

# Drinking Water Valuation: Challenges, Approaches, and Opportunities

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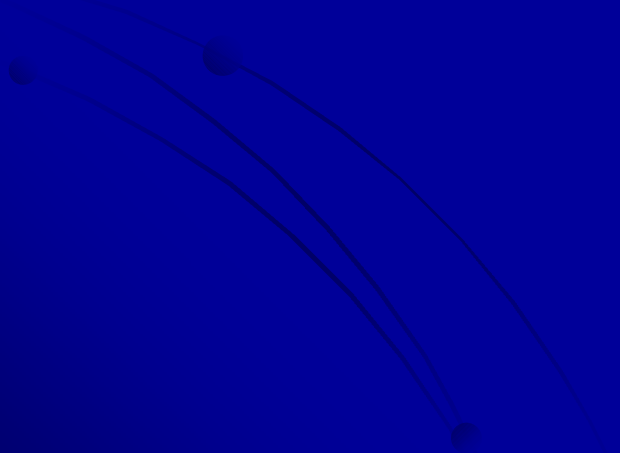
Brock University, Ontario, Canada

Presentation to Workshop on Global Environmental Health: Research Gaps and  
Barriers for Providing Sustainable Water, Sanitation, and Hygiene Services

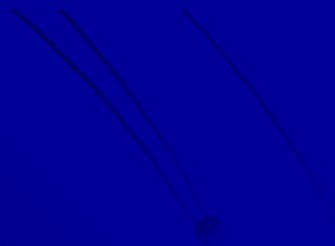
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# Challenges



Challenge No. 1:  
What are we valuing?



# | Valuable Components of Water

## | To households:

- | Direct use: consumption, waste disposal, recreation
- | Non-use/passive use: human health, ecosystem services, aesthetics, future use
- | Existence use

## | To firms (both industrial and agricultural)

- | Productive input or source for waste disposal

# Focus on Drinking Water

- I Drinking water can affect human health through two aspects

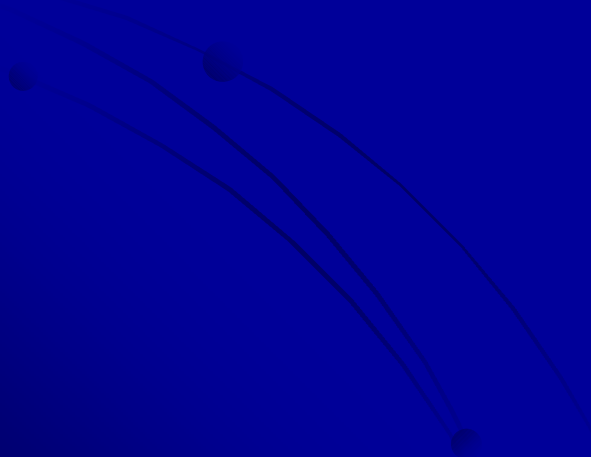
- I Quantity

- I Quality

# Value of Good Quality Drinking Water

- | Willingness to pay (WTP)
- | What you are willing to give up in exchange (trade-off – does not need to be \$)
- | If quality attributes of drinking water can be identified and sold separately in competitive markets,
- | Then, market price reveals WTP for one more unit of water of specific quality

# Challenge #2: Absence of Competitive Markets for Exchange of Water



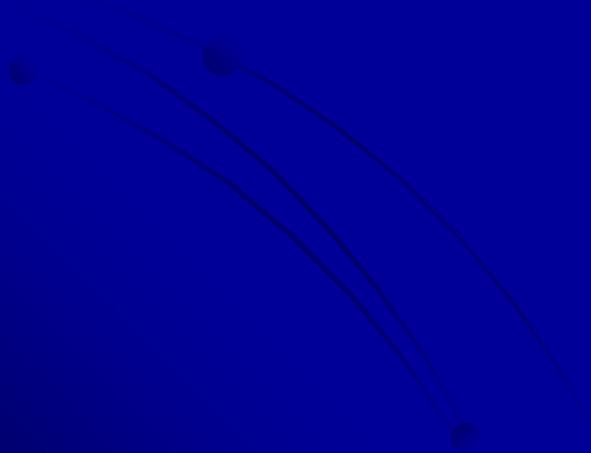
- | Supply-demand mechanism used to “value” private market goods is missing for water

Over consumption  
leads to reference point of “under valuation”

No feedback mechanism to reflect scarcity

Sustainable use is in jeopardy

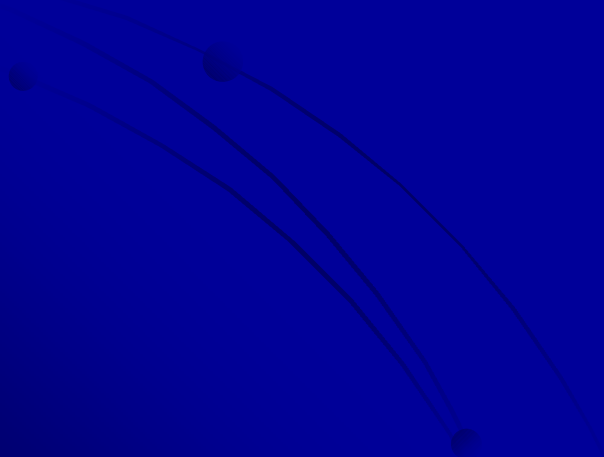
# Challenge #3: Quality and Value



I What are attributes of “good quality” water?

Consumers need to be educated about changes in quality before they can evaluate the impact upon willingness to pay, especially for ecosystem health effects

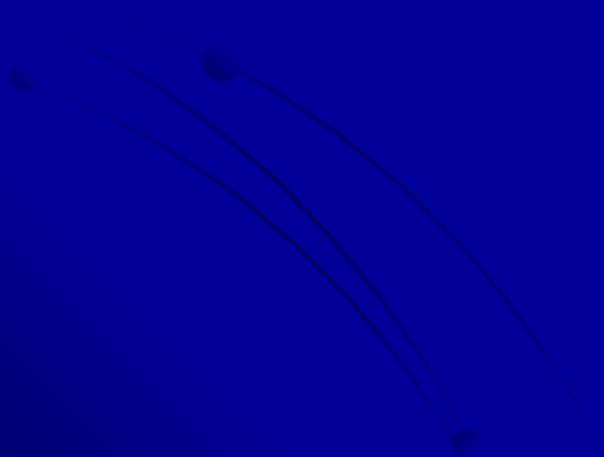
# Approaches to Water Valuation



# Non-market valuation techniques

- | Indirect methods

- | Direct methods



# Indirect Valuation Methods

- | Rely on market observations of expenditures on “related goods/services”
  - | Cost of Illness (COI) – sums up expenditures on doctors visits, medicine and lost work time
  - | Averting Behaviour (AB) – looks at expenditures made to avoid or reduce exposure to environmental risks (full knowledge assumed)

# Drinking Water Valuation Survey in Canada

- | Internet-based Survey over July-September 2004
- | 1600 + respondents across Canada
- | Purchases of water – about \$180 per hh per year
- | Home filtration expenditures – about \$189 annual spending on in-tap

# Direct Valuation Methods

- | Market is constructed to describe change in water services/attributes
- | Survey respondents choose to remain at status quo or agree to higher price (water bill) to obtain improvements from alternatives described

# Case Study

- | Chlorine removes microbes but has been implicated in the production of trihalomethanes linked to bladder cancer
- | Trade-offs: cancer versus microbes versus costs; Morbidity versus mortality risk
- | Question - How much are people willing to pay as premium on water bill to obtain reduced health risks?

# Two question formats

- | Contingent Valuation Method (CVM)
  - | Present “package” of health changes
  - | Respondent chooses status quo (no change) or alternative program (improvements)
  - | WTP for entire package

# Two question formats

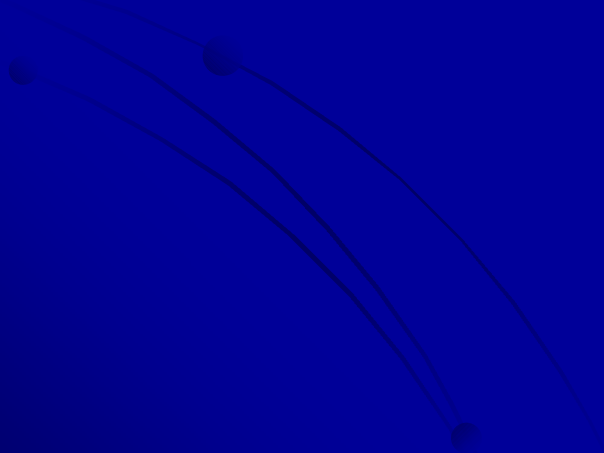
## I Choice Experiment (CE)

- I Break package down into attributes
- I Present number of “choice tasks”
- I Each involves different levels of attributes
- I WTP for each attribute or component of package

# Results from Choice Experiments

- | WTP to avoid one cancer illness \$2.18
- | WTP to avoid one cancer death \$10.01
  
- | WTP to avoid one microbial illness \$0.018
- | WTP to avoid one microbial death \$12.83

# Opportunities for Water Valuation



# Opportunities

- | Choice experiments offer opportunity to explore trade-offs between human health and ecosystem health components of value
- | Estimated values can be used instead of the often implicit value of zero
  - | Cost benefit analysis of infrastructure renewal or environmental protection spending