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# Understanding the Environment and Cultural Linkages in a Utility Subsidized Economy: A Case Study of Kuwait

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*Fossil fuel and energy conservation became an important issue as the crude oil price hit an all time high in summer 2008. Non-renewable nature of the resource and the growing demand for this resource from the new emerging economies has renewed the call for production and use of alternative energy sources and increase efficiency of existing energy use. Adam Smith's (1776) classical economic theory suggests that market forces are capable to allocate the resources efficiently. The citizens in the region are use to subsidized utility for a considerable period of time and it is not known whether the concept of resource conservation is embedded in their culture. The cultural-and-environmental linkage is important as a medium of exchange, in which the culture could shape the environment and the environment could shape the culture. In this paper, we examine the level of awareness and the state of resource conservation practices among Kuwaiti adults. We use the demographic, cultural and behavioral variables to explain the local population's motivation for resource conservation. About 80% of the respondents felt that water conservation is important to them, and they take measures to conserve water. Married people are more likely to conserve water over singles and to those over 40 years. Higher income, educational level and women are more likely to have a favorable perception for resource conservation.*

Field of Research: Resource Economics

## 1. Introduction:

Kuwait has very meager renewable natural resources and one the poorest countries in the world in terms of natural water, with a per capita water share of less than 70 cubic meters per year, while the global per capita share of fresh water is around 1000 cubic meter per year, which makes Kuwait one of the poorest countries in terms of water. In the pre-oil era, Kuwait relied on rainwater which was found near the surface in shallow wells, but by the turn of the 20th Century it turned to Shat Al-Arab for water, which was brought by dhows (STB, 2006). Shortly after the discovery and exportation of oil in the 1940s, Kuwait Oil Company built the first desalination plant in the early 1950s and several others followed since to bring the total distillation capacity of five plants to 317 million imperial gallons (MIG) per day in 2005, which makes Kuwait the highest producer of distilled water per capita in the world. In 2005, the gross consumption of fresh water was 111,502 MIG, 92% of which was produced by distillation process and the rest comes from brackish groundwater. Daily water consumption, increased from about 7 MIG in 1965 to 101 MIG in 1985 and it reached 305 MIG in 2005, which amount to 111,325 MIG for the year. The mean per capita consumption of fresh water increased from 25 gallons per day (gpd) in 1970 to over 102 gpd in 2005. Brackish water

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consumption increased from 11319 MIG in 1980 to 33929 MIG in 2005, which puts consumption at 31 gpd and raises the total water consumption (fresh and brackish) to 133 gpd (600 liters per capita per day), which is the highest in the world (STB, 2006 and Akbar, 2009).

There are limited agricultural production using an area of 84 square kilometers in the border regions of Al-Abdali with Iraq and Al-Wafrah with Saudi Arabia, in addition central region of Slaibiyah (AOAD, 2004). Agricultural production contributes less than 1% of GDP and mostly uses brackish groundwater, except in the Slaibiyah area, which uses heavily subsidized treated wastewater. Farmers at Slaibiya pay only 20 Kuwaiti fils for every 1000 gallons, which is equivalent to US $1 for 15,000 gallons. Wastewater is the only renewable water supply in Kuwait and it produces 35,200 MIG of tertiary wastewater per year. Although wastewater is treated to standards as high as drinking water quality, using reverse osmosis process, about two third of it is used in agriculture and roadside landscaping while the rest is discharged to the Arabian Gulf (Akber, 2008).

Water, albeit being very scarce, is heavily subsidized in Kuwait. Given the fact that it costs $0.70 to produce one cubic meter of distilled water, the government subsidy amounted to $832 million in 2000, which represents 2.4% of the country's GDP and about 5.9% of the oil revenue (Akbar, 2009). Water rates (based on one thousand imperial gallons) are flat and the subsidy varies across different user groups. Residential customers pay $3.43, government agencies pay rate is $2.75, while selected industrial establishments rate as low as $0.86.

The majority of electricity power (88%) is generated by fuel-powered stations using thermal steam turbines, while the rest is produced by thermal gas turbines. Thermal efficiency for power plants is low and in the best situations does not exceed 42% even for new plants. The growth rate in the mean annual rate of peak load has been around 6%, while the per capita consumption growth rate has been around 5% in recent years (1985: 6%, 1995: 4.7%, 2005: 0.9%). In 2007, the country was on the verge of implementing electricity rationing scam during the peak summer consumption. However, a concerted countrywide campaign (*Tarsheed*) to promote conservation, which reduced the peak consumption by about 3%, made it possible to get by without rationing. With a power shortage looming as early as next year, Kuwait is hashing an agreement to import power from Qatar (Reuters UK, 2009). Regardless of the amount of power used, customers pay a flat rate of $0.0068 per kilowatt, while selected industrial establishments pay a rate as low as $0.0034 per kilowatt.

## 2. Literature Review:

It has been long argued that culture and environment tend to play an important role in human behavior. Human behavior is subjected to change when the physical or social environment influences the culture or the culture influence the environment. Both of

these may have far reaching implications to the society. Cultural with respect to natural resource is particularly important, as Balbo (2006) argues that culture is directly related to resource availability and the environment may have a biological connotation, but it should also include the physical conditions, aided or hampered by the area configuration and social which emphasis culture of historical sense, like rural, urban, religious, artistic and ethnic (p.1). As a result, the culture and the environments are inseparable at all times. The need for preserving the natural environment had been rooted in middle-eastern culture for a very long time. Extreme dry conditions and limited precipitation would have exerted considerable pressure for water conservation. In the ancient history, as a cultural practice, fountains are used to irrigate the gardens and the nozzles of the fountains are placed carefully to get the best out of each drop of water (Moore, 1988). The predominant Islamic religious and cultural values emphasize the water conservation. Numbers of references are found in Holy Quran and the teachings of Prophet Mohamed. Conservation is considered to be part of the worship (obeying God's command). For example, in Holy Quran, God says "O children of Adam! Eat and drink but waste not in excess, for God does not love the wasters". In Islamic religion, wasting of any resource is strongly condemned. Another verse in Holy Quran says "squander not in the manner of spendthrift, verily spendthrifts are brothers of the Devil, and the Devil is ungrateful to his Lord".

Apart from using the water efficiently, innovative water use has set a very good example for other regions to adopt such practices. The scarcity of water and the difficulty of bringing it to the garden compelled Muslim designers to develop efficient methods of irrigation and to embrace a high regard for water as the indispensable support of life (Hamed, 1994). ElAraby (1972) reported that many European designers have "imitated" the water use practices in Alhambra, Spain.

The recent literature on environment and energy conservation has broadened their scope of analysis to global climate change. In the global socio-ecological system, a country's domestic energy policies may result in actions which may have far reaching implication on local and global environment. These energy policies could influence the consumer behavior and considerable impact on energy consumption and environment. In United States, about 71% of the total energy produced is consumed by households and commercial buildings (Farhar and Coburn, 2008) and the households alone contribute to 21% of total carbon emission in U.S. (Brown et al., 2007). While another study finds that households and nonbusiness travel alone consume about 38% of total energy production in the U.S. (Gardner and Stern, 2008). Environmentally friendly households are more likely to contribute to a better quality environment through their individual and collective actions. Promoting environmental awareness became a key policy instruments to protect the environment among the developed and developing countries. The 1972 United Nations conference on Human Environment, all the member countries proclaimed a declaration in recognizing the irreversible harm done to the environment and urging the member countries to use fuller knowledge and wiser actions to achieve a better life for human being while maintaining a better quality environment. Commenting on the 1972 charter, Venkataraman (2008) wrote that "explicitly, the declaration called for "education in environmental matters, for the

younger generation as well as adults" (p.9). Desirable actions can only be brought through culture, diversity, ethics, and justice (Cole, 2007). In this context, Thorgesen and Olander (2002) have found a relationship between individual's values and environmentally friendly behavior.

The public opinion and awareness does matter in energy conservation and protecting the environment. Public opinions, awareness and actions for conservation are assessed through household surveys. These surveys are revealed preferences reflecting individual's knowledge and actions. Gardner and Stern (2008) presented a popular survey results that the individuals can take 27 actions to conserve the energy. These actions include burying a more fuel efficient vehicle to replacing 85 percent of all incandescent bulbs with equally bright compact fluorescent bulbs. All these actions come with a cost and the rational individuals make those choices only when marginal benefit (financial and non-financial) exceeds the marginal cost. On one hand, the market forces could influence the individual's choices and alter human behavior. For example, higher gasoline prices results in less motor commute and vice-versa. Apart from prices and marketing forces, education, income and ages are likely to influence the energy consumption behavior as well. Straughan and Roberts (1999) and Pedersen (2000) found that individuals with better education tend show more environmentally friendly behavior.

A verity of psychology, economic and cognitive theories and empirical models were used to examine the environmentally friendly and rational choice behavior of the individuals and groups. Individuals display certain behavior when the individual believes that is important to him/her, disregarding impact on the others. These behaviors can be either the reflection of economic choice (rational behavior) or based on cultural norms and values. Stern et al. (1999) suggest that individuals tend to develop favorable perception (norm) as the individual become aware of potential consequences of an action. In case of rational choice behavior, an individual may consume less energy; if the individual knows that the price of energy is high. However, under the cultural norms and values, the individual would display an action-based altruistic behavior (care for the environment), disregarding price of the commodity (energy). Prakash (2002) found that the consumers were willing to pay a premium for goods that are produced in an environmentally friendly manner. In the former case pricing is an important component for bringing any desirable behavior. Any intervention of the government and distorted prices may leads to inefficient outcome. Previous studies found that when energy prices are subsidized consumers tends to over consume, which may leads to waste of resources. In this study we examine the awareness, attitude and action of individual's behavior in conserving water and energy in households. It was not known whether the subsidies in Kuwait have any adverse impact on water and energy use, given a strong culture that emphasizes resource conservation and waste minimization.

## 3. Methodology:

The objective of this research is to assess the state of conservation awareness among Kuwaiti citizens and the role of prices and various socioeconomic variables that are likely to impact such awareness. This research is based on a 31-questions survey directed to Kuwaitis including 11$^{th}$ and 12$^{th}$ grade high school students. The survey was written in English and translated to Arabic. Approximately one thousand surveys were distributed and administered in person. Out of the 821 valid responses, 598 were in Arabic and the remaining 223 were in English. The survey was designed to assess conservation practices of water, fuel, electricity, and to reveal respondent's attitudes and motivations to engage in conservation. In addition, the survey included questions on air quality, recycling, clean environment, and the role of high school education, government agencies, parents and religious belief in adopting conservation values. For the purposes of this paper, only data and results on water and electricity use are considered. SPSS statistical software was used for the analysis of frequencies and crosstabs.

## 4. Results and Discussions:

About 98% of the respondents were Kuwaiti nationals. Of the total respondents 82% are college or high school students, 43% are less than 20 years old, 54% are females, 70% are not married. In terms of income, the great majority are making less than 1,000 Kuwaiti Dinars (KD), or with no fixed monthly salary. With regard to water conservation, 80% of the respondents felt that water conservation is important to them, and they take measures to conserve water. These answers seem to contradict reports of widespread waste practices in water consumption. Given the fact that Kuwait has no renewable fresh water supply and relies entirely on desalination, yet Kuwait has one of the highest per capita consumption of water in the world. In spite of the massive and expensive water desalination, only about 8% of respondents indicated using tap water for drinking, while about 52% indicated that the primary source of drinking was bottled water, and the remaining 40% use water filtration system. About 69% of the respondents realized that the Gulf is the major source of water in the country. It was interesting to see that 29% of respondents cited their religious belief (Islamic), followed by less than 25% who felt that higher prices or water rationing would motivate them to conserve water, but overall, 46% cited education and conservation campaigns as their motivation for water conserving.

By Gender, water conservation was more important to females than males. Also, it was more important to married people over singles and to those over 40 years old. In general there was a positive correlation between the level of education and water conservation. As to the use of electricity, a large majority of respondents, 90%, said that they conserve electricity. Again, religious belief was the primary motive for conserving electricity, about 29, followed by higher prices, about 21%. However, when asked whether they ever inquire about energy-savings appliances when making purchases, 70% said no. This seems to suggest that the retail industry is under no

pressure to provide and promote energy-efficient appliances. Demographically, there is a positive relation between age of respondents and saving electricity, while married people tend to conserve electricity more than singles. Only 52% of respondents indicated that high school education enhanced their understanding and promoting awareness about conservation. Likewise, only 50% of respondents indicated that the government enhanced their understanding and promoting awareness about conservation. On the other hand, about 80% of respondents indicated that their parents taught them to conserve water and electricity.

## 5. Conclusion:

Our research indicates that the majority of Kuwaitis are aware of the need for water and electricity conservation. However percapita water use of 600 liters per day, which is the worlds highest, does not represents the reality. It seems like moral suasion approach used to promote conservation is being undermined by a pricing scheme, which provide no incentives for conservation and promote waste. Exiting resource management policies based on heavily subsidized rates, for both water and electricity, are responsible for wasteful practices. Flat-rate subsidies often encourage waste and inefficiency, as far as we can see, and also imposes huge external cost on current and future users. Kuwait is in urgent need of water and electricity management policy which promotes high-value use and efficiency, especially when it comes to its precious and strategic groundwater. Such policy should embody pricing mechanisms which allow water and electricity to be priced at rates comparable to their social cost of production. The moral suasion approach employed in Kuwait should be augmented with a market approach designed to internalize most, if not all, of these costs. Given that these commodities are universally viewed as necessities and basic human right, Kuwait could potentially promote their efficient use by adopting increasing-block rates instead of the exiting flat rates. These should be the backbone of a new water and electricity management regiment in Kuwait, which will reduce waste and cultivate a culture of conservation and sustainability.

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