

**DOMESTIC WATER DEMAND:
A CASE STUDY IN KLUANG, JOHOR**

By

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Abstract

Demand for water is a vital issue in Malaysia as population growth, agricultural, and industrial development takes place. In addition, some states face problems of water shortage and stress because water use is already reaching maximum demand levels like Selangor state. In Johor, supply shortage is not a common problem faced by the water supply department, but as early steps it is essential for improving the security and resilience of our nation's drinking water and wastewater infrastructures. It was estimated a bout 40% of the world's population currently lives in water stressed areas. With a global population increase of three billion people predicted by 2050, water scarcity will soon become a matter of life or death. Economist, therefore have become interested in understanding the empirical nature of water demand for the accurate forecasting of water demand, pricing and in improving water resource planning and management. Significant actions should be taken to assess and reduce water loss and develop new security technologies to detect and monitor contaminants and prevent security breaches in water demand.

The purpose of this study is to examine the relationship between price and quantity and other relevant variables for water consumption in Kluang, Johor. One panel data regression between consumption and expenditure of water was estimated and the result indicates that price and quantity of water demanded have a positive relationship where increase in price will leads to increase in water use because the use of average price in this study. The regressions give the best result because it takes care of heterogeneity of individual in this analysis and the elasticities of price in range of 0.66 to 0.65 respectively. Furthermore, five different price and other variables specification regression models for a cross sectional analysis of a 335 samples of households, indicated that the price is significant at one percent level in all the regression in the models. The models explain more than 80 percent of the variation in the water use in the year 2012. The social and cultural practices were also found to affect the consumption patterns of the three major different ethnic groups in Malaysia. The Malay community in the sample was found to consume more water than the Chinese and Indian communities respectively.

Results of the study indicate that water pricing has a great potential of being an effective policy tool for water supply authorities. Price could be used to allocate and use water efficiently and could play a key role in the long run planning and conservation of water supplies. In this study, price variable is statistically significant at one percent level. This result shows that price charge for water will influence the total demand that have to be met by suppliers. The investments that have to be made by the authority will depend on the demand it has to fulfill. In addition, the demand is a function of price charged, a direct relationship between pricing policy and the scale of the investment is established. Thus, the water authority can make use of the simulated models to estimate the size of the facilities to be produced in order to make an efficient investment decision for future plan. The structured tariff mechanism was the most appropriate way to increase efficiency in the industry.

Abstrak

Permintaan air di Malaysia semakin penting kerana arus pertumbuhan penduduk, pertanian, dan pembangunan perindustrian yang semakin berkembang. Di samping itu, beberapa negeri menghadapi masalah kekurangan dan tekanan bekalan air yang serius seperti negeri Selangor. Di Johor, bekalan air yang diterima adalah mencukupi dan tidak serius, walaubagaimanapun, untuk membendung masalah ini langkah awal harus diambil meningkatkan keselamatan dan kualiti air minuman negara kita dan infrastruktur kumbahan air. Dianggarkan 40% daripada penduduk dunia kini hidup di kawasan yang mempunyai masalah tekanan air dan diramalkan pertambahan penduduk global tiga bilion orang pada tahun 2050 akan mengakibatkan kekurangan air yang amat serius untuk melangsungkan kelangsungan hidup di masa hadapan. Pakar ekonomi, berminat dalam memahami sifat empirikal permintaan air untuk meramalkan penggunaan air pada masa hadapan dan dalam penetapan harga juga ingin meningkatkan perancangan sumber air dan pengurusan yang efektif. Tindakan penting perlu diambil untuk menilai dan mengurangkan kehilangan air dan membangunkan teknologi keselamatan yang baru untuk mengesan dan memantau pencemaran dan mengelakkan pelanggaran peraturan keselamatan dalam permintaan air.

Kajian ini bertujuan untuk melihat hubungan diantara harga dan quantity serta pemboleh ubah lain dalam mempengaruhi permintaan air di Kluang, Johor. Teknik analisis panel data antara penggunaan dan perbelanjaan air dianggarkan dan hasilnya menunjukkan bahawa harga dan kuantiti air mempunyai hubungan yang positif di mana kenaikan harga akan membawa kepada peningkatan dalam penggunaan air kerana penggunaan harga purata dalam kajian ini. Regresi ini memberikan hasil yang terbaik kerana ia membendung masalah kepelbagaian individu dalam analisis ini. Keanjalan harga adalah 0.66-0.65 masing-masing. Tambahan pula, lima model yang berbeza telah di analisis dengan menggunakan 335 sampel isi rumah dan hasil kajian menunjukkan bahawa harga signifikan dan hampir semua regresi dalam model keseluruhan menerangkan lebih daripada 80 peratus daripada perubahan dalam penggunaan air pada tahun 2012. Gaya hidup sosial dan budaya juga didapati memberi kesan kepada corak penggunaan daripada tiga kumpulan utama yang berbeza etnik di Malaysia. Masyarakat Melayu dalam sampel itu didapati menggunakan air lebih banyak daripada masyarakat Cina dan India masing-masing.

Hasil kajian menunjukkan, harga air mempunyai potensi yang besar menjadi alat mengubal dasar yang berkesan bagi pihak berkuasa bekalan air. Harga boleh digunakan untuk memperuntukkan dan menggunakan air dengan cekap dan boleh memainkan peranan penting dalam perancangan jangka panjang dan pemuliharaan bekalan air. Dalam kajian ini, menunjukkan bahawa caj harga air akan mempengaruhi jumlah permintaan yang perlu dipenuhi oleh pembekal. Pelaburan yang perlu dibuat oleh pihak berkuasa yang akan bergantung kepada permintaan yang ia memenuhi. Pihak berkuasa air boleh menggunakan model simulasi untuk menyediakan kemudahan bagi membuat keputusan pelaburan yang cekap untuk rancangan masa depan. Mekanisme tarif berstruktur adalah cara yang paling sesuai untuk meningkatkan kecekapan dalam industri.

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Chapter 1

1.0 Introduction

Water, a word that is synonymous with life, is nature's free gift to the human race. It is very essence and the source of life thus no organisms can live without water. Importance of water to our earth seems to be unique among the other known celestial body. It has water, which covers over three fourths of its surface and constitutes 60 to 70 percent of living world. Water regenerates and is redistributed through evaporation, making it seem endlessly renewable.

However, just 1 percent of the world's water is usable to us, 2 percent is frozen in glaciers and polar ice caps and the rest 97 percent is salty sea water. The importance of water is always not appreciated. It takes a lot of effort to provide clean water to households.

Access to water is one of the pressing global issues of the 21st century. As our global population grows and becomes wealthier, the demand for water will greatly increase. At the same time, water availability and quality are also under growing stress from climate change, energy scarcity, land use decisions, and the requirements of industry and minerals processing. We will need to find better ways to both manage our current use of fresh water and configure it for the future, so as to be able to serve our growing populations and preserve stocks for future generations.

The world's 6.7 billion people consume about 4,500 km (4.5 teralitres) of freshwater annually, roughly 10% for domestic use, 70 percent for food production,

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