

Economic Impact of Water/Sewer Facilities on Rural and Urban Communities

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Rural water/sewer facilities generate private investment and public funds, and increase the property tax base. But the average urban water/sewer facility, which costs only about one-third more than the average rural facility, creates about twice the amount of permanent jobs, induces three times more private investment, leverages twice as much in public funds, and adds three times more to the local property tax base. This difference may be due to greater aggregate infrastructure in urban than in small rural communities.



Water and sewer facilities are built mainly to provide safe drinking water, to treat sewage to meet wastewater standards, and to reduce related health risks. Some communities are compelled to build new systems or expand/improve existing ones to meet new regulations. However, many communities invest in water/sewer facilities to encourage economic growth by facilitating the expansion of existing businesses as well as attracting new ones.

Some conceptual studies argue that communities with water/sewer facilities operating near capacity (and vulnerable to overflow of raw sewage) can stimulate economic development by investing in water/sewer facilities and creating excess capacity for future growth (Rowley et al.). The literature on firm location decisions by businesses shows that water/sewer facilities are among the factors that influence such decisions, but they are not one of the most critical factors.

However, such studies do not inquire whether these businesses would have located in communities where there were no or inadequate water/sewer facilities. Moreover, such plant location studies do not convey or estimate the economic impact of water/sewer or other infrastructure on local communities. Some studies have estimated the impact of aggregate infrastructure on economic growth at the national or State level, over time (Gramlich), but not the impacts of water/sewer infrastructure at the community level.

This article makes use of data from one of the local impact studies conducted for the Economic Development Administration (EDA), focusing on rural and urban impacts of water and sewer projects specifically aimed at stimulating economic development in host communities. Data are from water/sewer projects built or expanded in 1989 and 1990, and which received final payments from the EDA during fiscal year 1990 (see “Data and Collection

Methods,” p. 48). Such information can help in identifying the direct and indirect business beneficiaries of such investment and in estimating their economic contribution to rural and urban host communities of these EDA-funded projects.

Characteristics of Host Communities

The Economic Development Administration provides grants subsidizing the cost of completing a water/sewer project. These grants are awarded only to economically depressed rural and urban areas (see “Data and Collection Methods”). Of the 87 water/sewer projects included in the study, 54 were located in rural and 33 in urban communities across 30 States. Eight water/sewer projects were in North Carolina, 7 in Texas, 6 each in West Virginia and Indiana, and 5 each in Pennsylvania, Michigan, Arkansas, and California (table 1).

In 1986/87, the local unemployment rate was 10 percent for all 87 communities and the share

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Table 1

Geographic distribution of water/sewer projects studied

The 87 projects were spread across 30 States, and 15 projects were studied in detail

State	Number of projects
Alabama	4*
Arkansas	5*
Arizona	1*
California	5*
Georgia	2
Idaho	3*
Illinois	2
Indiana	6*
Iowa	1
Kansas	1*
Kentucky	3
Michigan	5
Minnesota	2
Missouri	1
Montana	1
Nevada	1
New Jersey	1*
New York	3
North Carolina	8
Ohio	2
Oklahoma	2
Oregon	1*
Pennsylvania	5*
South Carolina	4*
South Dakota	1
Texas	7*
Virginia	2*
Washington	1*
West Virginia	6*
Wisconsin	1

*One community host to a water/sewer project in each of these States was paid a personal visit to collect detailed data about the economic impact of the water/sewer projects, and to verify the information being collected by the local authorities. Seven of these communities were rural and eight urban.

Source: Calculated by ERS, from U.S. Department of Commerce, EDA, *Public Works Program: Performance Evaluation*, May 1997.

of population below the poverty level was 20 percent (table 2). Per capita income in 1986/87 was \$7,440 for all 87 communities, \$7,088 for the rural communities, and \$8,017 for the urban commu-

nities, or about 40 percent below national and State per capita income.

Direct and Indirect Business Beneficiaries

Water/sewer projects, like all other infrastructure projects funded by EDA, are built for specific or potential firms and businesses. These businesses are called the direct beneficiaries, and their economic impact on the community is called the direct effect of water/sewer projects. Once a water/sewer project is built, it also benefits existing businesses and helps in attracting new businesses to the community. These businesses, called the indirect beneficiaries, may include: (1) primary and secondary suppliers to the direct beneficiary businesses, (2) businesses that tap into the new water and sewer lines and grow around these lines, (3) new startups or relocating businesses that make use of the excess capacity of new water/sewer facilities, and (4) retail stores and service businesses that arise in response to increasing prosperity of beneficiary businesses and rising family incomes.

Industrial and manufacturing firms are most frequently the direct beneficiaries of new water/sewer facilities (table 3). For example, a large potato chip factory in Pennsylvania had 506 jobs before the water/sewer project and 950 after the completion of the project. A major beef packing plant in Kansas had 1,300 jobs before the project and 2,700 after. Other direct beneficiaries include a major chicken processing plant, a farm produce processing plant, industrial parks, shopping centers, and commercial/office buildings. Businesses that indirectly benefited from water/sewer projects include retail stores and service industries, restaurants, housing subdivisions, automobile dealerships, motels, and service stations (table 3).

Economic Impacts of Projects' Beneficiaries

Water/sewer projects can save and/or create jobs, spur private-sector investment, attract government funds, and enlarge the property tax base. The 87 water/sewer projects studied, on average, created 16 full-time-equivalent construction jobs. Direct beneficiaries

Table 2

Characteristics of communities participating in water/sewer projects

Unemployment and poverty rates were similar in rural and urban communities, but rural communities had lower incomes and minority populations

Characteristic	All 87 projects	54 rural projects	33 urban projects
Unemployment rate, 1986/87	10.5	10.7	10.1
Population below poverty level (percent), 1986/87	20.3	20.1	20.7
Minority population (percent), 1990	19.7	15.3	26.8
Per capita income, 1986/87 dollars	7,440	7,088	8,017
Community population, 1990	36,189	13,415	73,456

Source: Calculated by ERS, from U.S. Department of Commerce, Economic Development Administration, *Public Works Program: Project Evaluation*, May 1997.

(businesses) saved, on average, 212 permanent jobs, created 402 new permanent jobs, made private investments of \$17.8 million, leveraged \$2.1 million of public funds, and added \$17.0 million to the local property tax base. Indirect beneficiaries saved, on average, 31 permanent jobs, created 172 new

permanent jobs, attracted \$3.34 million in private-sector investment, leveraged \$905,000 of public funds, and added \$3.0 million to the local property tax base. This enlarged property tax base, at a mere 1-percent tax rate, would yield \$200,000 in annual property tax to the community (table 4).

Rural Versus Urban Effects

On average, construction costs were higher (1.3 times) for urban than rural water/sewer projects, but so were the average economic benefits to businesses. For example, urban businesses directly benefiting from water/sewer projects saved 1.3 times more permanent jobs, created 1.9 times more permanent jobs, made 2.8 times more private investment, leveraged 2.5 times more public funds, and added 2.9 times more to the property tax base than similar businesses in rural communities (table 4). Both rural and urban businesses indirectly benefiting from the projects created substantial employment, private investment, public funds, and property taxes both in rural and urban communities. However, most urban projects have substantially larger impacts than rural projects.

Investment in Water/Sewer Facilities Pays Large Dividends

Total construction cost per water/sewer project was \$1,418,738 nationally in 1990. About \$582,000 (41 percent) came from EDA grants, over \$700,000 (49.6 percent) came from the applicants (primarily local governments), and over \$133,000 (9.4 percent) came from other Federal agencies, and State and county governments (table 4). Every dollar spent in constructing an average water/sewer project generated almost \$15 of private investment, leveraged \$2 of public funds, and added \$14 to the local property tax base (table 5). Since local communities paid only about half of the construction cost, the return on their investment would be twice as large as shown here.

Table 3

Businesses directly and indirectly affected by water/sewer projects studied in detail*

Most water/sewer projects' direct beneficiaries were industrial and manufacturing firms; most indirect beneficiaries were retail stores and service industries

Type of business	Number of businesses affected	
	Directly	Indirectly
Warehouse buildings		2
Shopping centers	2	1
Potato chip factory	1	
Restaurants	3	12
Deli-type stores		2
Nursing home		1
Funeral homes		2
Mobile home dealerships		1
Condominiums		1
Housing subdivision developments		6
Power generating plants	1	
Major chicken processing plant	1	
Major beef processing plant	1	
Industrial and manufacturing firms	11	3
Industrial parks	3	2
Automobile dealerships		7
Motels		4
Cinemas		1
Bookstores		3
Business/office buildings	2	
Saloons/taverns	1	1
Full-service RV parks		1
Flea markets		3
Railroad park		1
Construction and electrical firms	2	1
Office furniture warehouses	1	
Farm-produce processing plants	1	
Service stations		4
Prisons	1	
Retail stores and service industries		91
Tourism promoting facility		1
Golf course		1
Government offices		3

*Out of 87 water/sewer projects, 15 were personally visited onsite by the research team, and they identified businesses that were direct beneficiaries and indirect beneficiaries in each of these 15 communities. Seven of these communities were rural and eight were urban.

Source: Calculated by ERS from U.S. Department of Commerce, EDA, *Public Works Project: Performance Evaluation*, May 1997.

Table 4

Economic impact per water/sewer project, urban versus rural host*Urban water/sewer projects have two to three times larger economic effects than rural projects*

Economic impact	All 87 projects	54 rural projects	33 urban projects	Urban to rural ratio
<i>1990 dollars, per project</i>				<i>Ratio</i>
Construction/completion cost per project:				
EDA's grant funds	582,083	519,843	683,931	1.32
Applicant's funds	703,410	575,896	912,068	1.58
Funds from other sources	133,245	164,339	82,364	0.50
Total construction costs	1,418,738	1,260,078	1,678,363	1.33
Economic impact per water/sewer project				
Private investment directly induced	17,800,000	10,514,100	29,794,600	2.83
Private investment indirectly induced	3,340,000	1,459,560	6,429,750	4.41
Total private investment induced	21,140,000	11,973,660	36,224,350	3.03
Public investment directly related to projects	2,097,249	1,332,917	3,347,971	2.51
Public investment indirectly related to projects	905,270	784,415	1,103,031	1.41
Total public investment induced	3,002,519	2,117,332	4,451,002	2.10
Total private and public investment induced	24,142,519	14,090,992	40,675,352	2.89
Property tax base increased directly by projects	17,000,000	10,341,200	29,845,300	2.89
Property tax base increased indirectly by projects	3,000,000	1,300,000	6,250,000	4.81
Total increase in property tax base	20,000,000	11,641,200	36,095,300	3.10
<i>Number of jobs</i>				
Employment impact per water/sewer project:				
Construction jobs directly created	16	15	18	1.20
Permanent jobs directly saved by the projects	212	189	249	1.32
Permanent jobs indirectly saved by the projects	31	37	20	0.54
Total permanent jobs saved by the projects	243	226	269	1.19
Permanent jobs directly created by the projects	402	304	562	1.85
Permanent jobs indirectly created by the projects	172	87	159	1.83
Total permanent jobs created	574	391	721	1.84
Total permanent jobs saved and created	817	617	990	1.60

Source: Adapted by ERS, from U.S. Department of Commerce, EDA, *Public Works Program: Performance Evaluation*, May 1997.

In addition, water/sewer projects help teach communities to plan, prepare applications, obtain grants, manage construction projects, work with government agencies at every level, and negotiate with existing and relocating businesses. This helps them

succeed in further endeavors. Three communities (out of 15) that were studied in detail were in the process, during the personal visits by the research team, of building more ambitious infrastructure projects than the water/sewer projects already completed. Another com-

munity had applied for an EDA grant for an additional sewer line needed to expand its already fully occupied industrial park. Another community was ready for mixed development on a 100-acre tract of land, and two more had set up committees to search for additional

suitable land for further development. In one small community, 200 people showed up at the dedication ceremony of the new sewage treatment plant.

Some small rural communities might depend primarily on agriculture, forestry, or mining. Small rural towns or urban areas with only one or two main industries are vulnerable to economic downturns in those industries or sectors. Water/sewer systems, by facilitating the growth of a wide mix of local

businesses, can diversify the local economy, as evident in all 15 communities investigated in detail (table 3).

Increasing and expanding business activity will at least maintain and likely increase values of local properties, including private homes, the largest investment for most families. That helps people to build equity and engenders prosperity. Growing business activity and rising local incomes also add to the local property tax base, sales tax

revenues, and even local/county income tax revenues. And of course, water and sewer facilities are critical for meeting safe drinking water needs and clean water regulations.

Conclusion

Rural and urban water/sewer projects both generate much greater economic benefits than their total construction cost. In fact, the 87 water/sewer projects analyzed in this study had been operating only 6-7 years, and it is possible that the magnitude of the economic impact will continue to grow far into the future.

Rural water/sewer facilities save and create permanent jobs, generate private investment, leverage additional government funds, and increase the property tax base. But the average urban water/sewer facility generates two to three times the economic impacts of rural facilities. There are several likely reasons for this. First, due to the small size and remoteness of rural communities, a rural project may cost more to build than the same size project in urban areas. If construction costs were similar for both rural and urban water/sewer projects the relative difference in economic impacts may narrow or even disappear. Second, the general infrastructure—easy access to highways, railroads, and airports, primary and secondary suppliers, input and output markets, skilled labor, community services, community facilities and amenities, cultural activities, libraries, and good schools—is likely to be more abundant in urban than rural areas.

Data and Collection Methods

The Economic Development Administration (EDA) funds public works projects in communities where levels of unemployment and percentages of the population below the poverty level are 40 percent higher than State and national averages, and per capita income is typically 40 percent lower. The projects are located in either very rural or dense urban areas, with the vast majority in rural communities. Projects were usually built for a specific beneficiary (business) or with a likely beneficiary in mind.

The Economic Development Administration collected data, through contractors, from November 1996 through March 1997, from 203 projects, for which EDA had made its last payment during FY 1990. These projects had 6 years to get established and create a measurable economic impact on host communities.

The research team (including researchers from Rutgers University, New Jersey Institute of Technology, Columbia University, Princeton University, National Association of Regional Councils, and University of Cincinnati) developed a questionnaire, and contacted via phone or mail all 203 recipients of EDA grants. The grant recipients were asked to get local economic development officers, tax assessors, and owners of local businesses involved in order to gather the most knowledge about the impact of EDA-funded projects. The research design consisted of identifying every local business that had directly or indirectly benefited from the EDA-funded project, and then counting how many jobs were saved and created, how much private investment had been made, how much additional government funds had been leveraged, and how much the property tax base had been increased by each business identified to be directly or indirectly benefiting from the EDA-funded project.

All those responsible for collecting such information were trained at 13 different locations around the Nation. Out of 203 projects, 60 were selected for onsite visits by research team members. On these personal visits, researchers checked the data being collected by the EDA grant recipients. Eighty-seven projects were water/sewer projects, and 15 of those received onsite visits.

Table 5

Average economic impact to average construction cost ratios, and costs* per job

Both rural and urban water/sewer projects, on average, generate private investment, leverage public funds, and increase the property tax base many times more than the average construction cost

Economic impact/cost	All 87 projects	54 rural projects	33 urban projects
	<i>Ratio</i>		
Direct private investment to construction cost ratio	12.5	8.3	17.8
Indirect private investment to construction cost ratio	2.4	1.2	0.7
Direct and indirect private investment to construction cost ratio	14.9	9.5	21.6
Direct public investment to construction cost ratio	1.5	1.1	2.0
Indirect public investment to construction cost ratio	0.6	0.6	0.7
Direct and indirect public investment to construction cost ratio	2.1	1.7	2.7
Total private and public investment to construction cost ratio	17.0	11.2	24.2
Direct and indirect increase in property tax base	14.1	9.2	21.5
	<i>1990 dollars</i>		
Cost per permanent job saved	5,838	5,576	6,239
Cost per additional permanent job created	2,472	3,223	2,328
Cost per permanent job saved or created	1,737	2,042	1,695
Cost per construction job	88,671	84,005	93,242

*Construction cost here includes EDA grants, applicant's funds, and amounts contributed by local, county, and State governments.
Source: Calculated by ERS from U.S. Department of Commerce, EDA, *Public Works Program: Performance Evaluation*, May 1997.

However, EDA funds water/sewer and other infrastructure projects in economically distressed areas, and it requires applicants to document the expected extent of economic development that the project will generate. Therefore, the economic impacts generated by the projects analyzed in this article may not be duplicated in communities that build water/sewer facilities exclusively to provide safe drinking water and meet wastewater regulations. Such projects may or may not generate economic impacts beyond construction jobs and construction material sales in the community.^{RA}

For Further Reading . . .

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