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SURVEY

Urban and rural attitudes toward municipal water controls: A study of a semi-arid region with limited water supplies

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ABSTRACT

This study addresses the effectiveness of using pricing mechanisms, government-imposed constraints, or a hybrid, as a means of rationing municipal water. We try to test which policies would be most accepted among rural and urban communities in a semi-arid region of Texas that depend on both surface and groundwater sources for their municipal supplies. This study reveals that a hybrid conservation policy that includes mandatory restrictions, fines for overuse, *and* pricing increases could be more acceptable, and hence more efficient, than a policy that only consists of regulation. Moreover, there is not a significant dichotomy in policy preferences between rural and urban constituents; although those in rural communities would seem to appreciate far less regulatory policy than would urbanites.

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1. Introduction

Water resource depletion in the western and southwestern United States has been exacerbated by weather, double-digit population growth, and less-than-efficient use of the resource. Because of this, municipalities are increasingly competing with agriculture for water, hence, forcing community managers to seek out alternative sources to stabilize and/or increase future supply. On the other hand, conservation policies have been put in place to help ease demand-side pressures on the resource. It is our belief that while the supply alternatives are usually scrutinized quite thoroughly in a cost/benefit context, it is typically not the case that all conservation alternatives are analyzed with the same rigor. But this then begs the question: are the policies currently in place within a particular municipality optimal, or are there alternative policy schemes that would be more effective? Can these policies be changed in such a way that would be more acceptable to the demographic of that particular municipality resulting in increased conservation of the resource? Not only do we try to answer these questions for the *typical* community, but we try to answer these questions *separately* for rural and urban municipalities.

Many studies have documented the political characteristics of rural and urban residents that may (or may not) be consumers of municipal water.[1] The findings of these studies show that urbanites can have quite different beliefs and attitudes compared

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[1] There have been numerous studies evaluating attitudes of the *typical* consumer toward water conservation. Just a few examples are Moore et al., 1994; De Oliver, 1999; Gregory and Leo, 2003; Mahler et al., 2005; Trumbo and O'Keefe, 2005. But these inherently assume homogeneity across geographical and political lines.

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to rural constituents. It seems that urbanites tend to be more liberal, have more trust in government, are more likely to be a proponent of regulatory policies, and favor political change (Lowe and Peek, 1974; Avalos and De Young, 1995; Constance and Rikoon, 1997; Demers et al., 2000). Rural residents have less trust in government, are usually more conservative than urbanites, are less likely to appreciate government regulation, and prefer fewer taxes (Lowe and Peek, 1974; Tickmayer, 1983; Constance and Rikoon, 1997; Campbell et al., 2004; Champion and Hugo, 2004; Gimpel and Karnes, 2006). Existing policies that address urban water conservation are usually based upon regulatory policy—i.e., enforced water regulation and pecuniary penalties. These same urban policies are often used as guidelines for implementation in rural communities. But, if rural residents truly do not tolerate more government interference as compared to urban constituents, it seems that efficiency in conservation would be enhanced if measures adopted within rural municipalities were different from those implemented in urban areas. It also seems possible that standard regulatory policies may appeal more to those living in urban areas, while rural respondents may be more likely to agree to a price-rationing approach (i.e., increasing prices to reduce consumption).

Our objective in this paper, therefore, will be (1) to empirically test whether either classification of constituent wholly prefers one policy over the other, or is a hybrid policy more acceptable, and (2) whether a policy that weighs more heavily on pricing measures is actually more acceptable within rural municipalities.

We surveyed constituents in an 'urban' municipality, and five surrounding 'rural' communities. We then asked all respondents a series of questions in an attempt to gauge their attitudes toward the two conservation alternatives. What we have found is that policies which are purely regulatory in nature do not completely appeal to either community classification. Furthermore, rural respondents tend to prefer a policy that places less weight on a regulatory approach to conservation, but not necessarily more weight on pricing. What these results do suggest is that a hybrid policy might be more efficient, than is current policy, when attaining water conservation targets in either type of municipality. It must be mentioned at the outset that what we are seeking could never be regarded as actual *approval* of any of these rationing measures — at least in the eyes of the consumer. In our case it is sufficient to show levels of *relative* agreement. Neither policy is "desirable," but we have found that a combination of policies is relatively less offensive (more agreeable) than either a completely regulatory or pricing approach.

In what follows, Section 2 gives a geographic, climatic, and demographic description, of the region and towns we chose for our study. This section also outlines the current (dis)incentives for consumers to conserve water. Section 3 describes the survey approach, the questions asked, the design of the empirical model, as well as a brief instruction for interpreting the results. Section 4 outlines and attempts to explain the results of our study in the context of the dichotomies outlined above, and Section 5 summarizes our conclusion, addresses the limitations of this study, and provides recommendations for future work.

2. Description of municipalities in the study area

For survey purposes, we would expect there to be differences in rural and urban attitudes toward conservation policy for municipalities that are dislocated and drastically different demographically — for example, between constituents in the remote community of Hobbs, New Mexico, and those in Miami, Florida. However, if a researcher truly wants to determine if attitudes differ "just across the city line," he/she would want the demographics and geographic locations of the municipalities under study to be as similar as possible. We believe the Southern High Plains of Texas (henceforth labeled SHP) satisfies this criterion. The three characteristics of this area that lead us to this conclusion are (1) the relatively small disparities in education and income levels between the rural and urban areas in our study, (2) the relatively short geographical distances from the urban center to the rural communities, and (3) the fact that all municipalities use at least one of the same three major water sources.

The SHP is located in the rain shadow of the Rocky Mountains, has characteristically low rainfall, and is an area known for seasonal high winds and a long growing season. Perched atop the SHP, the Llano Estacado is a high, flat, treeless plain, with elevations ranging from 3000 (914 m) to over 4000 ft (1219 m). The Llano Estacado has a semi-arid climate, with annual rainfall averaging 18 in. (457 mm) (Brooks and Emel, 2000; Alvarez, 2006). Our five-county study area encompasses 4700 mi^2 (756 square km) and has a total population of 306,000 (U.S. Census Bureau, 2000). Our research focuses solely on towns located on the Texas SHP and the Rolling Plains region that are supplied by the Ogallala aquifer, White River Lake, Lake Meredith, or from a combination of these sources. In Fig. 1 below, Lake Meredith (to the north of the survey area) and White River Lake (to the east of the survey area) are marked with stars. In the Texas SHP region, the Ogallala aquifer roughly underlies the same general area that the Llano Estacado occupies.

Two towns supplied water by each of these three sources were selected for the study. The communities of Lubbock and Slaton are supplied water from Lake Meredith and the Ogallala aquifer; Abernathy and Littlefield depend solely upon groundwater; Crosbyton and Post are supplied water by White River Lake and use groundwater as a backup supply. Post also purchases surplus water from Slaton. Lubbock is the largest city in the region and has a population just over 200,000. We define Lubbock as 'urban' for this study because of its population size relative to surrounding locales, and because it is the wholesale trade center for a fifty-county area on the SHP, the Rolling Plains of Texas and eastern New Mexico. (Please see Tables A and B in the Appendix A for the demographic descriptions of each community. Table A describes area demographics according to census data, while Table B describes area demographics according to our survey data.) Lubbock is the regions' major education center with Texas Tech University (a major employer in Lubbock with well over 30,000 students, faculty, and staff), Lubbock Christian University, South Plains College, and Wayland Baptist University. Lubbock also houses the largest medical community in this portion of the state.

Abernathy, the second smallest town in the study by population, is located approximately 15 mi north of Lubbock. Crosbyton is the county seat of Crosby County and is located approximately 40 mi east of Lubbock and has the smallest population of all towns in the study. Littlefield is the county seat of Lamb County and is located approximately 40 mi northeast of Lubbock and has the largest population of all 'rural' towns in the study. The economies in Abernathy, Crosbyton, and Littlefield are

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