INTRODUCING! - A NEW MINOR: WATER AND SANITATION FOR HEALTH AND SUSTAINABLE DEVELOPMENT

JIM F. CHAMBERLAIN, PHD
THE OU WATER CENTER
THE CHALLENGES

748 million people - lack access to safe water

2.5 billion people – lack access to basic sanitation

100s of millions of people – do not have clean soap and water for basic hygiene

1.5 million children – die each year from diarrheal diseases

80 – 90% of these are due to contaminated water and inadequate sanitation.

THESE DEATHS ARE PREVENTABLE!
THE CHALLENGES

Women and young girls – carry burden
- Time away from school
- Time away from work, earning a living
TANZANIA – 46% WATER POINTS NOT FUNCTIONING

PUMP FAILURE, INABILITY TO MAINTAIN
EL SALVADOR - LATRINES NOT USED / EMPTIED

FEAR OF HUMANURE; UNCLEAN CONDITIONS
UNRELIABLE ELECTRICITY; LACK OF OPERATOR COMMITMENT
PERU - CAMPAIGN FOR BOILING WATER

BOILED WATER ASSOCIATED WITH ILLNESS
ISSUES

In each case, technology was appropriate.

But -

• No local ownership and responsibility
  • more bottom-up approach needed

• Cultural norms not honored or recognized
  • incompatibility with social context

• Long-term sustainability not provided
The solution is found in the center
OUT OF “COMFORT ZONE”

- “hard” science
  - Constraints and conditions given
  - Precise equations
  - One correct answer

- “soft” skills
  - Constraints and conditions unknown
  - Ambiguity
  - Range of correct answers
Humanitarian Engineering (Freshmen)

Service trip with Sooners Without Borders

Curriculum for the Minor in “Water and Sanitation for Health and Sustainable Development”

- Water Technologies for Emerging Regions (inside)
- WaTER Technical Field Methods (outside)
- Intercultural Immersion Experience
- Other coursework: Anthro, business, sociology, political science
FLUORIDE REMOVAL FROM WATER

GRADUATE RESEARCH IN ETHIOPIA
SOLAR IRRIGATION PUMPING

SOONERS WITHOUT BORDERS – EL SALVADOR
MINOR CONCENTRATION

• “Water and Sanitation for Health and Sustainable Development”
• Beginning Fall 2014
  • Courses taken prior can be used!
• Open to ALL majors
• For students who want to pursue WASH:
  • Vocation – e.g., Peace Corps, aid worker, USAID, U.S. State Department, CARE, UNICEF, CRS, etc
  • Avocation
### CORE COURSES (9 credit hours):
- CEES 4243G WaTER Technologies for Emerging Regions (3)
- CEES 4273G WaTER Technical Field Methods (3)
- CEES 3422 Intercultural Immersion Experience in an Emerging Region (2)
- CEES 3251 WaTER Center Integrated Seminar (1)

### ELECTIVE TRACK 1:
**ENGINEERING AND TECHNOLOGY**
**NATURAL AND PHYSICAL SCIENCES:**
- * CEES 5020 Research Methods in Global Health

Other examples:
- CEES G5363 Ecological Engineering Science
- ENGR 4510 Public Health Engineering
- GEOG 4293 Hydrologic Science
- BSE 5113 Principles of Epidemiology (OUHSC)

### ELECTIVE TRACK 2:
**BUSINESS, ECONOMICS, AND POLICY:**
- * ENT 3193 Fundamentals of Social Entrepreneurship

Other examples:
- IAS 3063 Politics of Developing Countries
- IAS 3323 The Political Economy of Development

* = recommended courses by area of competency; other courses may be chosen

### ELECTIVE TRACK 3:
**SOCIAL / CULTURAL / BEHAVIORAL SCIENCES:**
- * ANTH 4303 Women and Development in Africa

Other examples:
- ANTH 3953 Water and Health in Emerging Regions
- IAS 2003 Understanding the Global Community
- GEOG 3443 Environment and Society
- ANTH 3423 Anthropology of Religion

CORE (9) + TRACK ELECTIVES (9) = 18 total credit hours
CEES 4243G  WATER TECHNOLOGIES FOR EMERGING REGIONS

TOPICS COVERED:

• Human Hygiene, Health and Water Quality: Pathogens and Water Quality
• Water Resource Identification / Characterization and Development
• Water Technologies for Human Health: Transport and Water Treatment
• Water Technologies for Human Health: Discharge and Waste Treatment
• Cultural, Economic and Social-Political Factors
• Arsenic / Fluoride Issues and Treatment
• Water, sanitation, development and peace
• Community Involvement / Case Studies
CEES 4273G Technical Field Methods
Unique in its emphasis and approach

- 3 credits / 6 hours per day
- 14 class days
- Norman campus
- First summer session (May 11-29)
PURPOSE OF THE COURSE

A hands-on practicum covering skills necessary for construction and implementation of water and sanitation projects in developing countries.

Course modules are chosen to reflect the typical projects and types of skills needed by development workers in organizations such as Peace Corps, USAID, Engineers Without Borders, and faith-based organizations.
WATER QUALITY SAMPLING AND ANALYSIS

- pH, turbidity, conductivity
- Microbial sampling
- Nitrates
- Free and total chlorine
- Flowrate from tap
TOPOGRAPHICAL SURVEYING

- GPS (handheld)
- Abney levels
- Distance mensuration
- Spreadsheet analysis
BASIC CONSTRUCTION

- Concrete block
- Mixing concrete
- Wood structures
- PVC piping
- Using tools
HOUSEHOLD POINT-OF-USE (POU) WATER TREATMENT

- Ceramic filters
- Disinfection methods
  - PUR
  - SafeWater (CDC)
- Filters:
  - LifeStraw
- Solar disinfection (SODIS)
## GROUNDWATER AND WELL DRILLING

- Hand-drilling
- Mechanical drilling
- Well completion
- Well logs
BIOSAND FILTER CONSTRUCTION

- How it works
- Form-building
- Mix your own concrete
- Filter your own sand
BASELINE COMMUNITY SURVEYS
LATRINE DESIGN
SITUATED COGNITION
<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>INSTITUTION</th>
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</thead>
<tbody>
<tr>
<td>Development Engineering (graduate certification)</td>
<td>UC-Berkeley</td>
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PEACE CORPS

• Stint of 2-years
• Opportunities:
  • Education
  • Agriculture
  • Youth
  • Health - e.g., malaria, HIV/AIDS
  • Community economic development
• Stipend; plus, after completion –
  • $7,425 (pre-tax bonus)
  • Fellowship program for graduate school
• Advantages in Federal employment
60 COUNTRIES

43% - Africa
21% - Latin America
15% - Eastern Europe /
Central Asia
a Christian ministry that designs facilities that serve the poor in developing countries.

- hospitals, orphanages, schools, clean water projects and more - directly impact communities by meeting physical needs and communicating God's love in a practical way.
- partner with Christian workers, pastors, and other non-profits who have a vision to help the poor and preach the Gospel of Jesus Christ.
- over 100 staff and interns labor to bring the Gospel to the poorest and least reached peoples on earth.
USAID is the lead U.S. Government agency that

- to end extreme global poverty and
- enable resilient, democratic societies to realize their potential.
UNICEF

Purpose – to work with others to overcome the obstacles that poverty, violence, disease and discrimination place in a child’s path. A leading advocate for children’s rights, active in more than 190 countries.
QUESTIONS?