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SUBSIDIES FOR PUBLIC SERVICES AT AN INTERNATIONAL BORDER: IMPLEMENTING GOVERNMENT ASSISTANCE FOR ENVIRONMENTAL INFRASTRUCTURE IN TEXAS COLONIAS.

Abstract

Experience in the U.S.-Mexico border region demonstrates that a well-funded program to subsidize environmental infrastructure can falter if the incentives, capabilities, and institutional contexts of involved organizations do not support attainment of program goals. *Colonias* —informal communities in the border region— are characterized by the absence of physical infrastructure, including water supply and wastewater facilities. The Texas Legislature established the Economic Distressed Areas Program (EDAP) in 1989 to provide grants and loans for constructing *colonia* water and sewer systems. Our assessment of EDAP conducted over several years demonstrates that, despite being well funded, the program performed poorly through the late 1990s. Completed systems remained underused because *colonia* residents could not afford to hook up to them, and projects progressed slowly. This weak performance record is explained by the incentives and weak management capabilities of the water and sewer service providers and the Texas Water Development Board (TWDB), the agency administering EDAP. In the late 1990s, the institutional contexts of TWDB and many service providers changed, leading to notable improvements in the performance of EDAP and its projects.

Resumen

Experiencias en la región fronteriza entre los Estados Unidos y México muestran cómo un programa de subsidios bien financiado para la construcción de infraestructura ambiental puede fallar si los incentivos, capacidades y contextos institucionales de las organizaciones involucradas no apoyan la realización de las metas del programa. "Colonias" —comunidades informales en la región fronteriza— son caracterizadas por la ausencia de infraestructura, como sistemas de agua potable y alcantarillado. La legislatura de Texas estableció en 1989 el Economically Distressed Areas Program (EDAP, Programa para áreas económicamente afligidas) para proveer subsidios y prestamos para la construcción de sistemas de agua potable y alcantarillado en las colonias. Nuestra evaluación de EDAP durante siete años muestra que, a pesar del buen financiamiento, el programa tuvo un bajo desempeño hasta finales de los noventas. Muchos sistemas no fueron utilizados completamente debido a que muchos de los residentes de las colonias no podían pagar por las conexiones a los domicilios, los proyectos progresaron lentamente. Este desempeño decepcionante es explicado por los incentivos y las capacidades debilitadas de manejo de los proveedores de los servicios de agua y saneamiento y los del Texas Water Development Board (el Consejo del desarrollo del agua de Texas), la agencia administradora del EDAP. Durante el fin de los noventas, los contextos institucionales del TWDB y muchos de los proveedores cambiaron, dirigiendo mejoras notables en el desempeño del programa y sus proyectos.

Introduction

With the growing importance of trade in the global economy and decreased barriers between nations, some international border regions have become dynamic and prosperous areas that attract industries and workers to their urban centers. The U.S.-Mexico border region, defined as the area 100 kilometers (62 miles) on each side of the international border, is one such area. [1] Mexican and U.S. trade policies since 1965 have produced a sharp increase in the region's economic activity, including the establishment of more than two thousand *maquiladoras.*[2] The impacts of these policies have not been limited to economic growth. The region has also experienced a dramatic population boom, growth of informal housing settlements, shortcomings in physical infrastructure and urban services, and the degradation of human health and environmental quality (Peach *et al*, 2000; Ward, 1999; EPA, 2001).

These types of problems are not unique to the U.S.-Mexico border region. Many developing countries have difficulty providing services to squatter settlements that develop because of insufficient low-income housing in areas where employment opportunities attract laborers. Providing basic public services to informal settlements is often demanding because they are frequently in areas that are difficult or unwise to serve, such as flood-prone lands or unstable hillsides. Moreover, the cost of servicing these areas is often high because of their unfavorable locations and the lack of pre-development planning. Serving informal communities along the U.S.-Mexico border is a challenge that has yet to be overcome by local, state, and national governments.

Most people would not anticipate encountering communities with significantly substandard housing and dangerous sanitary conditions in the United States, but such circumstances are common in unregulated developments called *colonias* located outside of municipal boundaries in counties at or near the international border with Mexico. Most *colonias* are in Texas, but they exist in other border states as well.[3] Beginning in the 1970s, many families from the border's growing low-income population have purchased lots in Texas *colonias*. They have

[1] The US- Mexico border is not unique in this respect. For example, the Western border regions of the Višgrad Four (the Czech Republic, Hungary, Poland, and Slovakia) represent regions that were not economically dynamic in the past. Because of their proximity to the European Union and affluent countries such as Austria, those regions are experiencing a growth in services, trade, and direct foreign investment (Scott *et al*, 1997).

[2] "Maquiladoras" are assembly plants in Mexico owned and operated by foreign-owned industries whose finished goods are only taxed on value added.

[3] In Spanish, "*colonia*" means neighborhood, without reference to the affluence of the neighborhood. "Colonia" to describe U.S. communities is pejorative and implies that basic infrastructure is substandard. In addition to Texas, *colonias* exist in New Mexico, Arizona and California.

found *colonias* attractive because the land is inexpensive, they can build their houses as their budgets permit, and affordable housing is scarce in most U.S. border cities. Colonia lots are particularly affordable because they lack traditional subdivision services, such as water and sewer systems, drainage, paved roads, police and fire protection, and garbage collection.

As population increased in *colonias* in the 1980s, the dangerous sanitary conditions in these settlements caught the attention of nongovernmental organizations (NGOs) and the media; they publicized the public health threat linked to hundreds of thousands of people living without basic sanitation. The Texas state government responded in 1989 with actions aimed at controlling *colonia* growth and with a program to subsidize construction of water and sewer systems in *colonias*. This program—the Economically Distressed Areas Program (EDAP)—is administered by the Texas Water Development Board (TWDB or "the Board"), the state's principal water planning and financing agency.

We analyze the performance of EDAP from 1989 through mid-2002. This long-term perspective is important inasmuch as the program improved significantly after 1997, and, interestingly, that improvement was inspired primarily by factors exogenous to TWDB. Our study examines the performance of both individual EDAP-funded projects and the program as a whole. We argue that much of the program and project performance over time can be explained in terms of the incentives and management capabilities of TWDB and the service providers; i.e., the organizations (such as municipal water utilities) that own and operate EDAP projects. We also show how changes in the context within which TWDB and the service providers operate have affected their behavior with regard to EDAP.

Our analysis has implications well beyond Texas because it identifies factors affecting the performance of any government subsidy program intended to facilitate construction of water supply and wastewater treatment systems. As the literature on subsidy programs for environmental infrastructure makes clear (see, e.g., Binkley *et al*, 1975;Ostrom *et al*, 1993; Sanders, 1995), factors affecting the performance of such programs continues to be of great theoretical interest and enormous practical significance.

Research approach, data, and themes

A case study approach was selected over alternative research methods because it fits well with our goal of appraising EDAP's performance and identifying factors determining that performance. Our data comes from sixty interviews with TWDB personnel, staff of water and sewer service providers, municipal and county officials, NGO staff, *colonia* residents, and border researchers. We also reviewed documents on EDAP and EDAP-funded projects, as well as the Texas Water Development Board's EDAP files and databases.

The research began in 1995 with a short reconnaissance trip. Between October 1996 through May 1997, field research was conducted in Austin, Texas,

where TWDB is headquartered, and along the length of the Texas-Mexico border. Follow-up research was performed using telephone interviews. A final research trip to Austin and border counties in Southeast Texas was made in June 2002.

In addition to collecting data on all EDAP projects initiated before mid-2002, we conducted four "case projects," one for each of the major types of organizations undertaking EDAP projects: neighboring municipalities, which are municipalities near enough to a *colonia* to service it through an extension of their water and sewer lines; special-purpose governments, such as water utility districts; private providers, such as water supply corporations; and former *colonias*, which are *colonias* that have incorporated to become municipalities.

The arguments in this paper are given using specialized terms, which are clarified below. We view organizations as entities defined by a particular combination of expertise, resources, and organizational form. The ability to mobilize these elements to achieve a task is an organization's *capability* (Israel, 1987). Being capable means having the staff, resources and organizational structures needed to complete a task. In this context, staff includes technical, administrative, and managerial staff; resources include funds and materials; and structures include organizational arrangements and procedures. Part of an organization's ability to mobilize funds, staff and other elements is determined by its experience.

Our perspective herein is that programs are instruments for attaining goals, and they are implemented by organizations operating within a particular *institutional context*; that is, the organization's physical, socioeconomic, legal, financial, and inter-organizational setting. Institutional context can either inhibit or facilitate a program's success (Poister *et al*, 1979). Organizations (and the individuals within organizations) involved in implementing a program often choose their actions by identifying which of the set of institutionally-possible actions will allow them to best pursue their self-interests.

An organization's *incentives* relate to the pursuit of its self-interest within the constraints of its institutional context. For example, under EDAP water and sewer service providers function as the link between the program and the beneficiaries. Service providers become proxies that receive assistance for the intended beneficiaries: *colonia* residents. Sometimes service providers have objectives unrelated to *colonias* that can be satisfied using EDAP funds. In such cases, providers may have incentives to employ EDAP's resources to meet their own ends instead of giving priority to the program's formally stated goals (Bardach, 1977).

One of our two main argument concerns individual EDAP-funded projects: variations in performance among projects can be explained in terms of the institutional context, incentives and project management capabilities of service providers. For example, although former *colonias* possess strong incentives to complete their EDAP-funded projects and to connect residents to the projects, those providers often lack the capability to implement EDAP projects successfully.

Effective project performance is necessary for good program performance, but it is not sufficient. Program performance also depends on how the organization

administering the program—in this case TWDB—handles problems hindering individual projects and the program as a whole.

Our second main argument concerns how the incentives, capabilities, and institutional context of TWDB relate to the performance of EDAP as a whole. Because of the way accountability structures were established, the Board had few incentives to insure high program performance, and its core technologies (which link to its capabilities) did not initially match well with requirements for implementing EDAP. We demonstrate the importance of institutional context by showing how TWDB improved its performance in administering EDAP in response to political pressures brought by the media in the late 1990s when then-governor George W. Bush was laying the foundation for a presidential campaign.

Texas Colonias

Texas is home to about 400,000 *colonia* residents, most of whom live either in the border counties of Southeast Texas or outside of El Paso in the western tip of Texas. Although *colonias* are often thought of as enclaves of illegal aliens, 65 to 80 percent of *colonia* adults are U.S. citizens (Ward, 1999, citing the office of the Attorney General in Texas). The *colonia* population is predominately Hispanic and classified as low income (Texas Department of Health, 2000).

Colonias evolved in Texas because, prior to 1989, the Texas legal system allowed unregulated development on land outside municipal jurisdictions. During the 1970s, the tremendous influx of low income (legal and illegal) Mexican immigrants that entered Southern Texas to take advantage of employment opportunities, together with the expansion of the Mexican-American border population, placed enormous pressure on the stock of low-cost housing in border cities. The lack of affordable housing, and impediments to traditional mortgage financing faced by most low-income Hispanics in the border region, caused a large number of low-income families to seek housing in *colonias*. These families found *colonias* attractive because they could purchase land with minimal (or no) down payment, build a permanent home slowly as funds permitted, and construct additional dwellings on the land as needed. Developers could sell parcels inexpensively because the land lacked basic public services. The absence of infrastructure, which made the land cheap, is what led to the unsanitary conditions in *colonias*.

Most *colonias* in existence today are legal developments that were first settled between 1960 and 1989. They do not have local governments because they are unincorporated subdivisions outside of municipal limits. Some *colonias* are near municipal boundaries, while others are in isolated rural areas. Typically a *colonia* is constructed on poor-quality land adjacent to a secondary highway, often in a flood-prone area.

In creating a *colonia*, a developer generally converted agricultural and unused land to residential use by obtaining approval from the county government,

marking off lots, and bulldozing dirt roads. Before 1989, developers were only required to gain county approval for plans (known as plats) for the subdivision's roads and drainage. Water supplies, sewers and other basic services were not required. Purchases, with prices in the early 1990's between $2000 and $8000 per parcel (Wilson and Menzies 1995, 175), were often financed through an arrangement called a "contract-for-deed." Payments were generally spread over ten years at 10% interest. This financing scheme was risky for buyers because, prior to changes in Texas law in 1995,[4] the developer retained ownership through the last payment. During the contract period, a developer could repossess the land on the basis of one missed payment, and the buyer would lose all equity in the land and dwelling.

All but two of one thousand Texas *colonias* surveyed in 1990 lacked safe means of sewage disposal. Most *colonia* residences used either outhouses, cesspools, or septic tanks with drainage fields (Texas Department of Human Services, 1988). Septic tanks, the most sophisticated of these methods, were often poorly installed or maintained. Moreover they are ineffective in many *colonias* because of the small lot sizes, slow soil percolation rates, shallow water tables, and frequent flooding. In these conditions, septic systems and the other previously-mentioned sewage disposal methods contribute to groundwater and surface water contamination.

In addition to lacking safe wastewater disposal methods, a quarter of the households in Texas *colonias* in 1988 had no facilities to deliver treated drinking water to their dwellings (Texas Department of Human Services, 1988). Households with indoor taps were often served by water distribution systems with deficient capacity. Consequently, many *colonia* households used water from a combination of sources: hauling (often over long distances), purchasing from vendors at high prices, and taking untreated (typically contaminated) water from nearby drainage ditches and private wells. Not surprisingly, rates of disease among *colonia* residents are notably higher than rates in the rest of Texas (Hernandez, 1997).

Weak incentives to provide services before EDAP

The water and wastewater needs of the *colonias* were largely ignored before 1990 because the most likely water and wastewater service providers lacked the incentives and/or management capabilities to act. A limited pool of state and federal subsidies for water and sewer systems existed, but *colonias* could not apply for the subsidies directly because they lacked governments. To obtain the funds, *colonias* had to find political entities to sponsor their proposed water or sewer projects and then operate and maintain them. However, the entities that could apply for funding—municipalities and counties—were not interested in getting involved with *colonias*.

Cities were uninterested because *colonias* were outside municipal boundaries. A city could annex adjacent *colonias*, but then it would have to deliver

[4] Tex. Local Government Code Ann. §232.033.

them a wide range of services. The small tax-base of *colonias* made them unattractive for annexation. As of mid-2002, few *colonias* had been annexed by neighboring municipalities.

Before 1989, counties lacked authority to control water supply and sewage disposal in new housing developments, and they had no experience in providing water and sewer services. County officials defended not serving *colonias* by arguing that counties were severely restricted in their powers both to regulate development of subdivisions and to raise funds for infrastructure.

Some water supply corporations (private non-profit water providers common in rural Texas) served *colonias*, but they restricted themselves to supplying only water services. They excused their lack of interest in sewer systems by citing limitations caused by their status as private organizations. For example, these corporations are not eligible for certain federal grant programs because they are not political entities. Also, because water supply corporations do not possess the right of eminent domain, their ability to develop rights-of-way and make other land acquisitions needed for providing sewer services is restricted.

In the late 1980s, the border region came into the national spotlight in connection with early debates over passage of the North American Free Trade Agreement (NAFTA). During that same period, NGOs began advocating for improvements in *colonias*. This focus on the living conditions in *colonias* put water and sewer service providers and the state government under pressure to act.

The state's first response to the pressure came in 1989 when the 71st Texas Legislature passed a law giving counties authority to adopt "model subdivision rules."[5] These rules required developers to file plats and to describe how and when water and wastewater facilities would be constructed.

In 1995, the 74th Texas Legislature enacted numerous provisions to improve conditions in *colonias*; three were particularly notable. One authorized counties to impose subdivision regulations similar to those used by municipalities and to increase platting requirements to include minimum infrastructure in new subdivisions and information on water, wastewater, and drainage.[6] A second provision allowed counties to cancel certain platted subdivisions if the land had not been developed by a certain time after platting.[7] A third change provided financial protection for individuals purchasing land using contracts-for-deed.[8]

In the mid-1990s, the Attorney General of Texas began to prosecute *colonia* developers and county commissioners who failed to enforce model subdivision rules. Under Texas' Deceptive Trade Practices Act,[9] the Office of the Attorney General can prosecute a developer who makes only vague assurances to buyers

[5] 31 Tex. Administrative Code Ann. §364

[6] Tex. Local Government Code Ann. §232.025-030.

[7] Tex. Local Government Code Ann. §232.0085.

[8] Tex. Local Government Code Ann. §232.033.

[9] Tex. Property Code Ann. §5.068-069.

about future utility services or other improvements, conducts a sale with a non-English speaking buyer in English, or otherwise deceives a buyer of land.

Origins of EDAP

In 1989, as its main response to environmental infrastructure needs in *colonias*, the Texas Legislature created EDAP to subsidize development of water and sewer systems.[10] However, the Legislature chose not to limit eligibility just to border communities. EDAP's goal is "to provide financial assistance to aid economically distressed areas, in order to provide residents access to adequate water supplies and/or wastewater treatment systems" (TWDB, 1997a, 74). An "economically distressed area" is defined as one that was established as a residential subdivision by June 1, 1989 and has the following characteristics: it is within an eligible county, has water supply or wastewater services below state standards, and insufficient financial resources to meet those standards.

An eligible county is one that is either located adjacent to the Texas-Mexico border or has a per capita income 25% below the state average and unemployment 25% above the state average. The county must adopt model subdivision rules in order to be eligible for funding. As of 2002, 26 of the 51 eligible counties were within 100 kilometers of the border, and that is where about 85 % of EDAP projects were concentrated. All political subdivisions (including cities, counties, and water districts) and water supply corporations are eligible to apply for EDAP funds.

EDAP's total budget (for 1989 through 2002) was $579 million—$279 million from state sources and $300 million from the U.S. Environmental Protection Agency (EPA). The last funding for the program was allocated in 1998 by the federal government. Because projects underway as of 2002 would use up the $579 million, there was a moratorium in effect and no applications for facility planning grants were being accepted.

For nearly five years after the completion of the first EDAP project, the rate of hookups between EDAP project lines and residences was quite low for some projects. Prior to 1998, connections between a house and the main lines in streets had to be paid for by the individual *colonia* households, and this often was prohibitively expensive. A change in the federal funding conditions for EDAP made it possible to use federal funds to pay for household connections to wastewater systems.

[10] Other, more minor efforts to address *colonias*' sanitary conditions have evolved in state and federal agencies. By 1996, the federal Rural Development Administration had a special grant program for water and wastewater infrastructure in small border communities. Also in 1996, the Texas Department of Housing and Community Affairs set aside 10% of its water and wastewater budget for projects in *colonias*; this program has made funds available for water supply and wastewater disposal systems and household connections to constructed water and sewer systems.

Links between incentives and institutional context

Before 1989, three of the main types of water and sewer service providers —neighboring municipalities, private corporations, and former *colonias*— had few incentives to deliver services to *colonias*.[11] That changed when service providers became aware that they could get EDAP grants generally covering over ninety percent of the cost of planning and building water and wastewater systems.

A fundamental change in the institutional context of EDAP took place in 1997 and 1998. In light of the slow progress in getting EDAP-funded projects completed —only 9 projects serving less than 22,000 residents had been completed before September 1997— TWDB was criticized by the media. The press began asking why the sanitation problems of *colonias* were persisting if programs like EDAP existed to deal with those problems. In September of 1998, at a time when Governor Bush was preparing his run for the U.S. presidency, a series of articles highly critical of the performance of programs to assist *colonias* was published in the *Austin American Statesman* (Haurwitz, 1998a; *Austin American Statesman*, 1998). In response to the lack of headway being made under EDAP and the negative attention by the press, a number of administrative changes took place during 1997 and 1998 (McKenzie, 1998).[12]

One such change concerned accountability. In 1997, the EPA staff person responsible for overseeing use of federal funds for EDAP changed, and that led to more active EPA oversight of TWDB's performance. In addition, TWDB's Board of Directors began to monitor EDAP's performance more critically and hired a new director for the program.

In response to the negative media attention, Governor Bush pushed the Texas executive branch to become more actively involved in *colonia* activities. Within the Office of the Texas Secretary of State, the Bush administration established a Colonia Initiatives Program that consisted of a director and six *colonia* ombudsmen located in six counties along the U.S.-Mexico border. This group focused its efforts on improving the physical living conditions within *colonias* through the coordination of several state and federal agencies working with *colonias*. The ombudsmen gave priority to increasing household connection rates for EDAP projects.

In 1997 and 1998, new organizations also became active in border communities. At that time, the Border Environment Cooperation Commission and

[11] The fourth main type of provider —special purpose governments— only became important in *colonias* after 1989.

[12] Interestingly, the negative press coverage continued into 1999 and 2000 when criticism and questions were raised about what the administration of then Governor George W. Bush had done for *colonias* (see, e.g., Ganga M L, Miller T C, 2000, "Bush Record Spotty on Aid to Texas' Poor" *Los Angeles Times*, 16 October, A1). Similar criticisms were raised by the Democratic Party (Dyer, R A, 2000, "Lieberman says Texas '*colonia*' example of Bush's insensitivity" *Fort Worth Star-Telegram*, 14 October, 14).

the North American Development Bank (NADBank), which were created by NAFTA in 1994 to provide assistance and financing for environmental infrastructure in the border region, began working intensively with Texas border municipalities.[13]

During the late-1990s, just when new government institutions were working with border communities, NGOs new to the border region began to promote self-help projects in *colonias*. These NGOs complemented the work of government programs like EDAP by addressing *colonia* issues, such as the unaffordability of household connections, which were not treated by the government programs. Beginning in 1995, an NGO known as the Renssalaerville Institute brought its concept of self-help water and wastewater infrastructure to the border through a program called Texas Small Towns Environment Program (Texas STEP) (Carter *et al*, 1997). One year later, Border WaterWorks, another NGO, began promoting self-help projects in Texas (and New Mexico) *colonias* using the Texas STEP model (Lemos *et al*, 2002).[14]

An important factor influencing incentives of one particular type of service provider —neighboring municipalities— was the high economic and population growth that occurred in the border region during the 1990s. This growth caused many border cities to invest in water and wastewater infrastructure. A number of *colonias* were located near high-growth areas that received new infrastructure investment by municipalities, and many of these *colonias* undertook self-help projects to connect to the new municipal infrastructure. Other *colonias* were able to benefit because cities that had previously delayed work on their EDAP-funded projects were motivated to complete those projects to satisfy needs in their own growth corridors.

EDAP's record of outputs and outcomes

EDAP's intended outcome is access by residents in economically distressed areas to water and sewer services. TWDB works to achieve this outcome through EDAP's principal outputs: grants and loans for water and sewer projects.

As of June 2002, TWDB had provided EDAP funding to 97 projects. Of these, 77 had received $510 million in commitments of construction funds. When complete, these facilities will be available to 785 (53%) of Texas' *colonias* and

[13] For a discussion of these new institutions, see Mumme S P, Moore S T, 1999 "Innovation prospects in the US-Mexico border water management: the IBWC and the BECC in theoretical perspective", in *Environment and Planning C: Government and Policy* 17 753-772 and Carter N, Ortolano L "Impact of Two NAFTA Institutions on Border Water Infrastructure", in *Both Sides of the Border: Transboundary Environmental Management Issues Facing Mexico and the United States* Eds. L Fernandez, R T Carson (Kluwer Academic, Dordrecht, Netherlands) pp. 29-52.

[14] As of 2002, Border WaterWorks had participated in twenty-four completed self-help *colonia* projects in Texas, many of which were directly related to EDAP projects. The significant role that self-help had acquired in addressing *colonia* needs was recognized and supported by the Texas Legislature in 2000, when it passed a bill creating a special fund within the TWDB for these projects (Tex. Water Code Ann. §15).

243,000 (62%) of its *colonia* residents (TWDB 2002a). The average EDAP grant covered 94% of construction costs, and the remaining, minor component of project financing came from TWDB loans (TWDB 2001).

Twenty of the 97 projects have used EDAP funds only for facility planning, and they are likely to request construction funding in the future (TWDB 2002a). When completed, the twenty projects are expected to make water and/or sewer service available to an additional 40,000 (10%) *colonia* residents and an additional 191 (13%) of Texas' *colonias* (TWDB 2002a). Based on estimates available in June 2002, an additional $83 million is needed to complete these projects, and this exceeds available EDAP funds. TWDB's subsidies for water and wastewater projects can significantly improve living conditions for 72% of *colonias* residents. However, if no additional actions are taken to augment available funds, 34% of the *colonias* and 28% of the *colonia* population will continue living without adequate water supply and/or sewer systems (TWDB 2002a).

The statistics above relate to funds committed, not completed projects. If EDAP is evaluated in terms of the current number of *colonia* residents with access to water and sewer services through completed EDAP projects as of mid-2002, the program's performance looks considerably less positive. After twelve years of subsidizing systems, only 25% of the *colonia* population actually had completed EDAP-funded water and wastewater projects in their communities (TWDB, 2002a).

For the period from January 1994 (when the first EDAP-funded project was finished) through June 2002, the average annual percentage of residents benefiting from access to completed EDAP projects in *colonias* was 3.1%. At this rate, the entire *colonia* population in 1996 would not have water and wastewater services available from EDAP-funded projects until 2026, assuming sufficient EDAP funding. However, the requisite funds are not available. This slow improvement in meeting water and sewer needs of current *colonia* residents is troublesome because the population in existing Texas *colonias* is growing at an annual rate of 4.4% (Arriola, 1997).

Slow progress in completing projects

An analysis of the current distribution of projects in different stages of the EDAP project cycle—facility planning, plans and specifications, construction, and completion—clarifies the problem of slow moving projects. Almost all projects in the construction phase as of June 2002 took between eight and ten years to reach that point. Moreover, half of the projects in the facility planning and the plans and specifications phases as of June 2002 had been under development for more than eight years.

Some projects, especially those in Southeast Texas border counties, had been delayed by legal disputes among service providers fighting over authority to serve specific *colonias*. This is ironic since before EDAP's grants existed, service providers generally ignored *colonias*. Legal disputes among service providers often brought

project-related work to a standstill for years because no agency in Texas was in a position to resolve them.

Another explanation for the slow headway on projects relates to a decision by TWDB to stop accepting new EDAP applications as of April 1997. The Board's motivation was to ensure that it had enough EDAP grant monies to cover construction costs for projects already in the system, but the decision had an unintended side effect. Because service providers with projects in the system assumed that full funding was ensured, providers that had not been advancing their projects could continue to plod along without risking a loss of funds. Moreover, the Board generally upped the size of grants to cover higher costs caused by project delays. This further reduced the incentive to complete projects rapidly. Service providers assumed if project costs increased in the future due to delays, the Board would continue increasing the size of grants to cover the added costs.

In an effort to prod service providers who were moving slowly, TWDB announced in October 1999 that it would terminate projects that appeared to be stalled. By June 2002, eleven projects in the facility planning phase were cut based on their failure to advance their projects toward completion (TWDB, 2002a). For these projects, service providers had been uncooperative and showed no interest in advancing their projects. Seven other projects were under consideration to be dropped by the end of 2002.

A number of service providers that received notices from TWDB warning of possible termination of their EDAP projects made efforts to speed up. However, as statistics on projects in various stages of the project cycle make clear, progress toward completion continued to be slow. Notwithstanding the slow progress, TWDB has not taken more aggressive positions, such as imposing stiff penalties for failure to meet project milestones in a timely manner, or eliminating the expectation that TWDB will cover cost overruns caused by project delays.

Reasons for poor project performance

While TWDB's large grants have motivated service providers to initiate EDAP projects, many providers did so for reasons unrelated to serving *colonias*. Moreover, some providers have not proven capable of following through effectively. Difficulties linked to provider motivation and capability are described below for each of the four types of service providers.[15]

Nearly half the projects funded by EDAP have been undertaken by neighboring municipalities; i.e., municipalities that extend their water or sewer service to nearby *colonias*. Many of these municipalities applied for EDAP grants in order to construct water and sewer lines in projected growth corridors while, coincidentally, serving *colonias*. This is illustrated by the City of Donna's EDAP-funded project serving *colonia* residents living between the city and a planned

[15] The examples in this section are documented by Carter (1999).

international bridge. By obtaining an EDAP grant, Donna was able to expand its water and sewer systems through a part of the city that was expected to grow as a result of the proposed bridge. The city viewed the grant as a way to subsidize construction of water and sewer lines in its growth corridor.

Another example involves the City of Edinburg, which developed an EDAP-funded project to bring water and sewer service to 26 *colonias* while, simultaneously, providing water and sewer service to a new state prison. The portions of Edinburg's project that benefited the prison were completed in a mere 18 months of the Board's June 1994 commitment to fund construction. TWDB did not consider the entire project complete until May 2001, seven years after the Board's initial construction commitment.

Three factors help explain why many neighboring municipalities have been slow to provide *colonia* residents with water and sewer services. First, other municipal projects receive a higher priority than EDAP-funded projects because *colonia* residents neither pay local taxes nor vote in municipal elections. Second, neighboring municipalities were not penalized by TWDB if EDAP-funded *colonia* projects made little headway. Third, projects were so heavily-subsidized through EDAP grants that municipalities had few of their own resources invested in them.

The rapid growth in border municipalities during the 1990s provided some neighboring municipalities with incentives to improve their performance on EDAP projects. The increased attention to EDAP-funded projects since 1997 has also helped motivate some municipalities to speed up.

In addition to lacking incentives to address the needs of *colonia* residents, the majority of border municipalities undertaking EDAP projects are small (less than 50,000 residents), unsophisticated water and sewer service providers. Many small border municipalities share problems of frequent turnover of elected officials and municipal staff, lack of professional city managers and staff, paucity of opportunities for staff to obtain water and wastewater training within the region, and political patronage practices that grant municipal jobs to unqualified personal (Carter, 1999). The high turnover problem is illustrated by the City of Donna, which averaged one city manager per year during most of the 1990s. This rapid turnover significantly disrupted the planning and implementation of Donna's EDAP-funded *colonia* project.

In contrast to neighboring municipalities, special-purpose governments typically have strong incentives to complete their EDAP-funded projects quickly: water supply and/or sewer service is their core activity, and they depend entirely on user fees for their revenue stream, which is vital to their financial solvency. However, special-purpose governments, especially ones that lack experience, often stumble in implementing EDAP projects because of weaknesses in management capacity.

Management problems among special-purpose governments are demonstrated by the three-phase water and sewer service project in an area called the "Lower Valley," located east of El Paso in El Paso County. Lower Valley voters supported the creation of the Lower Valley Water District (LVWD), a special-purpose

government with a service area that included 25,000 people in more than 70 *colonias* needing first-time water and sewer services. The LVWD divided its planned EDAP-eligible activities into three phases. Although the LVWD completed the first phase in a satisfactory fashion, TWDB staff felt the scale of the project's first phase pushed LVWD's management capacity to its limits. The Board insisted that, while LVWD would own the second and third phases, those phases should be managed by a separate body, the El Paso Public Service Bureau.

Water supply corporations are single-purpose, private organizations that are much concerned with their financial health. (In some instances, these corporations have converted to municipal utility districts (MUDs) to gain tax advantages.) Before 1989, when EDAP was formed, many water supply corporations were uninterested in serving *colonias* because they believed they would lose money in the process. However, once they became involved with *colonias* after 1989, water supply corporations turned out to be highly motivated to rapidly finish EDAP-funded projects so they could start earning revenues. Based on the record of EDAP-funded projects, when water supply corporations and MUDs are slow in constructing projects, it is most often a result of inadequate managerial experience. In one instance, a project involving Sebastian MUD, the management problems adversely affected project performance to such a great extent that TWDB funded a special project manager position just to coordinate construction activities.

The fourth type of water and sewer service provider involved with EDAP consists of former *colonias*; that is, *colonias* that have incorporated and formed municipal governments. Former *colonias* have strong incentives to obtain EDAP grants and complete their projects because the projects benefit their municipal residents directly. However, these newly-formed governments generally lack the ability to effectively administer water and sewer projects.

The combination of strong incentives and weak management is demonstrated by the EDAP-funded project for the City Alton, a former *colonia*. It was seven years after the initial request for facility planning funds before the city finally initiated construction. Alton encountered obstacles because it lacked general experience as a government and particular experience with sewer projects. Causes of project delay linked directly to the city government's low management capabilities included problems in identifying community needs, managing consultants, and preparing documents that met TWDB's requirements. Once construction began, the project moved quickly. It was completed in two years, and all households were connected to the system as of June 2002.

Problems with low household connection rates

In addition to project delays, another major factor hampering program performance was the low rate of household connections in many *colonias*; this problem was particularly severe for wastewater systems. For example, the Hacienda Gardens project that finished in 1994 had a wastewater connection rate of 38% in 1998, and

the rate for the Madero and Granejeno project that finished in 1996 was even lower—24% in 1998 (TWDB, 1998). For many *colonia* residents, the hookup cost was prohibitive, averaging $300 to $600 per wastewater connection.

Before 1997, TWDB had attempted to improve household connections rates, but its responses did not eliminate the underlying problem—unaffordability. Moreover, the Board's initial efforts to increase connection rates failed to account for institutional barriers and the incentives and capabilities of the *colonia* residents and service providers.

One of the Board's unsuccessful attempts was the Colonia Plumbing Loan Program (CPLP), which was created to furnish service providers with funds that could be loaned to residents for household connections. This effort failed mainly because *colonia* residents were wary of putting liens on their property to secure loans for such a small amount. Moreover, many residents did not satisfy loan eligibility criteria, owed substantial back taxes, or did not hold clear title to the land (TWDB 1997b). In addition, many counties and municipalities lacked incentives to get involved with CPLP, and they had no experience in administering loans to individual households.

Another TWDB response with disappointing results consisted of a mandatory hookup requirement for all new commitments of EDAP funds for wastewater projects. Under policies established in 1991, all households in the area served by an EDAP-funded sewer project had to connect to sewer lines within ninety days of service availability. However, TWDB staff did not integrate this requirement into funding commitments until 1995. Moreover, this requirement was difficult to enforce. Sewer service providers in Texas generally lack statutory authority to require wastewater connections, but the case of public organizations receiving EDAP money represents an exception. The statute creating this exception, however, does not specify tools to use in making connections obligatory. As a consequence, strategies to enforce mandatory hookup requirements have been limited by the lack of previously-tested enforcement actions and the absence of case law to validate the legality of rules calling for mandatory hookups. Thus, although service providers on EDAP projects could require sewer connections, they lack workable enforcement procedures.

A turning point in dealing with low connection rates occurred in 1997 when a new EPA staff person took over responsibility for overseeing use of federal funds for EDAP. By the following year, the new EPA staff member, together with help from TWDB's new EDAP director, had made it possible to use federal funds to cover costs of household connections. Since then, most wastewater connections on EDAP-funded projects have been paid for through federal grants. Because of this change, connections are no longer performed individually but carried out in clusters, thereby reducing costs.

An additional scheme for funding household connections was developed in 1999 through the Office of the Texas Secretary of State. Under this plan, all EDAP projects having funding commitments as of March 1999 were guaranteed support for

water and wastewater hookups by Texas Department of Housing and Community Affairs, TWDB, NADBank, and the U.S. Department of Agriculture. As part of the plan, NADBank supplied $6.4 million in grants to make household connections for six EDAP projects.

Another initiative contributing to the improved hookup rate is the assignment (at the urging of Office of the Texas Secretary of State) of a TWDB staff person dedicated to the *colonias* in the Board's border office in Southeast Texas, where most EDAP projects are concentrated. This staff member makes monthly progress reports on EDAP projects and pays particular attention to household connection rates.

Colonia residents have also taken steps to improve hookup rates. Numerous *colonias* have undertaken self-help projects, often with the help of Border WaterWorks or Texas STEP, to complete household connections in their communities.

Results from initiatives taken since 1997 have been impressive. As of June 2002, 96% of residents in *colonias* with completed EDAP water and wastewater systems lived in homes connected to these systems (TWDB 2002b). The attention given to the *colonias* problem by the Texas Secretary of State, along with the new funding options, caused TWDB to focus on and effectively address the low connection rate problem. The self-help programs assisted by NGOs also helped improve hookup rates.

EDAP posed management challenges for TWDB

In the early years of the program, TWDB had trouble administering EDAP because it is not typical of the Board's many programs. In terms of budget, EDAP represents a small part of the Board's overall operation. EDAP is one of six programs under one of TWDB's four funds—the Texas Water Development Fund—and it represents only 15% of that fund.

Before EDAP was created in 1989, TWDB had no interaction with *colonias* or programs directed at Texas' poor residents. Its core task—the central task around which the Board was built—was providing loans to local governments for water supply projects and water quality projects. In the context of the Board's overall operations, EDAP was what James Q. Wilson (1989, 225) refers to as an "add-on"—a new program added to an organization without changing its core tasks or altering its organizational culture. Because TWDB's core tasks are related to loans rather than grants, the Board's core technology—the organizational arrangements developed to perform its central tasks—was superior for loan-related tasks than for grant-related tasks.

One characteristic of EDAP that made the program difficult for the Board to administer was that many service providers applying for grants had weak management capabilities, and some had virtually no experience with water and sewer services. More generally, the Board had not worked previously with the types of organizations that applied for EDAP funds. A typical TWDB applicant was a large,

well-established municipality or water district that approached the Board seeking a loan for a well-developed project proposal. In comparison to most loan applicants, service providers seeking EDAP funds were generally small, had low technical and administrative ability, and had little experience in creating project plans.

EDAP-funded projects also required more oversight and different tools and administrative arrangements than ordinary loan-based projects. Loans motivate a service provider to complete projects that improve or expand the service it delivers because the provider must collect fees to repay loans. If providers with loans offer poor service, they can be wiped out financially: customers may stop paying them. Because EDAP projects typically involved more than 90 percent grant funding, service providers for those projects needed customers' fees primarily to cover operation and maintenance expenses, not for significant loan repayments. Moreover, EDAP grants were intended to benefit a specific segment of the Texas population: *colonia* residents. Some providers, particularly some of the neighboring municipalities extending their systems to nearby *colonias*, used EDAP grants to pursue their own objectives with little concern for access by *colonia* residents. Although EDAP grants called for different oversight mechanisms than the ones TWDB used for loans, the Board administered EDAP using the same procedures it employed for loan-based projects.

By the late 1990s, the Board's staff had acquired experience with grant-based projects, and this helped in their administration of EDAP. More importantly for program performance, the incentives faced by TWDB had changed.

TWDB lacked strong incentives for improving services

Before 1997, the Board's accountability arrangements gave it few strong incentives to improve EDAP's performance. The Board received its state funding for EDAP in a few lump-sum allotments in 1989 and 1991 from the state. Although TWDB produced annual and quarterly reports for EDAP, it did not make regular budget requests for state funding for EDAP, except for administrative expenses. The lump-sum funding of EDAP spared the Board from regularly justifying the program and its progress to the Texas Legislature, and thus the Board had low accountability at the state level for EDAP's performance.

TWDB's accountability was also minimal because neither the Texas Legislature nor EPA was well equipped to oversee EDAP and its projects. Because both funders had numerous programs and only modest resources for oversight, it was not unusual for a relatively small program, such as EDAP, to receive little attention. The lack of oversight of the federal funds was particularly apparent, since only 10% of one EPA employees' time was dedicated to overseeing *colonia* activities, including the EDAP funds. However, TWDB could not completely ignore EDAP because the Board wanted to maintain good relationships with the Texas Legislature and EPA. Consequently, the Board made attempts to improve

performance (e.g., the requirement for mandatory hookups), but these were often incomplete and ineffective.

The Board also lacked strong accountability to *colonia* residents. TWDB's staff worked on EDAP-funded projects with service providers and engineering consultants, not *colonia* residents. Before the ombudsmen system was put in place in 1998, no mechanism existed for TWDB to learn of residents' problems and concerns related to EDAP-funded projects during the project cycle.[16]

Another factor linked to TWDB's minimal focus on the plight of *colonia* residents before 1997 was the lack of pressure from NGOs and the media. The attention to sanitation issues in *colonias* that led to the creation of EDAP in 1989 had dissolved by the mid-1990s. Border NGOs that had advocated improved conditions in *colonias* in the 1980s had moved onto other border issues. Also, the spotlight on the border's environmental problems that accompanied debates on NAFTA had disappeared. This lack of attention on *colonias* during the mid-1990s meant the Board's need to demonstrate EDAP's accomplishment to the general public was minimal.

As mentioned, TWDB's incentives to improve EDAP's performance increased significantly in 1998 when the media began criticizing the program's accomplishments and when the Bush Administration reacted to this criticism by having the Office of the Secretary of State become directly involved in overseeing *colonia* activities. By the late 1990s, the attention by actors external to TWDB, together with the Board's acquired experience with EDAP, led to improvements, such as the rate of household connections increasing substantially. In addition, there were indications that the rate of completion of EDAP projects was speeding up. Whereas only nine projects serving 22,000 residents were completed from fiscal year (FY) 1994 through FY 1997, thirty projects serving 75,000 residents were finished between FY 1998 and June 2002.

[16] On a few occasions, when a request for funding construction of a particular EDAP project was before TWDB's Board of Directors, some *colonia* residents benefiting from the project attended the Board of Director's monthly meeting.

Conclusions

Our analysis uses institutional context, incentives, and capabilities to explain the longitudinal performance of EDAP-funded projects and the program as a whole. Although EDAP was well funded compared to many programs to provide water and sewer services to similar settlements in developing countries, the program performed poorly during its first several years. Numerous projects were stalled in pre-construction phases of the project cycle, and many *colonia* households were unable to connect to completed systems.

Incentives faced by both program administrators and service providers help explain EDAP's poor performance before 1997. Neighboring municipalities had weak incentives for serving *colonia* residents, and they sometimes directed EDAP funds to meet municipal objectives unrelated to *colonias*. In addition, weak accountability requirements for TWDB meant the Board had little motivation to eliminate shortcomings that were obvious during the program's first several years.

Shortcomings in management capability also affected performance. It took time for TWDB to learn how to manage projects based on grants, as opposed to loans. And management capacity limitations of some providers, particularly former *colonias*, contributed to the slow progress of many EDAP projects.

The long timeframe of our research allowed us to identify how changes in institutional context affected program performance. The Board's implementation of EDAP did not improve substantially until after 1997. The experience the Board gained in the early years of the program is one explanation for the improvement. However, a more persuasive explanation for the change in performance relates to pressures brought by outside forces, particularly the media. These external forces —together with heightened oversight by EPA, TWDB's Board of Directors, and the Office of the Texas Secretary of State— motivated TWDB staff to improve EDAP.

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