems should, if possible, include a reserve fund to cover management functions and to alleviate some of the liability issues discussed below.

LIABILITY AND ENGINEERING FEE ISSUES

One of the factors that has impeded the acceptance and use of innovative and alternative onsite systems is the potential risk of installing systems that do not perform as anticipated. Due to this risk, regulators have, in many cases, not provided an environment that is conducive to trying out new systems. In some cases, the requirements to install and operate such systems are so administratively or economically burdensome (e.g., redundant systems) that they inhibit new or experimental solutions. As a result, homeowners or developers are often unwilling to accept the liability incurred with alternative systems. In the 1970s and 1980s, EPA's Innovative and Alternative (I&A) Technology Program provided grants of up to 100 percent of the cost for modifying or replacing I/A systems that failed to perform according to their design standards. The I&A program was terminated in 1990, and the current Clean Water State Revolving Fund program contains no similar "modification and replacement" provision. Thus this type of risk insurance no longer exists for the use of decentralized wastewater systems (GAO, 1994). In addition, the issue of liability has been raised in various communities where the use of decentralized cluster systems appears appropriate. Small communities are thus hesitant to choose these systems, despite their apparent advantages.

Engineers also face financial disincentives in designing lower cost decentralized systems since engineers' fees are sometimes based on a percentage of the project cost.

Overcoming the Liability and Fee Barrier. Liability can be addressed within the context of a management program, which can establish ongoing operation and maintenance programs to prevent system failures and mechanisms for covering failures should they occur (e.g., through federal or commercial insurance programs or escrow of a designated portion of system fees). Engineers can also obtain liability insurance. Engineering fees should be based on cost-plus-fixed-fee or lump-sum approaches.

FINANCIAL BARRIERS: PUBLIC GRANT AND LOAN PROGRAMS

Traditionally, EPA grants and loans for the construction of wastewater treatment facilities are available only to public entities. In such cases, if a community wishes to seek such funding, the management agency for decentralized wastewater systems must be a public agency. Private entities such as private contractors, individual homeowners, and homeowners' associations would not be eligible, except under certain provisions of the Clean Water Act that allow federal funds to be used for specific non-point source pollution management programs. Also, states have typically given funding priority to larger communities with more costly wastewater needs over smaller communities with lower-cost needs. Thus smaller communities typically are the last ones to receive wastewater funding assistance and often do not receive these types of funds. In addition, costs for planning purposes and for state review may be higher with alternative systems

than for conventional systems. As a result, financially strapped small communities are not able or are reluctant to incur additional costs without financial assistance. At the same time, most small communities are not informed of how to pursue outside funding sources.

Overcoming the Financial Barriers. There are other federal sources of funding for public as well as private entities. The U.S. Department of Agriculture's Rural Utility Service provides funding through the Water and Waste Disposal loan and grant program to public entities, Indian tribes, and organizations operated on a not-for-profit basis, such as an association, cooperative, or private corporation.

Public grant and loan funds for wastewater management should be utilized to a greater extent to manage decentralized wastewater systems where eligible (i.e., the Rural Utilities Service's funding program, EPA's Hardship Grants program, the Clean Water SRF program for nonpoint source control and the CWA section 319 program). Community officials should be educated on the these eligibilities.