



ENGINEERS WITHOUT BORDERS-USA
TUFTS UNIVERSITY STUDENT CHAPTER

Presents

Approaching Communities in the Developing World

A Seminar about the Community Health Aspects of
Sustainable Development



Saturday, March 13th, 10:30-2:00

Anderson Hall, Tufts University



Message from the President

On behalf of the entire Tufts University chapter of Engineers Without Borders, I welcome you to this year's spring seminar, *Approaching Communities in the Developing World: A seminar about the community health aspects of sustainable development*. An extensive community health assessment is vital to the successful implementation of any engineering development project. The gathering and analyzing of baseline health data serve to guide the design of a suitable system, strengthen the relationship between the community and the engineering group, and quantifiably assess progress. This connection between engineering and public health is not only important for small scale development projects such as performed by Engineers Without Borders, but is also vital to the healthy and sustainable development of the global community. We hope that this seminar illuminates the importance of public health considerations in engineering applications.

Thank you,

Russell Hyatt

President of the Tufts chapter of Engineers Without Borders

Schedule of Events

10:00am-10:45: Registration

10:45-11:00: Opening Remarks:

Russell Hyatt, President, Nelson Auditorium

11:00-11:45: Keynote Speaker:

Dr. David Gute: "Using Descriptive Epidemiology in Community Specific Applications" Nelson Auditorium

11:50-12:35pm: First Breakout Session

*Dr. Yvonne Wakeford: Topic Unavailable at the time of print, Nelson Auditorium
Water Quality Testing, A Practical Approach, Tufts EWB, Room 211*

12:35-1:00: Brunch and Networking

Burden Lounge

1:00-1:45: Second Breakout Session

*Dr. Astier Almedom: Topic Unavailable at the time of print, Nelson Auditorium
Tufts EWB in El Salvador: A Case Study, Tufts EWB, Room 211*

1:45-2:00: Closing Remarks

Russell Hyatt, President, Nelson Auditorium



About Our Speakers

Dr. David Gute

David M. Gute is an Associate Professor of Civil and Environmental Engineering at Tufts University. He holds a joint appointment with the Department of Public Health and Community Medicine at the Tufts University School of Medicine as well as at the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy. He directs a M.S./Ph.D. program in Environmental Health and has served as the Academic Director of the Tufts in Talloires program located in the Haute Savoie, France.

Prior to joining the Tufts faculty Dr. Gute served as an Assistant Commissioner responsible for personal and environmental disease risk factor reductions with the Massachusetts Department of Public Health and as an Epidemiologist with the Rhode Island Department of Health. He has served as a consultant for a number of organizations including the World Health Organization and Academy Health. He is interested and committed to offering environmental and public health training in a variety of settings including international venues, having lead and co-directed training programs in Brazil and the Philippines. Dr. Gute received his Ph.D. and M.P.H. from Yale University.

Dr. Yvonne Wakeford

Yvonne Wakeford is the current IRB administrator for the Medford campus of Tufts University. Dr. Wakeford received her Bachelor's degree in Psychology in 2000 from Boston University. She later earned her Ph.D. in Experimental Cognitive Psychology in 2006 from Tufts University.

As the IRB administrator, Dr. Wakeford oversees the IRB committee at Tufts and serves as a bridge between researchers and the rest of the IRB. Prior to taking her role as IRB administrator, Dr. Wakeford received a number of honors such as the Tufts University Graduate Student Research award in 2004 and 2005, as well as the Tufts award for Outstanding Contributions to Undergraduate Education in 2002.

Dr. Astier Almedom

Astier Almedom is currently a Professor of Practice at the Fletcher School. Prior to Tufts, Dr. Almedom taught in the London School of Hygiene & Tropical Medicine (University of London, Graduate and Professional School of Public Health) and served in senior management, National Health Service (NHS) in London. Her applied research interests in East Africa, Asia, the UK and more recently in the USA focus on the dimensions of resilience that reflect inter-connectedness of public health, human security, and sustainability of social-ecological systems. Dr. Almedom enjoys working with both graduate and undergraduate students at Tufts and beyond - with field-based teams of researchers, practitioners, and policy makers.



Bacteria Testing Procedure

1. Collect Sample
 - a. Use Sterilized Container
 - b. Rinse Container three times in source before collecting sample
 - c. Keep samples chilled until testing
2. Pull off top of apparatus
 - a. Do not place bottom on table, place in designated area
3. Sanitize Tweezers
 - a. Dip tip in deionized (DI) water (see below)
 - b. Dip tip in alcohol
 - c. Wave tweezers through flame twice
 - d. Wave tweezers in air - do not blow on it
4. Take out filter
 - a. Filter is gridded white paper, not blue paper
 - b. Only touch filter on edges with tweezers, NOT WITH YOUR HANDS
 - c. Do not breath on filter
 - d. If it tears or melts get a new one
5. Place filter on apparatus with grid side facing up
6. Place top back on apparatus
7. Shake sample bottle
8. Pour 100mL of sample into apparatus
 - a. Place sample bottle top face up
 - b. Do not allow sample bottle to touch apparatus while pouring it in
 - c. Place top onto sample bottle
9. Pull plunger slowly so that the sample **drips** through
10. Sanitize Tweezers
 - a. Dip tip in DI water
 - b. Dip tip in alcohol
 - c. Wave Tweezers through flame twice
 - d. Wave tweezers in air - do not blow on it
11. Pull top off of apparatus
12. Put filter in the Petri dish grid size up
 - a. Try not to keep Petri dish open for too long
 - b. Only touch filter **on the edges**
 - c. Avoid bubbles
13. Place Petri dish in incubator
14. Empty apparatus
15. Pour 30mL of DI water into apparatus
 - a. Swirl
 - b. Pull plunger to suck through
 - c. Empty contents when done
 - d. Do this three times

Note on DI water:

In the field, you will probably not have access to purified water. Instead, take the best water source you can find, boil, and then cool while keeping covered.



Hands on Workshop: Testing for Bacterial Levels in Water

Water Testing Objectives

- Quality of existing sources
- Quality of potential sources

To assess the viability of water sources water quality is evaluated in terms of:

- Disease-causing bacteria as indicated by the presence of *E. coli*. If *E. coli* test is not available, then fecal coliform levels can be used.
- Turbidity
- Phosphorus – indicator of fertilizers
- Nitrates
- Arsenic – naturally occurring in some areas of the world

Water Testing Methods

Bacteria testing

Tufts EWB has experience using three types of bacteria tests: petrifilm, Easygel, and membrane filtration.

Test	Advantages	Disadvantages	Conclusions
Petrifilm	Quick to perform Little equipment required cheap Easily transported	Maximum 1 mL sample Can only detect <i>E. coli</i> and coliform bacteria down to 100 units per 100 mL	OK for initial assessment, or for non-potable sources
Easygel	Quick to perform No equipment required	Maximum 5 mL sample Can only detect <i>E. coli</i> and coliform bacteria down to 20 units per 100 mL	Appropriate for initial water quality testing for potable sources
Membrane Filtration	Can detect <i>E. coli</i> and coliform bacteria down to 1 unit per 100 mL	Time consuming to perform Filtration equipment and incubator needed	Appropriate for detailed evaluation of water quality



Hands On Workshop: Testing for Bacterial Levels in Water

Example: Bacteria testing results from Porvenir, El Salvador

	Date	Total Coliform (counts/100mL)	E. coli (counts/100ml)	Testing Method
Springbox in river (Domingo's)	7/5/09	2,360	60	Easygel (5 mL)
Springbox in river (Domingo's)	7/8/09	2,060	0	Easygel (5 mL)
Springbox in river (Domingo's)	7/14/09	2,460	20	Easygel (5 mL)
Springbox in river (Domingo's)	7/14/09	3,520	0	Easygel (5 mL)
River Water (Río Muyapa)	7/14/09	LAWN	LAWN	Easygel (5 mL)
Springbox in river (Domingo's)	7/14/09	LAWN	95	MF (100mL)
Springbox in river (Domingo's)	7/14/09	LAWN	148	MF (100mL)
River Water (Río Muyapa)	7/14/09	LAWN	440	MF (5mL)
Tomas' well	7/5/09	LAWN	340	Easygel (5 mL)
Tomas' well duplicate	7/5/09	LAWN	280	Easygel (5 mL)
Don Chepe springbox (rainwater)	7/5/09	LAWN	480	Easygel (5 mL)
Survey house #5 (ceramic filter)	7/5/09	20	0	Easygel (5 mL)
Marta Pabla (rainwater)	7/8/09	LAWN	160	Easygel (5 mL)
Juan Daniel Amaya (springbox at river)	7/8/09	LAWN	0	Easygel (5 mL)
Beatrice (springbox at river)	7/8/09	900	0	Easygel (5 mL)
Clauida Andre Lisano (rainwater)	7/8/09	1,170	0	Easygel (5 mL)
Ana Guadalupe (springbox in river)	7/8/09	630	160	Easygel (5 mL)
Tomas' house (ceramic filter)	7/8/09	LAWN	0	Easygel (5 mL)

LAWN = Too many to count



The below survey is a translated version of a survey we have used in our communities in El Salvador. Several Parts of the survey have been condensed to preserve space.

**Tufts University Chapter of Engineers Without Borders
Informed Consent to Participate in Research**

Tufts Engineers Without Borders Health, Education, and Economics Community Survey

Principal Investigator:

Co-Investigators:

Explanation of Study

The purpose of this interview is to collect information, which will help us to assess the needs and provide for relevant future work that will benefit the people of the San Jose Villanueva region of El Salvador. The data gathered will help to inform later studies and work done by Tufts Engineers Without Borders, faculty and students. We will be collecting information regarding education, economics, and health.

Verbal Consent Script

Hello, we are (State name of survey administrator), and (State name of witness), of the Tufts University Chapter of Engineers Without Borders. We are asking you to take part in a research study. You can choose whether or not to participate; should you choose not to participate there will be no consequences. You may decide to stop or not to answer questions at any point. Before you make a decision we would like to tell you what the purpose of the study is, as well as all of the possible outcomes of being in the study and what you will have to do if you decide to participate.

The purpose of the study is to collect data to inform later studies and work done by Tufts Engineers Without Borders, faculty, and students in San Jose Villanueva. During the survey, we will ask you questions about health, economics, and water.

We would also like to ask if we may tape or video record the interview and take a photo of you and your residence. The tape recordings will help us to verify all the information we have received during the interview and make sure we have not left out answers from the survey. The photos will also help us to identify you and your place of residence in the future; but if you do not wish for us to take either of these photos, please tell us and we will not. If you do not feel comfortable with being tape recorded, please let us know, and we will not do it. If you wish to stop being tape recorded at any time, you may also do so without any consequences.

There are no risks that will come about from taking this survey. Your privacy and confidentiality will be maintained throughout this study as the surveys do not include your identification information but are coded with numbers corresponding to your identification information. Only students and faculty within Tufts Engineers Without Borders will have access to the information drawn from this study.



If you choose to participate in the study, please ask us to explain anything you do not understand either now or at any other point during the interview.

Thank you for taking the time to let us share our ideas with you. Your participation will be helpful to our research.

Tufts Chapter, Engineers Without Borders

Signatures for Survey Administration

The signatures below certify that the information in this form has been read to the participants in front of a witness. This also verifies that the participants have clearly understood and agreed to be interviewed.

Date Principal Investigator or Representative's Signature

Date Witness' Signature

Signatures for Tape and/or Video Recording Administration

***The signatures below certify that the information in this form has been read to the participants in front of the witness. This also certifies that the participants have clearly understood and agreed to be tape recorded and/or video recorded during their interview**

Date Principal Investigator or Representative's Signature

Date Witness' Signature

Signatures for Photographing Administration

***The signatures below certify that the information in this form has been read to the participants in front of the witness. This also certifies that the participants have clearly understood and agreed to be photographed during their interview.**

Date Principal Investigator or Representative's Signature

Date Witness' Signature

Survey # _____ Date of Survey: _____

EWB Community and Health Assessment Survey for Community Individuals

Project: _____ Chapter: _____

Start Time: _____ End Time: _____

Location of Interview: _____

Source of Information (Identification Number): _____

Role in Community: _____

Section 1: Demographics and Personal History

1. Were you born in Porvenir? _____
2. If no, where were you born? _____



3. If you lived in multiple locations before coming to Porvenir, where were they and for how long were you there?

Location	Duration of Residence

4. In what year did you move to Porvenir? _____

5. Why did you move to Porvenir? _____

6. How many people live in your house? _____ Adults? _____ Children? _____

Section 2: Community Illness/Injury Information

1. In the last three months, have you experienced any of the following?

Symptom	Frequency	Equally affect men/women/children?
Fever		
Diarrhea		
Flu (with any of the following symptoms) ___ Headache ___ Runny nose ___ Sore throat ___ Fever		
Bronchitis		
Cough		
Constipation		
Stomach pain or discomfort		
Headaches		
Other		

If "Other", please describe

2. How many times in the past three months have your children experienced any of the following?

(Insert Same Chart as Above)

If "Other", please describe:

Illness/Injury #1:

Illness/Injury	Does this illness affect men and women equally?	What is the perceived cause of this illness/injury?	Is it treated? How? By whom? Where? Name medicines?	What time of year are the symptoms most prevalent?

Injury #2: (Insert Above Chart)

Illness/Injury #3: (Insert Above Chart)

Is there an overall difference between the health of women and the health of men? Explain.

Is HIV/AIDS considered a problem in the community? _____

If so, what is known about HIV/AIDS prevention? _____

Is tuberculosis (TB) considered a problem in the community? _____

Have there been any confirmed cases of Dengue fever among members of your family in the last year? How many?

Do the members of your household use mosquito nets at night? _____

Is malnutrition a problem? _____

Where is the nearest health facility? Is this an in-patient facility or outpatient only?

How do most people get to this facility? _____

Does the health facility send people to the community? If so, how often?

Where do you get your health information/education?

Is transportation a barrier to obtaining medical treatment?

Is cost a barrier to obtaining medical treatment?

Do you use any home treatments when your family is ill? If so, what?

Did your children receive immunizations? If so, what ones? From where?



About how many days per month are you unable to work because of illness?

About how many days per month are your children unable to go to school because of illness?

Section 3: Daily Living Information

	How many cantarros do you use for each of the activities?	From where do you retrieve this water?	At what times of the day do you get this water?
Drinking			
Cooking			
Washing Clothes			
Bathing			
Animals			
Irrigation			

Water Source	How far is the source from your home?	Who else in the community uses this water source?	What activities take place at or near the water source?	Has the taste, color or smell of the water ever changed? When?

Who in your family collects the water?

Is there enough water during all times of the year? _____

Explain

Do you use any methods to purify your drinking water? If yes, what?

Where do you store your water?

Do you clean those water containers? How? How often?

What else do you drink in addition to water?

Section 4: Sanitation

Where do you usually go to the bathroom?

If latrines, how many and where are they?

Do you ever go to the bathroom in a place other than this? If so, where?

Where do the children go to the bathroom?

Do people wash their hands regularly? If so, in what situation?

How do you dispose of your garbage?

Section 5: Economics

Do you earn money? How?

About how much money do you earn per month/season?

What is this money usually spent on?

Do you pay taxes? If so, what taxes and how much is paid?

Would your household be willing to contribute to a fund for clean water access?

Section 6: Education

How much education have you received? _____

Can you read or write? _____

Do you children go to school? _____ If no, why? _____

If yes, during what time of year? _____

How many days a week? _____

What skills do you teach your children at home? _____

Section 7: Miscellaneous

How do you view the community's relationship with EWB and what do you expect for the future?

For future projects, what should we do differently? The same?