SOAR Research Proposal- Summer 2014

Professor Sonia Aziz
Assistant Professor
Economics

Student Emily Lambright
Class of 2015
Economics Major
Political Science Major

Title Estimating Willingness to Pay for Water Quality in Low Income Areas in Bangladesh

Start Date May 27, 2014; 10 Weeks

Description of Project

Purpose:

The purpose of this project is to evaluate preferences for clean water in low income areas of Bangladesh. Emily Lambright will be traveling to Bangladesh this summer as part of an affiliation agreement between Moravian College and the International Center for Diarrheal Disease Research (ICDDR, B) in Bangladesh. Using an ongoing ICDDR, B study focused on estimating willingness to pay for point of source water treatment devices, and data from surveys of low income households in Bangladesh, Emily will conduct regression analyses to estimate the effect of socio-demographic and personal characteristics on household valuation of clean water. Some explanatory variables include gender, education level, and household size. The results of the study can be used to assign a monetary value on goods with environmental dimensions and can help guide administration in setting policy guidelines and goals.

Scholarly Value:

This research is based on non-market valuation methodology and forms part of a rapid stream of steadily growing research in environmental economics. Non-market valuation is difficult and fractious because the idea is to value goods and services not normally valued by the marketplace. The inherent value in environmental goods and services are reflected through anthropocentric preferences. These preferences and the respective demands for environmental goods and services can be estimated using revealed or stated preferences. Valuing the demand or willingness to pay for clean water is the objective of this project.

Emily is designing the theoretical model that will frame her empirical study. Deriving the demand for clean water, a non-market good, the robust theoretical framework that accompanies this as well as the regression analyses of the empirical model all form her original contributions. Studies such as this lend additional data to evaluate robustness of non-market modeling methodologies. The results of the study may lead to conference presentations, publication and be helpful for public health policy.

Suitability of Project (for undergraduates and for Emily Lambright)

Any student focusing on environmental economics/natural resource economics or environmental policy would benefit from applying theory to data, and devising a research question, posing hypotheses, and testing the hypotheses using available data. Since ICDDR, B has field stations in heavily resource constrained communities with lack of safe drinking water, Emily is in the advantageous position of using the institute's considerable proximity to and experience with dealing with safe water access issues. Emily's field work will be conducted during late summer in accordance with the ongoing WTP study in Dhaka, giving Emily ample time to analyze and document her results. We are hoping to access a target sample size of 1000 households, but are accounting for a potential reduction in the actual sample size by 40%. In other words, an actual sample size of 600 will be sufficient for statistical analysis. She should be able to complete her study of household level data and adequately prepare for her econometric analysis through her work with ICDDR, B. Having taken courses in Intermediate Microeconomics, Public Policy and Administration, and Econometrics, Emily is well equipped to complete calculations based on the data she collects. These courses provide a solid framework for her to use as she completes this project.

Benefits for Student/Faculty Member/College

The research will be beneficial to Emily's post graduation plans. This gives her an opportunity to bridge the gap between theory and application via experiment and will provide experience with conducting a literature review, survey methodology, data analyses, and writing and critiquing results. Emily will also learn to run models and programs in STATA over the course of the project. Learning these methodologies as they apply to public policy evaluation and modeling in economics in general will be most helpful for graduate school or for a position in public policy.

My research involves valuation of non-market goods, particularly in heavily resource constrained economies. This project provides an opportunity to investigate the scope of valuing clean water in low income households of Bangladesh, an area in which my work is heavily focused. The methodology can later be used for broader research applications.

The affiliation agreement between Moravian College and ICDDR, B represents a unique opportunity for students interested in working with critical global issues such as access to clean water. Emily's study will showcase the type of research students can do at Moravian College, which will benefit the institution's reputation with prospective students interested in pursuing answers to social, global and health concerns. This type of work sets Moravian College apart from other colleges of similar size and profile. This research resonates with Moravian College's vision and strategic initiative toward environmental issues, poverty and inequality and sustainability. Awareness about global environmental issues and responsible resource use is an inherent concept in this work and is an integral part of Moravian College's vision of stewardship.

Roles and Responsibilities and Proposed timeline for project completion

I will guide and supervise the literature review, the design of the theoretical framework as well as empirical model, data analysis and write-up of results. Emily Lambright will cull relevant data from the ongoing ICDDR, B study. I will collaborate with Emily on data analysis and write-up of results.

May 27 – June 27:	Build theoretical and empirical model, Literature Review
June 28 – August 1:	Identifying and accessing data from ongoing ICDDR, B study, data analysis
August 1 – August 23:	Write-up of report

Budget Items

Student compensation - $300 per week at 40 hours a week for ten weeks
Faculty compensation - $1000
Student Travel - - $1000 (trip cost is $1800, we are aware of the cap and asking for $1000 to offset travel expenses.) There are numerous other expenses (such as accommodation) but we are seeking alternate funding to help offset these costs.

References

Champ, Patricia A., Boyle, Kevin J., Brown, Thomas C. (Eds) *A primer on nonmarket valuation. Springer, 2003,* 576 p.

SOAR Expense Proposal- Summer 2014

Project Title Estimating Willingness to Pay for Water Quality in Low Income Areas in Bangladesh

Professor Dr. Sonia Aziz, Ph. D.
Assistant Professor
Economics

Student Emily Lambright
Class of 2015
Economics Major
Political Science Major

Budget Items

Student Travel: Airfare to Bangladesh - $1000

Explanation

Emily Lambright will be traveling to Bangladesh to work with ICDDR, B to gain research experience and access data essential to her SOAR work.

The estimated cost of her airfare is $1,800 but we are requesting $1000 per the standard cap. There are numerous other expenses (eg. accommodation) but we are seeking alternate funding to help offset these costs.

You are booking this flight on Yayama via KAYAK Learn more

New York, NY (JFK) to Dhaka, Bangladesh (DAC)
Fri, Jul 4 to Thu Jul 31 2014

Round-trip, economy
1 adult

1. Review Flight and Fare

This flight leaves on **Friday, July 4** and arrives on **Sunday, July 6.**

Departure Fri, Jul 4	Turkish Airlines Flight 4 Operated by Turkish Airlines Coach | Airbus A330-300	Take-off: Fri 12:50p Landing: Sat 5:40a	JFK: John F Kennedy Intl IST: Ataturk & other airports	9h 50m
	Connection		IST: Istanbul, Turkey	12h 40m
	Turkish Airlines Flight 712 Operated by Turkish Airlines Coach | Airbus A330-200	Take-off: Sat 6:20p Landing: Sun 4:50a	IST: Ataturk & other airports DAC: Zia International	7h 30m

This flight leaves on **Thursday, July 31** and arrives on **Friday, August 1.**

Return Flight Thu, Jul 31	Turkish Airlines Flight 713 Operated by Turkish Airlines Coach | Airbus A330-200	Take-off: Thu 6:10a Landing: Thu 11:40a	DAC: Zia International IST: Ataturk & other airports	8h 30m
	Connection (overnight)		IST: Istanbul, Turkey	19h 45m
	Turkish Airlines Flight 3 Operated by Turkish Airlines Coach | Airbus A330-300	Take-off: Fri 7:25a Landing: Fri 11:20a	IST: Ataturk & other airports JFK: John F Kennedy Intl	10h 55m

See fare rules

Fare Details

	Base Fare	Taxes & Carrier Surcharges	Total
1 adult	$1183.00	$608.73	$1791.73
Total			**$1791.73**

All prices in USD
Additional baggage fees and options service fees may apply

2. Enter Traveler Details (must be an adult)

Login if you have an account to retrieve saved travelers and credit cards.

Traveler 1 (primary contact for this trip, must be an adult)

First Name Emily
Middle Name
Last Name Lambright

Email Address sterl02@moravian.edu
Phone Number 267-515-3434

Secure flight information required by the airline

Date of Birth Month Day Year
Gender Male Female
I have a redress number

Create an account to book faster next time — save traveler and credit card information.

Email Address sterl02@moravian.edu
Password
Email me KAYAK's deals

3. Travel Options (optional)

Add Trip Protection

Protect your travel investment with valuable Allianz Travel Insurance. Trip protection includes coverage if you cancel or interrupt your trip for reasons like covered illness, injury, layoff, and more. This plan also covers expenses for emergency medical and dental needs, travel delay, and includes a 24-hour toll-free emergency hotline with award-winning support. Terms, conditions and exclusions apply. Learn more

Allianz Global Assistance

- ◯ Yes. Add trip protection for **$98.55.**
- ◯ No, thanks.

This product is available to residents of all states except Washington.

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- Faster checkout
- View and share your trips online and on your phone

Yayama will provide customer support

Summary

Flights
Turkish Airlines
JFK: 12:50p → DAC: 4:50a 1 stop
DAC: 6:10a → JFK: 11:20a 1 stop

1 adult	$1791.73
Ticket Total in USD:	**$1791.73**

Trip Protection no

4. Enter Billing Information

For your protection we have secured this checkout form with **256-bit SSL encryption.**

Name on Card (exactly as it appears)

Emily Lambright

Credit Card Number **Accepted Cards**

Expiration Date **Security Code**

(01) Jan 2015

Billing Address

Street (line 1) **Street (line 2) -** optional

Country

United States

City **State/Region** **Postal Code**

Choose

5. Review Policies and Terms & Conditions

Change Policy

In addition to increased fares, if allowed, cancellation or changes may be subject to fees/penalties (fees/penalties vary based on factors such as airline, market, and the applicable fare rules), and may be $150 or more for domestic flights and $200 or more for international flights, plus up to $100 fee from Vayama per ticket.

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Booking cancelation requests must be made by phone and received no later than 7pm Central Time following the date the booking is completed. For cancelation requests received AFTER 7pm Central Time following the date the booking is completed, all associated fare rules will apply.

Terms & Conditions

You will be issued electronic tickets. Adult passengers must have a valid government-issued photo ID. International travelers must have a valid passport.

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Agree and book

SOAR Student Statement of Purpose—Summer 2014

Project Title Estimating Willingness to Pay for Water Quality in Low Income Areas in Bangladesh

Student Emily Lambright
Class of 2015
Economics Major
Political Science Major
On Campus Housing Requested for May 27, 2014 through August 1, 2014

Professor Dr. Sonia Aziz, Ph. D.
Assistant Professor
Economics

Rationale

Problems of water quality in Bangladesh create a critical need for research and development. Tube wells have provided access to water in Bangladesh in significant quantities since the 1970s, as public health officials thought they could provide drinking water free of harmful pathogens (Smith, Lingas, & Rahman, 2000). Prior to the use of tube wells, drinking water in Bangladesh was primarily surface water and pathogen contaminated as a result of inadequate sewage facilities. Although tube wells attempted to remedy this issue, microorganisms and pathogens remain an issue in water quality for those unable to access alternate water sources (Islam et al., 2001). Since the 1980s, scientists have found that the water from some of the shallow tube wells contains dangerous levels of arsenic, the ingestion of which can lead to serious and fatal health complications including various forms of cancer, skin lesions, neurological damage, cardiovascular disease, pulmonary disease, peripheral vascular disease, and diabetes (Smith, Lingas, & Rahman, 2000). The World Health Organization estimated in 2000 that between 28 and 61.6 percent of the population risked exposure to arsenic contamination in their water (Smith, Lingas, & Rahman, 2000).

Based on the health risks, persons should neither ingest nor cook with water contaminated with arsenic or pathogens. Unfortunately, due to lack of education and clean water access, the use of contaminated water in Bangladesh persists. In addition to health consequences, water contamination leads to economic repercussions. Filtration methods and clean water wells exist in Bangladesh; however, the alterations, on a large scale, are either infeasible or inconsistent. Persons, generally women, must make the decision whether or not the benefits of clean water are worth the opportunity costs associated with obtaining it. From a health perspective, research to determine estimations for the demand for clean water in Bangladesh could be central in modifying policy decisions centering on the country's water distribution. If studies can determine that clean water projects have the potential to improve the economic status and social welfare of the citizens of Bangladesh, policymakers and NGOs may increase their interest in water quality projects.

My education up until this point at Moravian College has focused primarily on classroom learning of academic topics in economics, political science, and mathematics. While my classes have offered me a baseline of knowledge and resources to utilize throughout my academic pursuits, I believe first hand research experience would provide indispensible augmentation to

my undergraduate education. SOAR provides students with the opportunity to work closely with experienced faculty members to learn from them outside of the classroom and explore potential subject areas of future interest. I have had the privilege of working with Dr. Aziz in multiple settings at Moravian College; however, I believe conducting economic research in the field in Bangladesh under her guidance will provide me with an educational experience unparalleled in the classroom.

As a double major in economics and political science I have had the opportunity to expand my knowledge of multiple academic pursuits. Based on the knowledge I have gained, I plan to continue my economic studies upon completing my undergraduate degree, and I hope to focus my efforts on issues of development economics from a microeconomic perspective. With this goal in mind, I believe that working with Dr. Aziz through SOAR will expose me to things I will face in my future studies and career. I will have the opportunity to travel to Bangladesh, synthesize secondary data, and work with other researchers in the field. This experience will force me to experience new things from both academic and cultural perspectives, and I do not think there is a better way to gain this than pursing research work abroad.

Expected Outcomes

It is my hope that working on this project will reinforce my aspirations for graduate work in economics with a focus on microeconomics in developing countries. I hope to gain experience in the research process as well as contribute valuable academic research regarding the valuation of clean water in Bangladesh and its welfare effects. SOAR would give me the educational experience outside of the classroom that I need to further my studies and provide me the opportunity to contribute to the field of environmental economics. Though working on this project, I will have the opportunity to develop an economic theoretical framework to test in conjunction with econometric models, giving me experience from the planning stages of a research project through the results and potential implications of the study. This research would provide a basis for additional work as an honors project.

In addition to academic expectations, I hope that the work we complete during this project will contribute to increasing awareness and understanding of water quality issues in low income areas of Bangladesh. I will be working with researchers at the International Center for Diarrheal Disease Research in Bangladesh (ICDDR, B) on a willingness to pay study. This study will estimate WTP for point-of-source in-line chlorinators, a water treatment method. The data gathered through the study could act to inform future policy regarding water quality. Through my participation in SOAR, I will also have the opportunity to present my research at Moravian College Scholar's Day, which will provide me with a platform to share my research experiences and results with others at the college.

Attached is a list of potential references for beginning my research on the topics of valuation of non-market, environmental goods, willingness to pay in developing countries, research methods, and water studies in Bangladesh.

References:

Ahmad, J., Goldar, B. N., Masra, S., & Jakariya, M. (2003). Willingness to Pay for Arsenic-Free, Safe Drinking Water in Bangladesh. *World Bank,* 1-119. Retrieved from http://www.wsp.org/sites/wsp.org/files/publications/WSP_Pay_Arsenic_free.pdf.

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Islam, A. S., Siddika, M. N. H., Khan, M. M., Goldar, M. A., Sadique, A. N. M. H., Anwar H., & Colwell, R. R. (2001). Microbiological Analysis of Tube-Well Water in a Rural Area of Bangladesh. *Applied and Environmental Microbiology, 67,* 3328-3330. doi: 10.1128/AEM.67.7.3328-3330.2001

Murty, M. N., Gulati, S. C., & Banerjee, A. (2003). Welfare Gains from Urban-Air Pollution Abatement in the Indian Subcontinent. *Institute of Economic Growth*, 1-36.

Pattanayak, S. K., Yang J. C., Whittington, D., & Bal Kumar, K. C. (2005). Coping with Unreliable Public Water Supplies: Averting Expenditures by Households in Kathmandu, Nepal. *Water Resources Research, 41*(2), 1-11.

Smith, A. H., Lingas, E. O., & Rahman M. (2000). Contamination of Drinking-Water by Arsenic in Bangladesh: a Public Health Emergency. *Bulletin of the World Health Organization, 78*(9), 1093-1103. Retrieved from http://www.who.int/bulletin/archives/78%289%291093.pdf

Smith, V. K. (1997). Time and the Valuation of Environmental Resources. *Resources for the Future*, 1-29.