

Stanford Department of Civil & Environmental Engineering
CEE 265D: Water and sanitation infrastructure planning in developing countries
Spring 2009

Tuesdays and Thursdays, 1:15 – 3:05 pm ◇ Bldg. Thornton, room 110

Prof. Jenna Davis ◇ Office: Y2E2, #255

Office hours: Thursdays, 10:30-12:30 (sign-up sheet on the door)

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25 April 2009 syllabus version *

Course description:

In this course, we examine the planning process and policy context for the provision of water supply and sanitation (W&S) services in developing countries. After a review of the state of W&S service delivery in different parts of the world and an introduction to the range of technologies employed in the sector, we cover issues of alternative institutional structures, including privatization, service pricing, and the role of consumer demand and community participation in the planning process. We also examine environmental and public health considerations in water supply and sanitation planning, as well as strategies for serving low-income households. The course makes extensive use of case studies from Asia, Africa, Latin America, and Eastern Europe. Please see the class website, which can be accessed through Coursework (<https://coursework.stanford.edu>), for more information. Note that admission to the class is on an application basis. Application forms can be downloaded from Prof. Davis' website: <http://www.stanford.edu/group/jennadavis/teaching.html>.

Course policies:

- Students who need any special accommodations are encouraged to make an appointment to discuss their needs with Prof. Davis as early in the quarter as possible.
- Academic honesty: Students are expected to comply with the Stanford Honor Code and Fundamental Standard. Information on these policies is available at <http://www.stanford.edu/dept/vpsa/judicialaffairs/guiding/fundamental.htm>
- Communication in course: Verbal and written communication, including e-mail, among all class participants and staff must reflect respect for every individual. Whereas constructive criticism is expected and encouraged, it should be targeted toward ideas and arguments, not individuals.

Readings: All required readings for this course are available on the class website.

* PLEASE NOTE: We will make adjustments to the syllabus as needed throughout the quarter. Whenever an updated version of the syllabus is posted to the class website, we will send out an email message to the class. Please be sure to download and use the latest version of the syllabus so you will be on track with readings and assignments!

Class website:

Our class website can be found at the address https://coursework.stanford.edu/portal/site/Sp09-CEE-165D-01_Sp09-CEE-265D-01 (login required). Please become accustomed to consulting it regularly, as all class announcements and assignments, as well as other information related to water and sanitation policy and planning, will be available there. Please direct any questions or problems about the class website to the course TA, Valentina Zuin (valezuin@stanford.edu), with a copy to Prof. Davis (jennadavis@stanford.edu).

Class e-mail list:

Our class also has an email list. We will be sending out a test message to the list at the end of the first week of class. If you do not receive this message please check with the course staff to make sure you are on the list.

W&S News:

Prof. Davis maintains a listserv called ‘W&S News’ that disseminates news, job and volunteer opportunities, event and publications announcements, scholarship and fellowship opportunities, and other W&S-related information. Usually 2 or 3 digests are sent out per month. If you’d like to subscribe and/or to view a few archived digests, visit https://mailman.stanford.edu/mailman/listinfo/watsan_news.

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Assignments due (post to class website unless otherwise noted)</i>	<i>Required readings</i>
1	Mar. 31 Tues.	Introduction to the class; State of the world's water and sanitation infrastructure; problem identification	None	<p><i>What will it take? Water, sanitation, and the Millennium Development Goals.</i> Abridged Final Report of the United Nations Millennium Project's Task Force on Water and Sanitation. Section 2, "Meeting the Millennium Development target for Water and Sanitation" (p. 21-36). <i>NOTES:</i> For additional background on the Millennium Development process, visit http://www.developmentgoals.org/. If you are unfamiliar with international aid agencies like the World Bank, you will also find the following websites useful: http://www.worldbank.org (click on 'About' at the top left corner); http://www.50years.org/institutions/ (start with the Q&A link)</p> <p>Another good resource for background readings in the W&S sector is the 2006 UN Human Development Report. See http://hdr.undp.org/en/reports/global/hdr2006/chapters/ for a listing of chapters in the report, as well as a link to a much larger set of background papers.</p>
	Apr. 2 Thurs.	An introduction to water supply and sanitation technologies	Student information sheet: Send via email to valezuin@stanford.edu	<p><u>Required:</u> Matrix of W&S development paths: Handout Melosi, M. 2000. <i>The Sanitary City</i>. Baltimore, MD: Johns Hopkins University Press. "Introduction" (with particular emphasis on "Decision-Making, Permanence, & Path Dependence"), pages 1-14. Nelson, K. and A. Murray. 2008. Sanitation for Unserved Populations: Technologies, Implementation Challenges, and Opportunities. <i>Annual Review of Environment and Resources</i> 33: 119-151.</p> <p><u>Optional, recommended:</u> WELL factsheets (most ~4 pages) are concise introductions/overviews regarding a variety of technical issues related to W&S services. We encourage you to pick a few whose titles particularly interest you and have a look. Rainer, G. 1990. <i>Understanding Infrastructure: A Guide for Architects & Planners</i>. Wiley-Interscience. Chapters 1 and 2, "Water Supply" and "Sewers and Storm Drainage" (pages 1-29). Sinnatamby, G. 1990. Low cost sanitation. In Cairncross, S., J. Hardoy and D. Satterthwaite (eds.), <i>The Poor Die Young</i>, London: Earthscan. EAP Task Force. Undated. <i>Rural water supply and sanitation: Technology overview and cost functions</i>. Read lightly: Sections 3 and 4, summaries of water supply and sanitation technology choices.</p>
2	April 6 Mon.	<i>Assignment due date:</i> Readings journal entry #1	Post to class website by 12:00 noon. (See website for discussion questions.)	

	Apr. 7 Tues.	How to define and measure access to improved water supply and sanitation	None	<p>Joint Monitoring Program. 2006. Meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade. Geneva: WHO/UNICEF. Pages 9-30.</p> <p>Gadgil, A. 1998. Drinking water in developing countries. <i>Annu. Rev. Energy Environ.</i> 23:253–86.</p>
	Apr. 9 Thurs.	Impacts of W&S investment: Human health	None	<p>Guest lecture by Dr. Karen Levy</p> <p>Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, Colford JM Jr. Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis. <i>Lancet Infect Dis.</i> 2005 Jan. 5 (1): 42-52.</p> <p>Zwane, Alix, and Michael Kremer. (2007). “What works in Fighting Diarrheal Diseases in Developing Countries: A Critical Review.” <i>The World Bank Research Observer</i> 22 (1): 1-24. <u>Optional, recommended</u></p> <p>Levy K., Nelson K, Hubbard L., Eisenberg J. (2008). “Following the Water: A Controlled Study of Drinking Water Storage in Northern Coastal Ecuador.” <i>Environmental Health Perspectives</i> 116(11).</p> <p>Cutler, D., and G. Miller. 2005. The role of public health improvements in health advances: The twentieth century United States. <i>Demography</i> 42 (1).</p> <p>Gundry S, Wright J, Conroy R. 2004. A systematic review of the health outcomes related to household water quality in developing countries. <i>J Water Health</i> 2 (1): 1-13.</p> <p>Kosek, M., Bern, C. and Guerrant, R. L. (2003). “The global burden of diarrheal disease, as estimated from studies published between 1992 and 2000.” <i>Bulletin of the World Health Organization</i>, 81 (3), 197-204.</p>
3	Mon. April 13	Assignment due date: Readings journal entry #2	Post to class website by 12 noon. (See website for discussion questions.)	
	Apr. 14 Tues.	Impacts of W&S investment: Non-health benefits.	None.	<p>Ray, I. 2007. Women, water and development. <i>Annual Review of Environment and Resources</i> 32: 421-449. (You may skip over Section 5 if desired.)</p> <p>Whittington, Dale, Xinming Mu, and Robert Roche. (1990). “Calculating the Value of Time Spent Collecting Water: Some Estimates for Ukunda, Kenya.” <i>World Development</i>. Vol. 18, No. 2. pp. 269-280.</p> <p><u>Optional, recommended</u></p> <p>World Bank. 1994. “Infrastructure: Achievements, challenges, and opportunities.” In <i>World Development Report 1994: Infrastructure for Development</i> (pages 13-22). Washington, DC: The World Bank.</p> <p>Pattanayak, Subhrendu, Jui-Chen Yang, Dale Whittington, and Bal Kumar. (2005). “Coping with Unreliable Public Water Supplies: Averting Expenditures by Households in Kathmandu, Nepal.” <i>Water Resources Research</i>. Vol. 4, No. 2, Feb. W02012. 11 pages.</p>

	Apr. 16 Thurs.	Stakeholder analysis: actors in water and sanitation infrastructure planning and their objectives	None. (See website for a list of class discussion questions for these readings.)	<p>Davis, J. 2004. Corruption in public services: Experience from South Asia's water and sanitation sector. <i>World Development</i> 32(1): 53-71.</p> <p>Whittington, D., D. Lauria, and X. Mu (1991), A study of water vending and willingness to pay for water in Onitsha, Nigeria. <i>World Development</i> 19(2/3): 179-198.</p> <p><u>Optional, recommended:</u></p> <p>Spiller, W., and P. Savedoff. 1999. Government opportunism and the provision of water. Chapter 1 in <i>Spilled Water: Institutional Commitment in the Provision of Water Services</i>. Focus on the sections entitled "The emergence & stability of low-level equilibria" and "Failed strategies"—skim the rest.</p> <p>Lovei, L., et al. 1993. Rent-Seeking in the Water Supply Sector: A Case Study of Jakarta, Indonesia. <i>Water Resources Research</i>. Vol. 29, No. 7, pp. 1965-1974.</p> <p>Guide to Development Speak, BBC</p>
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4	April 20 Mon.	<i>Assignment due date:</i> Readings journal entry #3	Post to class website by 12:00 noon. (See website for discussion questions.)	
	Apr. 21 Tues.	The evolution of W&S infrastructure planning in developing countries: Supply- <i>versus</i> demand-oriented approaches	None. (See website for a list of class discussion questions for these readings.)	Cairncross, S. 1992. "Sanitation and Water Supply: Practical Lessons from the Decade." World Bank Water and Sanitation Discussion Paper 9. Washington, DC: The World Bank. Sections 1 ("Introduction" and "Organizing the Program"), pages 1-24. World Bank Operations and Evaluation Department, selected tables. "Waters of Ayole" film – to be shown in class. <u>Optional, recommended:</u> Garn, Harvey A. (undated). "Lessons from Large-Scale Rural Water and Sanitation Projects: Transition and Innovation." Draft working paper. UNDP/World Bank Water and Sanitation Program. Washington D.C. 15 pages World Bank Water Demand Research Team. (1993). "The Demand for Water in Rural Areas: Determinants and Policy Implications." <i>The World Bank Research Observer</i> . pp. 47-70.
	Apr. 23 Thurs.	The evolution of W&S infrastructure planning in developing countries: Supply- <i>versus</i> demand-oriented approaches, continued	None. (See website for a list of class discussion questions for these readings.)	Davis, J. Handout on economic principles of W&S service delivery. The Dublin Statement Hanemann, W. M. (2005). "The Economic Conception of Water" in Peter P. Rogers, M. Ramon Llamas and Luis Martinez-Cortina (eds), <i>Water Crisis: Myth or Reality</i> . Taylor & Francis, pp 61-91. McPhail, A. 1993. The 'five percent rule' for improved water service: Can households afford more? <i>World Development</i> 21 (6): 963-973. <u>Optional:</u> WEDC. Undated. "Designing Water and Sanitation Projects to Meet Demands - The Engineer's Role." WEDC Background Paper.
5	Apr. 26 Sun.	<i>Note: Stanford course drop deadline</i>	None	None
	Apr. 27 Mon.	<i>Assignment due date:</i> Readings journal entry #4	Post to class website by 12:00 noon. (See website for discussion questions.)	
	Apr. 28 Tues.	Demand-oriented approaches, cont'd.: How do we measure and respond to demand(s)?	None. (See website for a list of class discussion questions for these readings.)	Whittington, D., J. Davis, H. Miarsono, and R. Pollard. 2000. Designing a "neighborhood deal" for urban sewers: A case study of Semarang, Indonesia. <i>Journal of Planning Education and Research</i> 19 : 297-308. MacRae, D., <i>et al.</i> 1988. Assessing preferences in cost-benefit analysis: Reflections on rural water supply evaluation in Haiti. <i>Journal of Policy Analysis and Management</i> 7 (2): 246-263. Water & Sanitation Program. 1999. Willing to pay but unwilling to charge. Field note, June 1999.

	Apr. 30 Thurs.	Institutional options for W&S in developing countries: decentralization and community management.	None. (See website for a list of class discussion questions for these readings.)	<p>Parkinson, J. and Tayler, K. 2003. Decentralized wastewater management in peri-urban areas in low-income countries. <i>Environment and Urbanization</i> 15(1): 75-89.</p> <p>Davis, J., <i>et al.</i> 2007. Sustaining the benefits of rural water supply: Experiences from Cochabamba and Chuquisaca, Bolivia. <i>Water Resources Research</i>.</p> <p>Brown, J. and M. Sobsey. 2007. Use of Ceramic Water Filters in Cambodia. Water and Sanitation Program Field Note. Jakarta: Water & Sanitation Program, Southeast Asia.</p> <p><u>Optional:</u></p> <p>Pearce-Oroz, G. 2006. The viability of decentralized water and sanitation provision in developing countries: the case of Honduras. <i>Water Policy</i> 8: 31-50.</p> <p>NSF International. 2005. "Feasibility of an Economically Sustainable Point-of-Use/Point-of-Entry Decentralized Public Water System." Report to the US EPA.</p>
6	May 4 Mon.	<i>Assignment due date:</i> User participation in W&S planning Readings journal entry #5	Post to class website by 12:00 noon. (See website for discussion questions.)	
	May 5 Tues.	User participation in W&S planning	None.	<p>Jaglin, S. 2002. The right to water versus cost recovery: participation, urban water supply and the poor in sub-Saharan Africa. <i>Environment & Urbanization</i> 14 (1): 231-245.</p> <p>Khwaja, A. Is increasing community participation always a good thing? <i>Journal of the European Economic Association</i> April–May 2004 2 (2–3):427– 436.</p> <p><u>Optional, recommended:</u> Watson, G. 1995. <i>Good Sewers Cheap: Agency Customer Interactions in Low-Cost Urban Sanitation in Brazil</i>. Washington, DC: World Bank. Parts IV, V, and VI, pages 35-51.</p>
	May 7 Thurs.	Institutional options for W&S planning and policy, cont'd.: private-sector participation	None. (See website for a list of class discussion questions for these readings.)	<p>Davis, J. 2005. Private-sector participation in water supply and sanitation: A review of experience. <i>Annual Review of Environment and Resources</i> 30: 145-183. Download from http://arjournals.annualreviews.org/eprint/hV6eK38SrGttZMk8QuZC/full/10.1146/annurev.energy.30.050504.144635</p> <p>Wu, Xun. (2008). "A Tale of Two Concessionaires: A Natural Experiment of Water Privatization in Metro Manila." <i>Urban Studies</i>. January. 45 (1). Pp. 207-227.</p> <p><u>Optional:</u> Loach, P., Melgarejo, S., and M. Lombardo. 2000. The small-scale water provider in Paraguay: Bringing private sector efficiency to water resource use & provision of drinking water to the poor. <i>Natural Resources Forum</i> 24 (4): 263–271.</p> <p>Galiani, Sebastian, Paul Gertler, and Ernesto Schangrotsky. (2005). "Water for Life: The Impact of the Privatization of Water Services on Child Mortality." <i>Journal of Political Economy</i>. Vol. 113, No. 1. pp. 83-119.</p>
7	May 11 Mon.	<i>Assignment due date:</i> Readings journal entry #6	Post to class website by 12:00 noon. (See website for discussion questions.)	

7	May 12 Tues.	Financing and pricing of water and sanitation services	None. (See website for a list of class discussion questions for these readings.)	<p>Warford, J. 1997. Marginal Opportunity Cost Pricing for Municipal Water Supply. International Development Research Centre, Ottawa, Canada.</p> <p>Boland, John, and Dale Whittington. (2000). "The Political Economy of Increasing Block Water Tariffs in Developing Countries." <i>The Political Economy of Water Pricing Reforms</i>. Ariel Dinar, Editor. Oxford University Press. 2000. Pp. 215-236.</p> <p><u>Optional</u> : US EPA 2005. Case Studies of Sustainable Water and Wastewater Pricing</p> <p>NOTE: Prof. Davis will be hosting a screening of the film <i>Thirst</i> at 7:00 pm on this evening as part of the Stanford Ethics in Society series. We hope you'll be there!</p> <p>http://ethicsinsociety.stanford.edu/ethics-events/lectures-events/</p>
	May 14 Thurs.	Providing water and sanitation services to the poor: Subsidy programs	None. (See website for a list of discussion questions for these readings.)	<p>Gómez-Lobo, A., and D. Contreras. 2003. Water subsidy policies: A comparison of the Chilean and Colombian schemes. <i>World Bank Economic Review</i> 17(3): 391-407.</p> <p>Foster, Vivien, Subhrendu Pattanayak, and Linda Prokopy. (2003). "Water Tariffs and Subsidies in South Asia: Do Current Water Subsidies Reach the Poor?" World Bank. April. 10 pages</p>
8	May. 18 Mon	<i>Assignment due date:</i> Readings journal entry #7	Post to class website by 12:00 noon. (See website for discussion questions.)	
	May 19 Tues.	Providing water and sanitation services to the poor: Regulation and markets		<p>Crane, R. 1994. Water markets, market reform and the urban poor: Results from Jakarta, Indonesia. <i>World Development</i> 22(1): 71-83.</p> <p>Davis, J. <i>et al.</i> 2009. Water services for the urban poor: The microcredit option.</p>
	May 21 Thurs.	Providing water and sanitation services to the poor: Technology & planning frameworks	None. (See website for a list of class discussion questions for these readings.)	<p>Davis, J., <i>et al.</i> 2001. Good governance the water and sanitation sector: Experience from South Asia. Section 3, "Municipal Corporation of Ahmedabad, India."</p> <p>Watson, G. 1995. <i>Good Sewers Cheap: Agency Customer Interactions in Low-Cost Urban Sanitation in Brazil</i>. Washington, DC: World Bank. Read Parts I-III, pages 9-34.</p>
9	May. 25 Mon.	<i>Assignment due date:</i> Readings journal entry #8	Post to class website by 12:00 noon. (See website for discussion questions.)	
	May 26 Tues.	Slack, TBD	None. (See website for a list of class discussion questions for these readings.)	TBD

9	May 28 Thurs.	Water as a human right	None	<p>Calaguas, B. 1999. "The Right to Water, Sanitation and Hygiene and the Human Rights-Based approach to development." WaterAid Briefing Paper. London, UK: WaterAid.</p> <p>Water & Sanitation Program. 2002 "The National Water and Sanitation Programme in South Africa: Turning the 'Right to Water' into Reality. WSP Field Note. Washington, DC: Water & Sanitation Program.</p> <p>Smith, JA; Green, JM. 2005. Free basic water in Msunduzi, KwaZulu-Natal: is it making a difference to the lives of low-income households? <i>Water Policy</i> 7 (5): 443-467.</p> <p><u>Optional, recommended:</u> ECOSOC General comment on the human right to water.</p>
10	June 1 Mon	<i>Assignment due date:</i> Policy memo	Policy memo due: Post to class website by <u>12:00 noon.</u>	
	June 2 Tues.	Discussion of the policy memo assignment	None	None
	June 4 Thurs.	Class wrap-up, professional opportunities in W&S, other topics by request	TBD	TBD