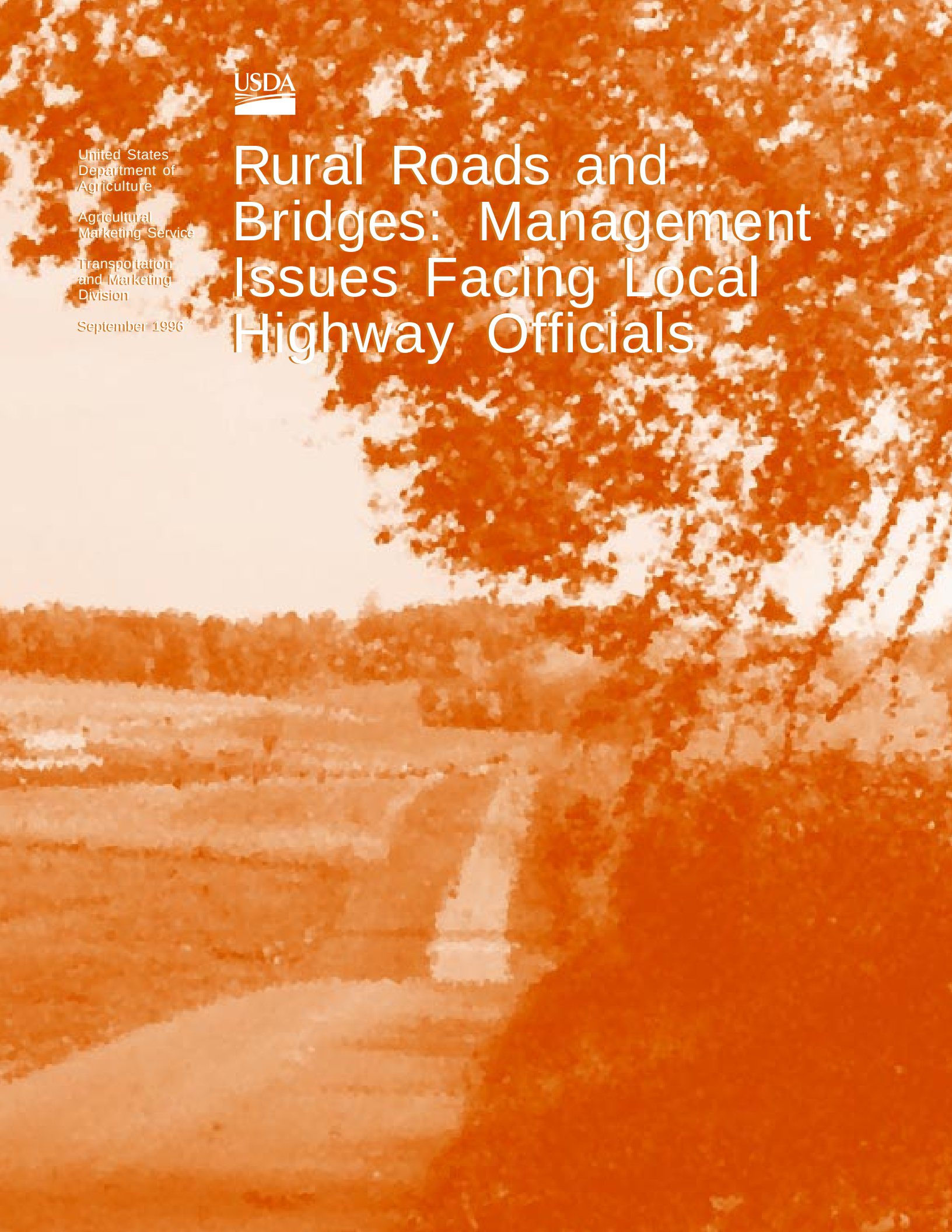

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Rural Roads and Bridges: Management Issues Facing Local Highway Officials

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Introduction

The quality of services provided by the local highway system depends mainly on the people who maintain the system. Sound management practices are particularly important in providing services, especially during times of scarce resources. Poor management decisions and/or inadequate maintenance procedures can result in higher than necessary short- and long-term costs. Restricted revenues and shifting traffic demands on the local highway system have placed greater emphasis on planning for future needs and on finding innovative methods of providing transportation services.

Because effective management is so important, this report documents management practices used by, and issues facing, local transportation administrators. From a national survey of county and town highway officials, in fall 1994 and spring 1995, five specific issues are discussed.[1] A total of 609 counties and 1,961 towns provided usable information. First, training opportunities and needs for those maintaining the local road system are outlined and discussed. Next, cooperative arrangements among local jurisdictions and the working relationships with State departments of transportation are presented. This discussion addresses the impact of the Intermodal Surface Transportation Efficiency Act (ISTEA) on local road management. We then review recent research that suggests a shift in how local road officials view intergovernmental aid in management decisions. The report closes with a discussion of policy changes that could improve local resource management in road and bridge management.

Personnel Training

The ability of local road officials to perform their functions effectively depends on several factors, including the training and experience level of the entire local highway staff. Recent studies show that professional requirements differ widely among local jurisdictions responsible for road and bridge maintenance. In a previous national survey of county highway officials, Walzer and Chicoine (1989) reported that highway administrators had to be professional engineers in more than one-third of the counties surveyed. They also noted that smaller counties and towns tended to have few, if any, formal training or educational requirements for highway administrators.

Independent of training requirements, numerous training opportunities for local highway officials and their staff currently exist. Nearly all State departments of transportation provide technical training for local road officials, with workshops ranging from basic equipment maintenance to financial administration. Additional training opportunities are provided by private vendors, professional associations, and various higher education institutions, including the Cooperative

[1]Responses are included for both towns (New England) and townships (Midwest). For convenience in exposition, the word “towns” is used for both towns and townships.

State Research, Education, and Extension Service of the U.S. Department of Agriculture. A recent study of local road officials in New England reported that participation in these educational opportunities can result in significant local cost savings (Deller and Halstead, 1994).

When queried about participation levels in educational opportunities, programs provided by State departments of transportation, Technology Transfer (T2) Centers, Local Transit Assistance Program, and professional associations were the most commonly attended (**table 1**). Participation rates of county highway officials and highway staff are reasonably high with little variation across counties in urban and rural areas. The participation levels of town officials are significantly lower compared with those of county officials.

While many reasons can be advanced for lack of participation, four issues rise to the top. First, local demands on officials and staff limit participation opportunities. More than one in five county and town officials responded that sufficient time to participate was not available. Second, fiscal restraint limits attendance. Over 19 percent of county officials and 26.9 percent of town officials expressed concern over the availability of fiscal resources. Third, while a wide range of training programs is available, local needs may not be met with broad-based programming. This latter concern is more commonly expressed by town officials (29.6 percent) than by county officials (12.1 percent). Finally, for many town road officials, local responsibilities are a part-time commitment which makes participation in educational opportunities difficult, given other time demands, limited fiscal resources, and specific local needs.

The relatively low participation rates in towns are troublesome because maintaining the local road and bridge network is becoming more complex as new demands are placed on an aging transportation system. The growing need for reinvestment in roads and bridges comes at a time of greater fiscal constraint, which makes management of limited resources more difficult. Experience shows that participation in training opportunities helps local officials cope with greater engineering and management demands. These educational programs should be supported and participation encouraged at all levels.

Cooperative Arrangements

A common criticism of local road and bridge service arrangements in rural areas is that the small size of operation is not cost-effective. Historically, local road responsibilities coincide with prevailing units of local

Table 1. Training, 1994

Question	Counties		Towns	
	Percent	(n)*	Percent	(n)*
If you or staff regularly participate in training seminars, which topics have been attended in the past 12 months?				
Transportation Planning & Administration	44.3	268	6.2	202
Design & Construction of Roads	47.9	290	8.0	261
Design & Construction of Bridges	35.9	217	2.2	70
Maintenance of Roads	65.0	393	19.6	638
Maintenance of Bridges	46.4	281	5.1	166
Equipment Maintenance and Repair	44.6	270	7.2	235
Computer Applications to Management	44.8	271	4.0	129
Financing Strategies and Control	15.7	95	6.6	215
Operations & Safety	62.1	376	13.4	435
Hazardous Materials	41.0	248	9.9	322
Americans With Disabilities Act	38.8	235	7.1	231
Risk Management/Tort Liability	44.8	271	10.6	344
What is the main source of training for you and your staff?				
T2 Centers (LTAP)	57.4	347	6.9	107
State Highway Department Programs	64.0	387	17.9	277
Cooperative Extension Service	18.8	114	21.2	327
Seminars Provided by Vendors	45.1	273	21.2	327
Seminars by Professional Associations	61.0	369	32.8	507
If you have not participated in training, is it because:				
Not enough time?	24.0	145	23.7	384
Not enough resources?	6.8	41	9.9	161
Didn't know about programs?	6.0	36	9.9	161
Programs not suitable for our needs?	12.1	73	29.6	481
Limited county funding?	19.5	118	26.9	437

*number responding

Source: Illinois Institute for Rural Affairs, National Association of Counties/National Association of County Engineers (NACo/NACE) Survey of County Officials and National Association of Towns and Townships (NATAT) Survey of Township Highway Officials, 1994.

government. In New England—the most decentralized system—towns are vested with responsibility for roads. In Southern and Western States, counties have primary responsibility. In the Midwest, a tiered system of responsibility is shared between counties and towns. In a few Mid-Atlantic States—Virginia, West Virginia, Delaware, and North Carolina—and Alaska, State government assumes major responsibility for roads and bridges (Chicoine, Walzer, and Deller, 1989).

A decentralized system of road construction and maintenance has implications for the cost of providing adequate maintenance schedules, new road construction, and other road and bridge responsibilities. Numerous studies of local roads, including studies of townships in Midwestern States by Deller, Chicoine, and Walzer (1988); counties in Kansas by Lamb and Pine (1974); counties in New York by Lesher and Mapp (1974); and towns in Maine by Deller (1992), document the presence of economies of scale in local road administration. For example, the latter study shows that economies of scale can be captured by towns and counties that manage approximately 80 miles of road or more. The issue is that a typical town in Maine has responsibility for about 30 miles of roads.

In essence, a decentralized system can hinder the ability of local officials to capture the benefits of scale economies. The results can be an inadequate base on which to raise revenues to support local roads and higher overall costs to residents. The small size of many jurisdictions, both counties and towns, can prevent them from hiring well-trained engineers and managers to implement maintenance and repair schedules. This latter consideration may result in a patchwork network of local road officials lacking adequate training or professional experience. Some States, such as Indiana and Iowa, have experimented with transferring local responsibilities to county governments, but this often is politically difficult.

A more common approach to reduce costs through economies of scale involves cooperative arrangements with other governments that have road responsibility. During tight fiscal conditions, local road officials have noted the benefits from cooperation with other local governments on construction projects, the sharing of equipment, and joint planning efforts. When asked about the advantages obtained from cooperative arrangements, the most commonly cited is cost-savings. For example, in Maine, the Penobscot Valley Council of Governments coordinates a cooperative purchase of winter road salt. A recent study by Meagher, who manages the council, reported that the average price paid for a ton of salt was $33.99 for participating towns and $36.79 for nonparticipating

towns, a difference of about $3 a ton. A similar program in southern Maine, organized by the Greater Portland Council of Governments, reported annual savings in excess of $250,000 for 40 towns participating in the program.

For nearly a decade, town highway commissioners in McDonough County, Illinois, have cooperated by forming an association to maintain almost 800 miles of road. Annually, highway commissioners in the county elect a president of the association to organize a work program to maintain the mileage. Each town pays into a common fund based on the gallons of oil used in road applications in their district. This fund covers equipment purchases, maintenance, repairs, and other services. The result is an estimated cost-savings of $50,000 per town.

Conceptually, many of these options make sense, but local officials are quick to point out the difficulties associated with implementing cooperative arrangements. For example, problems such as liability can undermine cooperative efforts. Uncertainty surrounding liability insurance for cooperative snow-plowing efforts or repair costs related to jointly shared equipment have hindered cooperative attempts. In addition, if historical antagonism between local jurisdictions exists, cooperative agreements simply will not work.

Nationally, the most common cooperative projects involve constructing new roads and bridges (**table 2**). More than half of county officials and over a third of town officials responding to the survey are involved in cooperative arrangements for construction projects. Of special interest is the finding that nearly one in six of these cooperative arrangements started or has been expanded since 1987. Counties have a larger share of new or expanded agreements, 14.4 percent, with 17.7 percent being in metropolitan (metro) areas.

For counties, sharing equipment and engineering services is also commonly reported, with slightly fewer than half participating in such programs. Larger counties that have captured economies of scale are often in the best position to aid smaller jurisdictions in these types of arrangements. Highly specialized road equipment is often beyond the financial resources of small counties and towns. By sharing expensive equipment, large counties can share part of the equipment costs while smaller governments with road responsibility have access to equipment normally beyond their reach. The much smaller percentage of towns with equipment sharing arrangements—19.9 percent for towns and 50.4 percent of counties—reflects a potential opportunity.

A special case can be made for engineering services. Large counties may have the critical mass to hire professional highway and bridge engineers. Again, counties with professional engineers can assist neighboring counties and/or towns through contract engineering. Large counties may subsidize part of the

Table 2. Cooperative Arrangements Between Local Units of Government

	Counties		Towns	
Type of Arrangement	***Percent***	***(n)****	***Percent***	***(n)****
Contract for All Road Maintenance	28.1	170	31.5	618
Cooperation on Road Construction	61.4	372	37.9	743
Cooperation on Bridge Construction	53.9	326	28.0	550
Haul Gravel	35.5	215	29.3	575
Blacktopping and Surface Application	48.1	291	24.9	488
Snow Plowing	46.1	279	40.7	801
Cooperative Purchasing Program	38.6	234	19.0	372
Training Session for Local Officials	39.4	238	18.0	352
Budget Development	11.7	71	8.9	174
Work Planning and Scheduling	26.9	163	13.6	267
Engineering Services	47.8	289	30.4	598
Administer State Highway Formula Funds	25.9	157	12.1	238
Administer State Highway Project Funds	23.4	142	10.0	197
Administer State Bridge Project Funds	27.7	168	11.9	234
Administer Federal Highway Project Funds	23.1	140	7.0	137
Administer Federal Bridge Project Funds	30.9	187	8.8	172
Share Personnel	30.4	184	14.9	294
Share Equipment	50.4	305	19.9	392

*number responding

Source: IIRA, NACo/NACE Survey of County Officials and NATAT Survey of Township Highway Officials, 1994.

engineering costs, while smaller governments with road responsibility have access to services normally beyond their reach. In Wisconsin, for example, 88.9 percent of all counties statewide have a cooperative agreement with towns to perform some road-related work with either local governments or the State highway department. In Rock County, Wisconsin, for example, towns recognize the cost savings with size and have contracted with the county highway department for several years. Here towns retain responsibility for setting priorities and funding decisions, but contract with a larger highway department for road work. The result is better road services at generally lower cost. Nationwide, approximately one in four towns contracts for all road maintenance. These are predominantly in the Midwestern states of Illinois, Iowa, Michigan, Minnesota, Ohio, and Wisconsin.

In addition to vertical cooperative arrangements in which smaller jurisdictions contract with larger jurisdictions for services, another common approach to securing access to expensive equipment and engineering services is through horizontal linkages. Two or more jurisdictions with road responsibility form a coalition of the size required to purchase the specialized equipment or the engineering services needed by coalition members.

In Illinois, two relatively small counties—McDonough and Henderson—share a county highway superintendent who is a registered engineer. This highway administrator spends 2 days per week with the smaller county and 3 days in the larger county. His salary is paid by both counties. Both counties benefit from lower administrative costs, and they have not had to face the political issue of consolidation or the relinquishment of local authority.

In Maine, three small towns in Aroostook County—Mapleton, Chapman, and Castle Hill—have supported a joint highway department. After snow falls, the roads are plowed by personnel paid from their joint highway account. For new equipment purchases, each town turns to its own equipment reserve account to fund its portion of the costs. But, when one of the towns decides to pave roads, the payment comes from the town's road improvement account. Duncan Beaton, who manages the three towns, estimates that the combined cost savings, when compared with neighboring towns operating independently, is nearly $1,000 per road mile.

Other possible opportunities to build cooperative arrangements focus on financial and budgetary responsibilities. These responsibilities include budget development as well as administration of State and/or Federal project funds. When officials set local road policies, a two-step process occurs. The first step asks how to provide road services: priorities, budgets, and the identification of funding sources. Generally, all local officials are involved in this decision-making process.

The second step involves actual road construction and maintenance. It is in this latter stage when economies of scale through cooperative arrangements come into play. Because local officials and residents may be reluctant to relinquish provisionary responsibilities but are interested in reducing production-related costs, the pattern reported in **table 2** becomes clear and reasonable. All four examples cited previously reflect this important distinction.

State highway departments are vital to successful local road operations. These departments greatly influence the ability of local personnel to perform their functions by providing technical and engineering information through educational workshops and/or direct consultation. State highway departments often administer State and Federal formula funds and therefore play a vital role in the budgetary, or provision, side of local road administration. In many States, the highway department establishes and enforces engineering design standards directly influencing local practices.

The simplest measure of the relationship between local officials and the State highway department is the number of contacts between agencies. County road administrators have almost weekly contacts with State highway departments

(**table 3**). Still, nearly a third reported that their only contacts are on a project-by-project basis. When considering county size and location, metro counties have a slightly higher rate of weekly contact with State agencies than smaller, nonmetro counties. Town officials, on the other hand, have the fewest direct contacts. The vast majority, 85.0 percent, contact State highway department officials only on a project basis. Indeed, contact between town road officials and State highway department officials is so infrequent that 14.8 percent did not even report whether they were satisfied with the State procedures for local consultation. This contrasts with 81.2 percent of county officials, who reported that they are at least somewhat satisfied with the State consultation practices.

Nationwide, 70.9 percent of county officials reported at least a “good” level of cooperation. The level of contact for towns varies almost directly with size: smaller agencies have the least contact with State highway officials. The remoteness of many of these smaller governments, coupled with the part-time nature of road responsibilities, explains, in part, the lack of contact with State highway departments. Another likely explanation is that county highway officials serve as an intermediary and assist towns in administering State funds.

The Intermodal Surface Transportation Efficiency Act (ISTEA) requires State highway departments to more actively incorporate public input into their planning efforts. For nearly one in three counties, the level of cooperation with State highway departments has improved since this change. Yet, only a small handful of towns, 12.7 percent, reported improved cooperation with State highway departments. Indeed, a comparison of towns which were part of both the earlier 1987 study and this study reveals two points. First, there is increased movement toward contacts on a project-by-project basis. Second, there has been a significant increase in levels of dissatisfaction with State highway department procedures for local consultation in State road and highway matters. Clearly, in States where towns play an important role in producing road services, levels of vertical and horizontal cooperation could be improved.

State highway officials reported a slightly different perspective on the level of cooperation. In a 1987 survey of State highway agencies, 38.9 percent reported working relations between the local and State officials as “excellent” and 58.3 percent as “good.” The 1994 survey revealed a slight worsening of relations. Today, 29.4 percent report “excellent” working relationships, a decline of 24.4 percent over 1987 levels, while 67.6 percent reported “good” levels of cooperation. While fewer than 3

Table 3. Relation With State Highway Agencies

Question	Counties		Towns	
	Percent	(n)*	Percent	(n)*
Frequency of contacts between local highway office and State highway agency:				
Weekly	40.2	253	2.5	33
Biweekly	12.8	75	2.3	30
Monthly	8.0	47	6.1	81
Quarterly	4.1	24	4.1	54
On a project by project basis	34.9	204	85.0	1,125
Level of satisfaction with State's procedure for local consultation in State road and highway matters:				
Very satisfied	33.9	200	11.7	187
Somewhat satisfied	47.3	279	39.0	623
Not very	12.0	71	13.6	218
Not at all	5.3	31	11.3	181
Don't know	1.5	9	24.3	389
Level of cooperation between local and State officials for road and highway planning and construction:				
Excellent	16.2	96	6.3	106
Good	54.7	323	34.7	579
Fair	22.2	131	21.9	366
Poor	6.6	39	12.6	210
Don't know	0.3	14	24.5	409
During the past 5 years the level of State/local road and highway cooperation has generally:				
Improved	31.0	182	12.7	213
Stayed the same	53.4	314	54.4	910
Deteriorated	12.9	76	6.3	106
Don't know	2.7	16	25.5	427

*number responding

Source: IIRA, NACo/NACE Survey of County Officials and NATAT Survey of Township Highway Officials, 1994.

percent reported "fair" in both years and none reported "poor" levels of cooperation, the shift is away from a rating of "excellent."

The Effects of ISTEA

In reviewing the debate over ISTEA, two key points arise. First, ISTEA encourages greater flexibility for local and State governments to fund a variety of transportation-related projects. For example, a pool of funds earmarked for economic development-related projects exists. Indeed, evidence from the 1994 survey of State highway agencies suggests that when rural highway projects are considered for funding, the importance of the potential impact on regional

economic development is now equal to traffic counts. This represents a significant change over criteria in 1987.

Nearly three in four State highway department officials reported that their States took advantage of the flexibility offered by ISTEA to reallocate funds. Of those States reporting, 93.3 percent reallocated highway funds to public transit, with an average transfer of $46 million from highway investments. This shift clearly benefited public transit in urban areas but probably had relatively little effect in rural areas, with few exceptions. Wyoming has used the flexibility provided by ISTEA to provide environmental enhancements. These enhancements include such things as bike paths, pedestrian walkways, and scenic byways. Scenic byways are areas in which motorists may pull their vehicles off the road and enjoy the view and/or read historic markers.

Second, ISTEA requires more local/public input into the decision-making process for spending. When asked, State highway department officials reported that the level of local involvement has increased significantly because of ISTEA. A vast majority, 87.5 percent, reported more local/public involvement and only 12.5 percent said the level of involvement remained the same. No State highway department official reported a decrease in local/public involvement. The typical State highway department spent nearly $580,000 to gather additional input into the planning process. These monies went to hosting and advertising public hearings, commissioning citizen task forces, and conducting statewide surveys. Iowa, for example, has used its statewide fiber optic communication system to gain more public involvement in addition to the traditional methods.

While the intent of ISTEA to foster greater involvement in the planning process appears to have been fulfilled in some ways, it may not have been effective in other situations. These may have caused a relative shift in planning processes. Historically, the level of cooperation between town and State highway officials has been relatively strong. The most recent data, however, may suggest a weakening in this relationship. In efforts by States to expand the pool of residents providing input into the highway planning process, town officials may have lost ground. Generally, State highway department officials can devote only a certain amount of time to the planning effort. The data suggest that, in the past, town officials had been major contributors to the process. Given the mandates of ISTEA, State highway department officials turned to a broader audience for input, relying more on metro planning organizations or regional councils. As a result, the data suggest that town officials have, to some extent, been “squeezed out” of the process. This does not

appear to be the case for county officials, however. The closer ties between county and State officials may partially explain this result as well as the county officials' higher level of training and experience. In some States, county officials have direct responsibility for coordinating or administering State highway funds.

As the relationships between the State highway departments and towns weaken, some concern has been raised over the distribution of ISTEA and other State highway department funds in regard to the flow of these dollars to rural areas. This, coupled with the transfer of highway dollars to public transit, which tends to be located in urban areas, may hinder the flow of highway funding to rural areas. It is certain that local officials in rural areas will be under more competition for funds.

Treatment of Intergovernmental Aid

Local governments use a complex revenue system to finance road services. In general, five funding categories are involved: (1) property taxes, (2) other local revenues (general fund and user fees), (3) Federal aid, (4) dedicated motor fuel taxes, and (5) other forms of State aid. In most local governments, State motor fuel taxes represent the single largest source of revenues, followed by local general funds and property taxes. Other forms of State and Federal aid represent less than 10 percent of all road revenues. The role of the Federal Government in supporting local roads and bridges has declined substantially in recent years. Federal funds increased from less than 2 percent of total road revenues in 1965 to a high of nearly 10 percent in 1977. During the 1990s, however, the level of support has returned to that of 1965, with the losses of General Revenue Sharing and Community Development Block Grants.

When county and town officials identified strategies to reduce expendi-tures and enhance revenues in response to declining intergovernmental aid, two respective approaches were preferred. To reduce expenditures, new construction and reconstruction projects can be postponed. No clear agreement exists on preferences for other types of expenditure reductions.

To enhance revenues, local officials expressed a need to become more self-reliant by increasing property taxes and/or turning to user fees. The distaste for property taxes among taxpayers, however, makes the former option difficult, and in smaller jurisdictions the revenue-generating potential for user fees is limited.

Perhaps a more important change during the past 10 years has been the manner in which local road officials treat intergovernmental aid in budgeting and planning. Several recent studies show that the ongoing implementation of the policy of fiscal Federalism has created structural shifts in the treatment of intergovernmental aid (Deller and Walzer, 1995; Walzer and Deller, 1993).

These studies suggest that, prior to the policies of fiscal Federalism, local road officials had treated Federal aid as a semipermanent source of revenue that could be built into budgeting and planning decisions. Because this aid was viewed as reliable, local officials reduced their dependence on locally generated revenues. In short, Federal aid was partially used as a form of local tax relief. In the 1980s, local officials viewed this aid with less certainty—transitory rather than permanent (i.e., a structural shift). Officials now are more inclined to use Federal aid to leverage local dollars in expensive projects that would not otherwise be feasible. This shift may change the types of projects funded or at least the order in which they are undertaken.

Summary

Managing local government highway resources is a complex task, requiring that personnel be knowledgeable about current techniques and systems. Historical institutional arrangements, especially in rural areas, have created a variety of local governments vested with road service responsibilities. Studies have suggested that this patchwork of local governments is not necessarily the most cost-effective way to deliver road and bridge services.

Several options have been offered to address these difficulties. First, the construction and maintenance practices for roads and bridges are technical; there are correct and incorrect techniques to conduct the various operations, making education and training an important requirement for responsible personnel. In larger jurisdictions, a staff of well-trained engineers can ensure that the local road system meets engineering standards. In smaller jurisdictions that cannot afford an engineer, educational opportunities for highway officials and staff are a partial solution and State highway departments currently offer these services. As noted earlier, research suggests that participation in these training programs is cost-effective for smaller jurisdictions. Policies to promote further educational programs, as well as incentives for local participation, are needed.

Second, cooperative arrangements to overcome artificial institutional barriers have also been shown to be cost-effective. Vertical arrangements where larger units of government, such as State highway departments, assist smaller juris-dictions have proven beneficial. ISTEA encouraged State highway departments to include more local input in decision-making. Horizontal cooperative arrange-ments have enabled many smaller jurisdictions to capture economies of scale in road construction and maintenance. Policies aimed at encouraging such cooperative arrangements should be explored.

Effective management of local roads hinges on the stability and certainty of funding sources. Because of the long-term nature of investment in the local road system, stability and certainty are prerequisites to capital budgeting and planning. While Federal aid may not now represent a significant portion of local road funding, it is used to leverage local dollars for specific projects that might not otherwise occur. Introducing stability to the flow of Federal resources will help local road officials provide services more effectively.

Throughout this report, the overriding issue is how to reduce operating costs. The national survey and a review of applied research studies suggest two broad options. The first focuses on education and training. Through continuing education and training, whether the educational opportunities are provided by State highway departments, higher education agencies, or private vendors, costs can be reduced and services enhanced. Programs designed to expand the programs and encourage participation could be cost-effective.

The second option focuses on capturing economies of scale through cooperative arrangements. Research, as well as numerous examples, demonstrates that cooperative efforts across local jurisdictional lines have great potential for cost reduction and service enhancement. Some very small units may have to seriously consider consolidating with a neighboring unit of government.

A set of consistent and stable management practices promoting these two cost reduction and service enhancement approaches will help foster an environment that creates local solutions to problems with the local road and bridge systems. These practices will become even more important as funds for highway needs become more scarce in rural areas.

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