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The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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Making The Switch To A Sustainable Water Supply – A Study From Vietnam

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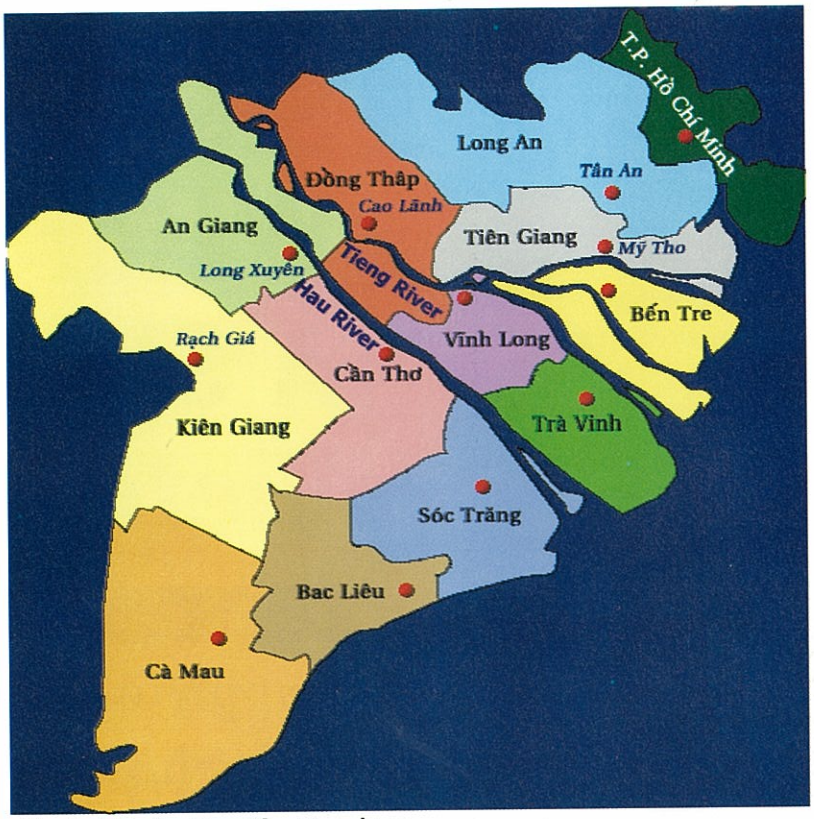
Supplying clean water to households is perhaps the most pressing challenge facing governments across Southeast Asia. Now a new EEPSEA report from Vietnam has looked at the water supply options available in the country's Mekong Delta. It finds that ground water extraction represents the →

A summary of EEPSEA research report 2008-RR3, 'Household Switching Behavior In The Use Of Groundwater In The Mekong Delta, Vietnam', by 'Dr. Vo Thanh Danh; c/o School of Economic and Business Administration, Can Tho University, Can Tho City, Vietnam. Email: vtdanh@st.ctu.edu.vn

"The best method to supply water is ....

best alternative both in terms of its popularity and its cleanliness. The report also finds that the best method to supply this resource is through groundwater supply units or GSUs. These extract water from a deeper level than tube wells (the other main method of extracting ground water) and are the most environmentally sustainable option. To get people to switch to this supply source (for which they have to pay a fee) the report recommends that the GSU option should be promoted to every household not currently using it, especially private tube-well owners.

The study was conducted by Dr. Vo Thanh Danh, from the School of Economic and Business Administration at Can Tho University. It looks at the situation in Can Tho City and Hau Giang Province (formerly part of Can Tho Province). This area lies in the centre of the Delta area. The Delta itself is home to 18 million people who account for 21 per cent of the country's population. As in many other parts of Vietnam, there is a huge demand for clean water in this region. This is especially true in rural areas, where it is difficult to use water from rivers due to pollution from agricultural production and aquaculture and because of saltwater intrusion in the dry season.



Study Site in Can Tho Province

The Water Challenge

The study was undertaken against a background of increased government action on the water supply issue. To try and address the demand for clean water the Vietnamese Government (in cooperation with UNICEF) has set up rural clean Water and Environment Management Centers (WEMCs). The main objective of these WEMCs is to help poor people in rural areas access clean water. The project has launched an impressive plan of establishing a network of the groundwater supply units (GSUs). However challenges remain: over-extraction, saltwater intrusion, and pollution are all associated with the supply of groundwater in the area. If these problems are not prevented or eliminated, the future availability of clean water will be severely compromised.

Danh's study was undertaken to review the GSUs relative to other water supply options, and explore the advantages and disadvantages of each. It was also designed to assess whether households would switch between sources and to see what factors would make them do so. To get the necessary information three different types of interview were carried out. These were with GSU managers, GSU users and non-GSU users. Data was gathered about water supply and demand alongside information on the respondents themselves. Questions regarding the pollution of groundwater resources were also asked. This was done to evaluate the effect of people's knowledge about pollution on the water sources they use. GSU plant managers were also interviewed on the status of the area's groundwater supply. About 80 GSU plants were visited and a sample of 127 GSU users and 233 non-GSU users were interviewed.

through groundwater supply units."

Three Sources of Water

Three main sources of water were found in the study area – rainwater, river water and ground water. Ground water in the region is accessed either through GSUs or shallower tube wells. Tube wells found in the area are between 70m and 120m deep while GSU wells are between 100m and 250m deep. Household preference for these different water sources was ranked by the study as follows: 52.4 per cent chose groundwater from tube-wells, 24.5 per cent chose rain water, 21 per cent chose GSU water and 2.1 per cent chose river water. These results show that groundwater is the most popular water source. Rain water ranks second, while river water is generally unpopular.

Groundwater's popularity can be explained by the fact that nearly two-thirds of the households interviewed believed that using groundwater would help them to avoid health hazards and that it represents a safe and clean source of water for domestic purposes. This belief is backed up by the fact that GSU water is treated before delivery and is therefore of a better quality than other supplies. It is also clear that the reliability of groundwater sources is widely appreciated. Meanwhile, people reported that rain water presents problems of pollution, reliability and storage. The poor showing of river water is easily explained by the serious river pollution that has taken place in the study area in recent years.

Although people in the Mekong Delta prefer to use groundwater, they still use rain water and river water for many of their daily activities. Availability and reliability were highlighted as the most important reasons for the continued domestic use of rain water and river water.

The Groundwater Situation

Given the popularity of groundwater, the study assessed its current supply and demand situation. The groundwater of Can Tho Province is found in four geological layers. Currently groundwater is extracted mostly from the Pleistoxen layer. The quality of groundwater in this layer is the best of the four and the water is extractable in large amounts. The amount of groundwater extracted has been steadily increasing: In the year 2000, the total amount of groundwater extracted for domestic use in the study area was about 57,000 m3/day. In 2002, there were 54,250 wells (of these 52,814 were tube wells). The total rate of water extracted at this time was 114,000 m3/day

The study found that the water consumption of groundwater supply unit (GSU) users was significantly lower than that of those using private tube-wells. Even at the highest consumption level, the mean rate of GSU water consumption was only at 109 litres/person/day. This was less than half that of private tube-well users. This behavior can be explained by the fact that people using GSU water have to pay a price for the water they use. It is clear that pricing water tends to reduce the volume of water demand.

Will People Switch?

The next stage of Dr. Vo Thanh Danh study looked at whether people would be willing to switch to new sources of water and, in particular, what factors would make them switch to a GSU supply. This study finds that the final choice of water source depends primarily on the availability and quality of the

Reasons for choice of water sources for domestic use of the average household

Unit: %

Reasons for choice	Sources of water		
	Groundwater	Rain water	River water
Reliability	67.4	16.9	41.2
Availability	27.9	62.8	71.9
Convenience	15.9	25.0	-
Health concerns	63.9	35.8	1.8
Other water source polluted	78.1	20.3	-
Low cost	36.9	25.0	36.8

Source: Survey 2006

different sources and on the economic situation of each household. The income and the size of households were found to be the main factors affecting the decision to switch to a GSU supply.

For non-GSU users, the probability of switching to GSU water was found to be 37 per cent. The survey of GSU managers also found that the probability of consumers switching to GSU water is higher during the dry season than in the wet season. This implies that increasing the use of GSUs would help relieve extraction pressures from shallow aquifers and rivers during this time of relative water scarcity. This, in turn, would result in improved environmental conditions in the region.

Non-GSU households showed an interesting change in their pattern of water use after they started to get water from a GSU. Not only did their level of consumption fall, but there was also a general move away from other sources of water. For example, more than one-third of such households had previously used water from a river and stopped doing so when they made the switch to a GSU supply. Also, more than 41 per cent had previously used water from private tube-wells. When they changed to water from a GSU, they abandoned their private wells.

The Sustainable Choice

These findings show that groundwater is the best source of clean water for the people of the Mekong Delta and that the GSU approach is attractive to households. It is also clear that switching from private tube-wells to GSUs would encourage water saving, thus preventing groundwater resources from being over-extracted.

Indeed, if the different levels of water consumption are assessed, then it becomes clear that sustainability is an important benefit of the GSU approach. If all the groundwater required for domestic purposes were to be extracted from privately owned tube-wells, groundwater would soon be completely depleted. However, if GSUs were the main supply, the sustainability of groundwater extraction would be maintained. It is clear that the best way to ensure sustainable groundwater management is by getting more private tube-well users into the GSU program.

Future Priorities

In light of these findings, Dr. Vo Thanh Danh recommends that the WEMCs should promote the GSU program to every non-GSU household, especially private tube-well owners. As mentioned, income and size of household are the main factors affecting people's decisions to switch. Households with more members are more likely to switch to GSU. Also, low income households are found capable of paying for GSU water connection.

If a truly sustainable, safe and equitable water supply system is to be developed, various issues remain to be assessed. Water pricing is obviously a key element of a sustainable water supply strategy. How groundwater should be priced should therefore be answered in a future study. It is also recommended that, in Can Tho Province, groundwater that is to be used for domestic use should only be extracted from the Pleistoxen layer. Extracting groundwater from other geological layers is not recommended until an official survey is conducted to ascertain the quantities and quality of groundwater resources present in these levels.

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