### LEARNING OBJECTIVES

<table>
<thead>
<tr>
<th>No.</th>
<th>Course Learning Objective</th>
<th>Related Departmental Competency</th>
</tr>
</thead>
</table>
| 1   | To develop the knowledge basis and understanding of status quo (baseline) conditions in the water and sanitation sector in less developed countries; and how “problems” are defined | - “Identify environmental engineering problems…”  
- “Develop a depth of knowledge in one area within environmental sciences & engineering” |
| 2   | To understand current trends in water and sanitation conditions and where current programs, economic growth, population growth, and demographic changes are headed (dynamic baseline) | - “Identify environmental engineering problems…”  
- “Develop a depth of knowledge in one area within environmental sciences & engineering” |
| 3   | To understand and think critically about the different types of policy interventions (instruments) that can be used to improve water and sanitation conditions in developing countries | - “Develop and design appropriate controls and facilities to solve environmental engineering problems.”  
- “Specify approaches for assessing, preventing, and controlling environmental hazards that pose risks to human health and safety.” |
| 4   | To understand the policy objectives (criteria) that governments and donors use to assess the outcomes of policy interventions in the water and sanitation sector | “Identify environmental engineering needs and objectives…”  
“Demonstrate awareness of and sensitivity to the varied perspectives, norms, and values of others based on individual and ethnic/cultural differences” |
| 5   | To understand the causal links between policy interventions and outcomes; to critically assess the available evidence about how effective different policy instruments are in improving conditions in the water and sanitation sector | - “Explain the relationships between scientific knowledge, exposure, risk assessment, environmental management, and environmental policy.”  
- “Apply evidence-based concepts in public health decision-making” |
| 6   | To think critically about implementation issues and the lessons learned about implementation, monitoring and evaluation | - “Show familiarity with public health practice” |
| 7   | To develop critical writing and communication skills in order to better explain policy recommendations in the water and sanitation sector to decision-makers | - “Demonstrate written and oral communication skills related to environmental engineering”  
- “Analyze, interpret, and explain the results of original research” |
| 8   | To learn how to read and synthesize                                                 | - “Review and synthesize a body of research” |
ASSIGNMENTS

There will be three required assignments in this course. Students can then choose between undertaking a fourth (optional) assignment or taking a final exam. The fourth optional assignment provides students an opportunity to explore in depth the literature on a WASH topic in which they are especially interested. Students opting for the fourth assignment will conduct a “lite” systematic literature review. A good literature review should critically appraise what is already known about a subject and identify gaps in knowledge (what is not yet known) from existing studies. Systematic literature reviews structure the search process and data extraction from existing studies systematically and transparently with explicit and reproducible methods. Students will not have time in this course to conduct a full-scale systematic literature review, but if they choose this fourth assignment in lieu of a final exam, they will learn more about what a systematic literature review entails. More details about the systematic literature review “lite” are provided below.

GRADING POLICY:

Grades for the course will be based on the following weights:

- Assignment No. 1 - (due Feb. 2) - 15%
- Assignment No. 2 - (due March 2) - 15%
- Assignment No. 3 (due April 20) - 15%
- Final Exam or Assignment No. 4 (May 8) - 40%
- Class participation and presentations - 15%

TOTAL = 100%
Participation in Class Debates, Student-led Discussions and In-Class Discussion (required):

- **Discussion of Taped Lectures:** Students should watch the recorded lectures before class and come to class prepared to discuss these materials. I encourage you to ask questions in class and to submit questions to me by email before a lecture. For some sessions, students will be given a discussion question a week before the session. Students should submit a 1-2 page answer to this question at the session and be prepared to discuss their answer.
- **Debates:** Students will participate in 1 of the 2 debates, on either the pro or con side, based on random assignment. Prompts and details for the debates will be distributed on Sakai.
- **Student-led Discussions:** Students (alone or in pairs depending on class enrollment) will present a summary and lead a student discussion for an assigned reading. The length of the presentation will vary between 20-30 minutes, according to the syllabus. Students who are not presenting are expected to participate in the discussion.
- **Teaching Cases:** There are four teaching cases during the semester. Students are expected to read the teaching case before class and come prepared for discussion (and/or presentation, if described in the teaching case assignment).

Final Exam (40%):

- **Date:** May 8, 4:00-7:00 pm
- **Description:** The final written exam will consist of multiple short answer questions and one essay question based on the lecture material and required readings. You will be given a selection of questions from which to choose.
- **Bring:** You are required to bring your own blue book(s) (1 to 2) on which to write the exam. These may be purchased at the student store.

Overall Grade:

Pass/Fail grades (graduate students):

- A grade of H indicates superior performance, over and above the mastery of basic concepts.
- A grade of P indicates satisfactory performance.
- A grade of L indicates a low pass and that the student has a poor understanding of numerous concepts covered in the course.
- A grade of F indicates a failure to understand the basic concepts covered in the course.

Other grades (undergraduate students and non-UNC graduate students):

- Grades will be converted to an A/B/C etc. scale for undergraduates and graduate students from non-UNC institutions that do not use a pass/fail grading system.

**All students are bound by the UNC honor code:** “It shall be the responsibility of every student at the University of North Carolina at Chapel Hill to obey and to support the enforcement of the honor code, which prohibits lying, cheating, or stealing when these actions involve academic processes or University, student or academic personnel acting in an official capacity.”
SCHEDULE AND READINGS

Part 1 - Understanding Status Quo Conditions

Session 1 (Jan. 12) – Introduction, Conceptual framework, Ancient instincts, Systematic literature review “Lite” assignment

In-class activities
- Introduction, Course Organization
- Student WASH experiences
- Discussion of Course Requirements, Systematic Literature Review “Lite”
- DW Lecture: Ancient Instincts
- Distribution of Assignment No. 1 (due Feb. 2)

Readings


Session 2 (Jan. 19) - Infrastructure Coverage, Dynamic Baseline, Water & Climate Change

In-class activities
- Class Discussion – Question for Session 2
- Student-led discussion of Cook et al (2017)
- Discussion of WASH SGDs: New Targets

MOOC Videos

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.0 Facts About Water</td>
<td><a href="https://youtu.be/7JpwuBSv4vY">https://youtu.be/7JpwuBSv4vY</a></td>
<td></td>
</tr>
<tr>
<td>1.1 Global Water and Sanitation Coverage</td>
<td><a href="https://youtu.be/Ml3uSQz3YTE">https://youtu.be/Ml3uSQz3YTE</a></td>
<td></td>
</tr>
<tr>
<td>1.2 Infrastructure Coverage (Electricity, Sewerage, Water, Telephone)</td>
<td><a href="https://youtu.be/vvB34Fzco58">https://youtu.be/vvB34Fzco58</a></td>
<td></td>
</tr>
<tr>
<td>1.4 Conversation with Clarissa Brocklehurst</td>
<td><a href="https://youtu.be/uLlYVhZb0OU">https://youtu.be/uLlYVhZb0OU</a></td>
<td></td>
</tr>
<tr>
<td>5.5 Effects of Climate Change on Water Utilities</td>
<td><a href="https://youtu.be/ntTwhkFU8Tg">https://youtu.be/ntTwhkFU8Tg</a></td>
<td></td>
</tr>
<tr>
<td>5.6 Conversation with Clive Agnew</td>
<td><a href="https://youtu.be/ibmTcHPhfcs">https://youtu.be/ibmTcHPhfcs</a></td>
<td></td>
</tr>
</tbody>
</table>
Additional Videos

<table>
<thead>
<tr>
<th>Hans Rosling: 2006 TED Conference in Monterey</th>
<th><a href="https://www.youtube.com/watch?v=hVimVzqtD6w">https://www.youtube.com/watch?v=hVimVzqtD6w</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hans Rosling: A Slum Insight</td>
<td><a href="https://www.youtube.com/watch?v=21v4HBNqfJw">https://www.youtube.com/watch?v=21v4HBNqfJw</a></td>
</tr>
</tbody>
</table>

Readings


Background Readings


Session 3 (Jan. 26) – Water Vending, Corruption

In-class activities
- Video - Water and Sanitation for the Poor: Independent Providers (18 min.)
- DW Lecture: Water Vending in Kathmandu
- Teaching Case No. 1: “USAID Mission to Haiti.”

MOOC Videos

<table>
<thead>
<tr>
<th>2.1 Outrage Versus Strategy?</th>
<th><a href="https://youtu.be/8D0aQrpUPZw">https://youtu.be/8D0aQrpUPZw</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 Types of Vendors and Vendor Prices</td>
<td><a href="https://youtu.be/XO1KPzADiYQ">https://youtu.be/XO1KPzADiYQ</a></td>
</tr>
<tr>
<td>2.3 Money and Water Flows, Onitsha, Nigeria</td>
<td><a href="https://youtu.be/QK_q4vu_738">https://youtu.be/QK_q4vu_738</a></td>
</tr>
</tbody>
</table>
2.4 An Introduction to Corruption

https://youtu.be/IPhl-cKm4ko

2.5 Corruption in South Asia

https://youtu.be/VIDWUF88Ep4

Additional Videos

PBS Frontline – “Battle for Haiti” - for students to watch before the class in preparation of case discussion

http://video.pbs.org/video/1737171448

Readings


Background Readings


Session 4 (Feb. 2) - Understanding the Supply-side - Costs & Technologies

In-class activities

- Class Discussion of question for Session 4
- Class Discussion of Assignment No. 1 – Monitoring Affordability
- Student-led discussion of Ebinger, 2006.
- Distribution of Assignment No. 2 (due March 2)
M0OC Videos

<table>
<thead>
<tr>
<th>Video Title</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 The Cost of Serving Households with Piped Networks</td>
<td><a href="https://youtu.be/SPWWcApx27Y">https://youtu.be/SPWWcApx27Y</a></td>
</tr>
<tr>
<td>3.1 Solution to Cost Calculation</td>
<td><a href="https://youtu.be/ThYhGYwQFQM">https://youtu.be/ThYhGYwQFQM</a></td>
</tr>
<tr>
<td>3.2 Cost Components and More on Costs</td>
<td><a href="https://youtu.be/ZXWITS36xYM">https://youtu.be/ZXWITS36xYM</a></td>
</tr>
<tr>
<td>3.3 Costs of Non-Piped Technologies</td>
<td><a href="https://youtu.be/apQWMRM7Qr4">https://youtu.be/apQWMRM7Qr4</a></td>
</tr>
<tr>
<td>3.4 Condominial sewers and desalination</td>
<td><a href="https://youtu.be/3E0w1IEtdi0">https://youtu.be/3E0w1IEtdi0</a></td>
</tr>
<tr>
<td>3.5 Conversation with Don Lauria - Part One</td>
<td><a href="https://youtu.be/-3Aojeihcj8">https://youtu.be/-3Aojeihcj8</a></td>
</tr>
<tr>
<td>3.6 Conversation with Don Lauria – Part Two</td>
<td><a href="https://youtu.be/mYTJZWT1cEo">https://youtu.be/mYTJZWT1cEo</a></td>
</tr>
</tbody>
</table>

Other Videos to watch before class

Readings


Background Readings


Session 5 (Feb. 9) – Understanding Demand for Improved Water and Sanitation Services

In-class activities
- Class debate No. 1 – Water-related Health risks
- Student presentations on literature review topics

MOOC Videos

<table>
<thead>
<tr>
<th>4.1: Introduction to Modeling Household Water Demand</th>
<th><a href="https://youtu.be/cs43N0X0WQI">https://youtu.be/cs43N0X0WQI</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3: Households with Water Sources Outside the Home</td>
<td><a href="https://youtu.be/AftnzwmBpSA">https://youtu.be/AftnzwmBpSA</a></td>
</tr>
<tr>
<td>4.4: Household Demand for Drinking Water Quality Improvements</td>
<td><a href="https://youtu.be/ggnUdbHM7Zo">https://youtu.be/ggnUdbHM7Zo</a></td>
</tr>
<tr>
<td>4.5: Effect of Social Norms on Household Water Use</td>
<td><a href="https://youtu.be/o9x5AdXpWeg">https://youtu.be/o9x5AdXpWeg</a></td>
</tr>
<tr>
<td>4.6: Conversation with Marc Jeuland</td>
<td><a href="https://youtu.be/pl4VteXilrg">https://youtu.be/pl4VteXilrg</a></td>
</tr>
<tr>
<td>5.1: Facts About Water and Health</td>
<td><a href="https://youtu.be/-nLJe-2Ny8">https://youtu.be/-nLJe-2Ny8</a></td>
</tr>
<tr>
<td>5.3: Exercise on Health vs. Non-Health Benefits for Households with Water Sources Outside the Home</td>
<td><a href="https://youtu.be/Sn76q60UxSU">https://youtu.be/Sn76q60UxSU</a></td>
</tr>
<tr>
<td>5.4: Climate Change on Water and Health</td>
<td><a href="https://youtu.be/jiq0DEY0is">https://youtu.be/jiq0DEY0is</a></td>
</tr>
</tbody>
</table>

Water

Readings


Background Readings


Sanitation

Readings


Class debate No. 1 – Proposition: “Most households in developing countries basically understand the health risks from poor water and sanitation. But household demand for drinking water quality improvements is often low because the morbidity and mortality risks of poor water and sanitation are a relatively small part of ‘portfolio’ of risks confronting poor households in low-income countries.”

Reading: *Portfolios of the Poor: How the World’s Poor Live on $2 a day,* by Daryl Collins, Jonathan Morduch, Stuart Rutherford, and Orlanda Ruthven. (2009). 281 pages

Session 6 (Feb. 16) - Water Development Paths

In-class activities
- Class Discussion of question for Session 6
- Class Discussion Presentation by Kyle Oda on water development paths in Asian cities
- Student-led discussion of Geels (2006)
- Student presentations on literature review topics

MOOC Videos
6.0: Possible Solutions to the Water Development Paths Exercise [https://youtu.be/lgj8M23o1WQ](https://youtu.be/lgj8M23o1WQ)
6.4: Changing Course [https://youtu.be/C2d2zLAdH3g](https://youtu.be/C2d2zLAdH3g)
6.5: Capital intensity - England and Wales [https://youtu.be/HmRxhHrfPoE](https://youtu.be/HmRxhHrfPoE)
6.6: Conversation with Marie Hart [https://youtu.be/tfL4zQPXXU](https://youtu.be/tfL4zQPXXU)
6.7: Wrap-up and Reflections [https://youtu.be/4x8Cgg9c08Y](https://youtu.be/4x8Cgg9c08Y)
Readings


Background Readings


Part 2 – Policy Interventions

Session 7 (Feb. 23) – Planning protocols

In-class activities
- Video - Orangi: City of Hope
- Kumasi Strategic Sanitation Planning
- Class Discussion of Question for Session 7
- Student-led discussion of Therkildsen (1988).

MOOC Videos

<table>
<thead>
<tr>
<th>Activity</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0: Does better planning result in better outcomes? An example from Bolivia</td>
<td><a href="https://youtu.be/B5iWE6S1piw">https://youtu.be/B5iWE6S1piw</a></td>
</tr>
<tr>
<td>2.1: Four types of planning protocols commonly used around the world</td>
<td><a href="https://youtu.be/KugD7lQR5Io">https://youtu.be/KugD7lQR5Io</a></td>
</tr>
</tbody>
</table>
2.2: Demand-driven planning: Designing for community preferences and affordability

https://youtu.be/X1QVLox7E1s

2.3: Do demand-driven planning protocols work? Evidence from Bolivia, Ghana and Peru

https://youtu.be/4JRnTNNQ-2s

2.4: When do participatory, demand-driven approaches work best? Evidence from a World Bank study

https://youtu.be/oh29Tab3rgA

2.5: Conversation between Arif Hasan and Diana Mitlin on participation

https://youtu.be/WBubv3VvUm0

Participation

Readings


Background Readings


Designing Demand-Driven Rural Water Programs

Readings


Background Readings

*Designing Demand-Driven Urban Sanitation Programs*

**Readings**


**Session 8 (March 2) – Water Pricing and Tariff Design**

**In-class activities**

- Class Discussion of Question for Session 8
- Discussion of Assignment No. 2 - Performance Indicators [Video link to Manchester]
- Student-led discussion of J-PAL (2011)
- Teaching Case #2 – Reform of Fayoum’s Water Tariff Structure

**MOOC Videos**

<table>
<thead>
<tr>
<th>3.0: Introducing municipal water pricing and tariff design</th>
<th><a href="https://youtu.be/hAYDKYkw9QU">https://youtu.be/hAYDKYkw9QU</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1: What are the objectives of tariff design?</td>
<td><a href="https://youtu.be/cmMo4CsE-nc">https://youtu.be/cmMo4CsE-nc</a></td>
</tr>
<tr>
<td>3.2: Possible types of tariff structures</td>
<td><a href="https://youtu.be/y1E3b4b-mBI">https://youtu.be/y1E3b4b-mBI</a></td>
</tr>
<tr>
<td>3.3: Current tariff structures in low and middle-income countries</td>
<td><a href="https://youtu.be/rbcNVasBz-k">https://youtu.be/rbcNVasBz-k</a></td>
</tr>
<tr>
<td>3.4: Problems with increasing block tariffs (IBTs)</td>
<td><a href="https://youtu.be/8xaEWnDxhv0">https://youtu.be/8xaEWnDxhv0</a></td>
</tr>
</tbody>
</table>

**Readings**


**Background Readings**


**Session 9 (March 9) –**

**Guest Lecture – W. Michael Hanemann, “Priority Setting: The Economic Analysis of Water and Sanitation Projects”** [Video link to Manchester, Prof. Hanemann will be broadcasting from Manchester]

*No MOOC Videos*

**Videos to watch before class**
- Kabuku Water Project Kenya: Sustainability- Productive Uses of Water  
  [https://www.youtube.com/watch?v=q7Hoz4c9_Q0](https://www.youtube.com/watch?v=q7Hoz4c9_Q0)

**Readings**


**Background readings**


March 16 – Spring break

Session 10 (March 23) – Information Treatments

In-class activities

- Guest lecture – Prof. Barbara Evans, University of Leeds [Video link to Manchester, Prof. Evans will be broadcasting from Manchester]
- Presentation by Mark Radin – “A Benefit-Cost Analysis of CLTS”
- Distribution of Assignment No. 3 (due April 20).

MOOC Videos

<table>
<thead>
<tr>
<th>Video Number</th>
<th>Title</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>Introduction to information treatments as a policy intervention</td>
<td><a href="https://youtu.be/HonMKqVeNDc">https://youtu.be/HonMKqVeNDc</a></td>
</tr>
<tr>
<td>4.1</td>
<td>Information treatment Case 1: In-house water quality testing</td>
<td><a href="https://youtu.be/S1jy0LivYc4">https://youtu.be/S1jy0LivYc4</a></td>
</tr>
<tr>
<td>4.2</td>
<td>Information treatment Case 2: Information provision via water bills and evidence from OWASA, Chapel Hill, USA</td>
<td><a href="https://youtu.be/O64sQCEm7xk">https://youtu.be/O64sQCEm7xk</a></td>
</tr>
<tr>
<td>4.3</td>
<td>Information treatment Case 3: Community-Led Total Sanitation (CLTS)</td>
<td><a href="https://youtu.be/VTnGdQnyy1l">https://youtu.be/VTnGdQnyy1l</a></td>
</tr>
<tr>
<td>4.5</td>
<td>Information treatment Case 4: Information provision via water bills in Jerico, Colombia</td>
<td><a href="https://youtu.be/6sjGtp_eWE">https://youtu.be/6sjGtp_eWE</a></td>
</tr>
<tr>
<td>4.6</td>
<td>Information treatment Case 4: UN Declaration on the Human Right to Water</td>
<td><a href="https://youtu.be/5XPlwcedki4">https://youtu.be/5XPlwcedki4</a></td>
</tr>
<tr>
<td>4.7</td>
<td>Conversation with Barbara Evans on CLTS</td>
<td><a href="https://youtu.be/ajMFUT2h35M">https://youtu.be/ajMFUT2h35M</a></td>
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<tr>
<td>4.8</td>
<td>Conversation with Kamal Kar on CLTS (in 7</td>
<td><a href="https://youtu.be/IhGPOzflC8A">https://youtu.be/IhGPOzflC8A</a></td>
</tr>
</tbody>
</table>
Other Videos to Watch Before Class
- UNICEF – Dividing the Mango; Meena’s Three Wishes; I’m Meena
  https://www.youtube.com/watch?v=WA1AH1DbQM4
  https://www.youtube.com/watch?v=iulgE0jEJNe

Readings


Community-Led Total Sanitation

Readings


Background Readings


March 30 – University Holiday
Session 11 (April 6) – Designing Subsidy Schemes to Reach the Poor

In-class activities
- DW Lecture on Customer Assistance Programs
- Student-Led Discussion - Leigland et al. 2016
- Class Debate No. 2 – Human Right to Water

MOOC Videos

| 3.5: Designing and targeting subsidies in the water and sanitation sector in LDCs | https://youtu.be/GRc35p1iB68 |
| 3.6: Distribution of subsidies in Chile and Colombia | https://youtu.be/j6npl_KNrik |
| 3.7: Evidence on subsidy schemes in Chile and Colombia | https://youtu.be/f6yax4IvJ6s |
| 3.8: Designing improved water subsidy schemes | https://youtu.be/GJFAX685AeE |

Readings


Background Readings


Class debate No. 2 – Proposition: “The United Nations Declaration establishing a human right to water and sanitation is a big step forward and will result in many more poor households receiving improved WASH services in the future.”

Readings for Debate:


Session 12 (April 13) – Changing Institutions: Privatization, UK Case

In-class activities
- Discussion of UK Privatization [Video link to Manchester, Dr. Duncan Thomas will be broadcasting from Manchester]
- Student-led discussion of Dumol (2000)
- Teaching Case #3 – The Privatization of Water in Cartagena, Colombia

MOOC Videos: Privatization

<table>
<thead>
<tr>
<th>5.0: Introduction to public private partnerships (PPP)</th>
<th><a href="https://youtu.be/rCenSSemF5U">https://youtu.be/rCenSSemF5U</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1: The seven main types of PPP deal structures</td>
<td><a href="https://youtu.be/_nKx1ZyNh1A">https://youtu.be/_nKx1ZyNh1A</a></td>
</tr>
<tr>
<td>5.2: Some challenges of PPPs from the private operator's perspective</td>
<td><a href="https://youtu.be/ffxHSJGTZlo">https://youtu.be/ffxHSJGTZlo</a></td>
</tr>
<tr>
<td>5.4: Comparative experiences with PPPs in the water and sanitation sector: China versus India</td>
<td><a href="https://youtu.be/KfRxTYMrC4">https://youtu.be/KfRxTYMrC4</a></td>
</tr>
<tr>
<td>5.5: Conversation with Wu Xun on privatization in China and India</td>
<td><a href="https://youtu.be/77VzJnPvbWg">https://youtu.be/77VzJnPvbWg</a></td>
</tr>
<tr>
<td>5.6: Conversation with Leong Ching on the devil's shift in water privatization in Jakarta, Indonesia</td>
<td><a href="https://youtu.be/lfq5aWreCQY">https://youtu.be/lfq5aWreCQY</a></td>
</tr>
</tbody>
</table>

MOOC Videos: UK Privatization

<table>
<thead>
<tr>
<th>6.0: The significance of institutional change in the UK water sector: Privatization and regulation</th>
<th><a href="https://youtu.be/n7yeXsMan-l">https://youtu.be/n7yeXsMan-l</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1: The historical setting and promises of the UK privatization programme</td>
<td><a href="https://youtu.be/JzMhBZSusGA">https://youtu.be/JzMhBZSusGA</a></td>
</tr>
<tr>
<td>6.3: Determining a sale price for the England and Wales water industry</td>
<td><a href="https://youtu.be/vz9O3H7uHuw">https://youtu.be/vz9O3H7uHuw</a></td>
</tr>
<tr>
<td>6.4: Some outcomes of UK water privatization, part 1: Good news</td>
<td><a href="https://youtu.be/qhs4SFJ8mwQ">https://youtu.be/qhs4SFJ8mwQ</a></td>
</tr>
<tr>
<td>6.5: Some outcomes of UK water privatization, part 2: Bad news</td>
<td><a href="https://youtu.be/7GeH4bxCuyY">https://youtu.be/7GeH4bxCuyY</a></td>
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</tbody>
</table>

Other Videos to watch before class
- The World Bank – Public Water, Private Partners (27 min)
Readings


Background readings


Session 13 (April 20) – Regulation of Water Utilities, UK Case

In-class activities
- Discussion of UK Regulation [Video link to Manchester, Dr. Duncan Thomas will be broadcasting from Manchester]
- Class Discussion of Assignment No. 3
- Student Presentations on Systematic Literature Review “Lite”

MOOC Videos

| 7.0: Regulation of the water utilities in LDCs | https://youtu.be/TuxXIxbIsw |
| 7.1: UK water regulation 1: The original vision | https://youtu.be/jUfOW1kBgHA |
| 7.4: Conservation with Stephen Littlechild on inventing the UK regulatory model | https://youtu.be/cKv68aRxIM4 |
| 7.5: Conservation with Regina Finn on reforming UK water regulation | https://youtu.be/ZBn4ayZit4A |
| 7.6: The case of Phnom Penh, Cambodia | https://youtu.be/GbqpdRVMrlg |
| 7.7: Part 2 MOOC Overall Wrap-up | https://youtu.be/prykPLC4V-g |
Readings


Gassner, Katharina and Nataliya Pushak. 2014. '30 years of British utility regulation: Developing country experience and outlook.' *Utilities Policy*, 31, 44–51.

Background Readings


Session 14 (April 27) – Wrapping up – Lessons from Phnom Penh

- Teaching Case #4 - “Ek Son Chan and the Transformation of the Phnom Penh Water Supply Utility.”
- Student Presentations on Systematic Literature Review “Lite”

Exam: Tuesday, May 8, 4:00-7:00pm
I want students in this course to have the opportunity to learn to conduct a systematic literature review and to explore in depth the literature on a WASH-related topic in which they are especially interested. A good literature review should critically appraise what is already known about a subject and identify gaps in knowledge (what is not yet known) from existing studies. Systematic literature reviews structure the search process and data extraction from existing studies systematically and transparently with explicit and reproducible methods.

Students who choose this option in lieu of a final exam will work in pairs on this assignment because it is important to have a way to control for individual biases in the assessment of a specific literature. You are encouraged to discuss different possible topics for your literature review with other students in class and find a “partner” with similar interests to you. If you are unable to find a suitable partner, you can do your literature review by yourself. However, I prefer that students work in pairs.

Review Topics

Students (in pairs) will select a topic that may be a policy/program intervention(s), technologies, or a specific scientific question/issue related to water and/or sanitation as the focus of their literature review. I suggest reviewing the syllabus to determine general topics of interest and then narrowing further based on discussions and/or preliminary searching.

On Friday, Feb. 3, students will make presentation to class on the proposed topic of their literature review and preliminary findings from a potential database they have begun to search.

It is recommended that students do some preliminary searching of existing literature and reviews to ensure that there are sufficient primary studies on their proposed topic; that the topic is narrow enough; and there have not been any recent systematic reviews on the same topic. As a benchmark, a search that yields less than 100 articles is likely too narrow in scope while more than 10,000 may be too large. Most will fall in the range of 1000-5000 articles.

Dates

Feb. 9 & 16  Students choosing this option will make a presentation to the class on the topic of their literature review and the results of a preliminary search of a database they have searched.

April 20 & 27  Student presentations on the results of their systematic literature review “lite”

Exam date  The written assignment is due.

Assignment No. 4 – Outputs

Journal-style systematic review
The final systematic review with narrative synthesis should follow standard journal formatting: introduction, methods, results, discussion, conclusion, bibliography. We recommend generally formatting the paper as a systematic review for PLoS ONE (http://www.plosone.org/static/guidelines#systematic), but I do not expect a discussion on bias nor a meta-analysis.

Systematic review components included within your systematic review should at least clearly convey the following (you may reference the PRISMA statement and checklist at http://www.prisma-statement.org/statement.htm for a complete list of systematic review components, but you are not expected to follow all of them):

- Research question;
- Methods:
  - Description of screening and search strategy, search terms used; and
  - Search results throughout the screening and search process (full search terms may be included in Supplementary Materials if space is limited).
  - Inclusion and exclusion criteria.
  - Database: 1 database selected for search. Suggested databases will be given during the presentation. While multiple databases are typically searched in a systematic literature review, due to time constraints we will limit the search to a single database. Students considering submitting their manuscript to a journal after the semester, however, may want to consider adding additional database(s) to their review.
- Basic descriptive statistics, a narrative synthesis (not meta-analysis) and discussion of the results.

- Appendices:
  - Submit via email the excel database that was used for screening and data extraction.

Students should design their search strategy with their partner. After final search terms are established, students should screen the results separately based on the inclusion and exclusion criteria, then compare and systematically resolve differences.

Once the search and screening has been done systematically, I’d like you to limit the final number of papers for data extraction and review to a quantity reasonable for you to review in the course of the semester (e.g. +/- 10). The exact number will depend on your topic and results. For example, if the results of your final screening include more than 10-15 articles, decide how to limited the articles you reviewed (i.e. the most recent publications through more narrow inclusion criteria; random sample; purposive sample, etc.) as best fits your paper. Describe this within the methods section of your paper. If, however, your original search and screening strategy yields less than 10 papers (i.e. 5+) because of the nature of the state of that literature, it is not necessary to arbitrarily expand the search to increase the final number the articles. We are not prescribing a minimum number.
Readings on Conducting a Systematic Literature Review


Examples of Systematic Literature Reviews

(Before class, select and fully read one article that you find most interesting. Skim the remaining articles to be familiar with the general format of systematic reviews and similarities/differences between them.)

**Water/sanitation interventions and diarrheal diseases**


**Water/sanitation interventions and HIV/AIDS**


**Water quality**


**Marketing water and sanitation technologies**


**WASH in schools and education**


**Improved cookstoves and adoption**


**Costs and benefits**


**Other Recommended Resources and Readings**

Cochrane Collaboration Handbook: [www.cochrane.org/resources/handbook](http://www.cochrane.org/resources/handbook)

3ie's (International Initiative for Impact Evaluation) systematic review database on the effectiveness of social and economic interventions in low- and middle- income countries: [http://www.3ieimpact.org/evidence/systematic-reviews/](http://www.3ieimpact.org/evidence/systematic-reviews/)


Additional resources for systematic reviews and meta-analyses recommended by Dr. Charlie Poole in EPID 731


Note on WASH Interventions and Health:

Understanding the link between water and sanitation interventions and health improvements is essential for the economic evaluation of water and sanitation projects. However, this subject is not discussed in detail in this course because it is covered elsewhere in the ENVR curriculum. Students are encouraged to do the following background readings if they are not familiar with the causal relationships between improved water and sanitation infrastructure and health outcomes:

**Linking improved water and sanitation conditions to health outcomes – Selected Readings**


