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The Problem

Unclean drinking water is a major cause of disease and death in less-developed countries. In South Africa, clean water sources are considered to be water from a tap or from a water tank. Rural African households with unclean drinking water are poor and household members spend many hours fetching water and wood or dung for fuel. The main water treatment methods – boiling and chemical treatment – require either more water and fuel (boiling) or expenditure of money (chemical treatment). Household characteristics related to water treatment and choice of treatment method reflect a rational decision-making process. Constraints of time and money result in a low percent of rural African households with an unclean drinking water source (18%) ever treating their drinking water.

The Decision to Treat Water and Type of Treatment

Only 15% of rural African households with an unclean drinking water source ever treat their water. Figure 4 shows whether a household ever treats its water and if so what method is used by type of unclean drinking water source. Water sources are classified from the best (borehole or rainwater tank) to the worst (flowing or stagnant water). Only 1% of households use a treatment method other than boiling or chemical treatment. The worse the drinking water source, the more likely the household is to treat its drinking water. Also, the worse the source, the more likely the household is to use chemical treatment.

Data

Data are from the 2005 South Africa General Household Survey, a nationally representative survey of 24,074 households. It included 3,965 rural African households that used an unclean drinking water source.

South African Households with an Unclean Drinking Water Source

In 2005, more than 1.5 million South African households used an unclean drinking water source. In 2005, 32% of rural African South African households used an unclean drinking water source. This was a reduction from 41% of rural African households using an unclean drinking water source in 2003.

The Burden of Fetching Water and Fuel

Figure 1 shows the percent of households with an unclean drinking water source that use chemical treatment by source of drinking water and by monthly household expenditures. 

Multivariate Analysis of Factors Related to Perception of Water Pollution, Water Treatment and to Choice of Chemical Treatment

Table 2. Logistic Regressions of Factors Related to Perception of Water Pollution as a Problem, Treatment of Drinking Water and, Among those who Treat Water, Choice of Chemical Treatment

Discussion of Logistic Regression Results

The more unclean the drinking water source, the more likely a household is to perceive water pollution as a problem, to treat its water and to choose chemical treatment.

More educated households are more likely to treat their water and more likely to choose chemical treatment than other households, but education is not important for perception that water pollution is a problem.

Households with higher expenditures are more likely to choose chemical treatment, probably because they can afford it, but higher expenditures do not matter in the perception of water pollution as a problem or in the decision to treat drinking water.

The longer it takes to reach the water source, the more likely the household is to perceive water pollution as a problem, and the more likely the household is to choose chemical treatment. Time to the water source does not influence whether the household treats its water.

Perception of water pollution as a problem is related to whether the household treats its water, but is not related to choice of treatment method.

Further Thoughts

South African households with an unclean drinking water source form their perceptions and decide on actions on a rational basis.

The worse the household’s water, the more likely it is to see water pollution as a problem. A household does not need to be well-educated to perceive water pollution as a problem.

Households are more likely to treat their drinking water the worse their water is and if they perceive water pollution as a problem. Education is related to whether the household treats its water. Although education is not related to the perception that water pollution is a problem, it is related to efficacy in organizing the household to undertake an action – treatment of drinking water.

Among households that treat their drinking water, the longer the time to reach the water source the more likely the household is to use chemical treatment. This is because boiling reduces the volume of water, and the burden of hauling extra water for boiling is greater the longer it takes to walk to the water source.

Among households that treat their drinking water, the higher the household expenditure level the more likely the household is to use chemical treatment. This is because higher expenditure households can more easily afford to purchase bleach for chemical treatment.

The substantial cost in labor of household members or in money involved in water treatment likely leads to the very low percentage of rural African households with an unclean drinking water source that treat their water – 15%.

It is estimated that boiling to treat drinking water reduces water volume by 20%. This is a substantial cost in labor when households on average spend 6 hours a week fetching water and 6 hours a week fetching wood or dung for fuel.

The main chemical treatment method is use of bleach, which would cost a household about R20 a month ($1.50). However, the poorest 31% of these households expend only R4 ($0.50) a month on non-food items. For very poor households the cost of bleach for water treatment is a substantial expense.

In order to increase the proportion of rural African households with an unclean drinking water source that treat their water, it would be very desirable for the South African government to provide free or heavily subsidized bleach for this purpose. The national pattern according to which these households already make decisions about water treatment suggests that such a program could be very successful.

References

