Socio-economic Well-being and Water Infrastructure: A Quantitative Analysis using the Aboriginal Peoples Survey

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Main objective

- To investigate the relationship between access to water and sanitation and general health condition in the First Nations community in Canada using the Aboriginal Peoples Survey (2001, 2006)

Contribution

- This is the first empirical study that attempt to analyze the impact of access to water and sanitation on health in the First Nations Community across Canada

Background and Motivation

- **Four of every ten** people in the world do not have access to a simple pit latrine

- **two in ten** have no source of safe drinking water

- **half of the people** in the developing world have one or more of the main diseases or infections such as **diarrhoea, intestinal helminth infections, dracunculiasis, schistosomiasis, and trachoma** associated with inadequate water supply and sanitation.

Background and Motivation

- Unfortunately this water and sanitation condition is not better in the First Nations community across Canada.

- About 20,000 First Nations people living on reserve across Canada have **no access to running water or sewage**

- As of April 30, 2012, the tap water in **122 First Nations** communities **was not safe to drink** as reported by the Federal government

Background and Motivation

- Both the quantitative and qualitative study indicate that having an **uninterrupted water supply has a significant negative effect on the incidence of childhood diarrhoea** (Roushdy *et.al.* 2012)

Background and Motivation

- So one of the most important question is:

  How cost-effective is the investment in water infrastructure and sanitation?

- A cost-benefit analysis by WHO showed that each **US$1 invested in water and sanitation would yield an economic return of between $3 and $34**, depending on region (WHO 2004).

Empirical Technique

- Following Abebaw *et.al* (2010) and Fink *et.al* (2011), we use the following regression model:

$$H_i = \beta_0 + \beta_{ki} X_{ki} + \delta_{ji} W_{ji} + \lambda_i R_i + \varepsilon_i$$

$$H_i = \beta_0 + \beta_{ki} X_{ki} + \mu_i S_i + \lambda_i R_i + \varepsilon_i$$

H_i is the overall health status of the respondent which is a latent variable

Empirical Technique

X_{ki} is the socio-economic condition of the household i, $k = 1.....3$ which includes:

- household size
- respondent ‘s level of education
- Household total income

Empirical Technique

W_{j_i} is the availability and safety of water to household i, j = 1....3where

$w_{1i} = 1$, if household consider water safe to drink, 0 otherwise

$w_{2i} = 1$, if have cold or hot running water or a flush toilet, 0 otherwise

$w_{3i} = 1$, if water contaminated in a particular time during a year, 0 otherwise

S_{1i} = 1 if have a septic tank or sewage system, 0 otherwise

R_i is the region (geography) of residence of the household i

Main Results

	APS 2001 (n=26535)			APS 2006 (n=23851)		
Health	**coefficient**	P>|z|	Marginal effect	**coefficient**	P>|z|	Marginal effect
WATSAFE	.2001517	0.000	.0496357	.2575633	0.000	.0641198
WATCHTLT	.1192906	0.228	.0295238	.3494754	0.033	.0941032
WATCONT	-.1404124	0.000	-.0336734	-.2310381	0.000	-.0558554
SANTSS	.0225456	0.424	.005351	.0972539	0.006	.0230054

Main Results

- The predicted probability of having good health is about **5% and 6% higher** in APS 2001 and 2006 respectively for the household which have access to safe drinking water than that of which does not have access to safe water.

- The predicted probability of having good health is about **3% and 9% higher** in APS 2001 and 2006 respectively for the household which have cold or hot running water or a flash toilet than that of which does not have access to those.

Main Results

- The predicted probability of having good health is about **3% and 6% lower** in APS 2001 and 2006 respectively for the household in which water is contaminated in a particular time period in a year than that of which does not contaminated

- Individual in a Household which have a septic tank or sewage system is **4% more likely** to have a good health comparing to those who does not have these.

Conclusion

- Since the empirical results of this study reveals that access to both safe water and sanitation system can significantly improve the health status of the First Nations people, this study have strong policy implication in improving the water and sanitation infrastructure through more efficient investment project .

Thank you