

Reaching Ghana's Sanitation Millennium Development Goal by 2015?

DUSP Practicum 11.S952 (IAP – Jan. 2013); 11.S944 (Spring 2013)
(Nov. 27, 2012)

Weekly Meeting Schedule: Mon. & Wed, 4:00 – 6:00 pm in 5-231 (correct time and place)
Course Website: <http://stellar.mit.edu/S/course/11/sp13/11.S944/>

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Prerequisite or Concurrent Requisite: 11.479 / 1.851J Water and Sanitation Infrastructure in
Developing Countries and Permission of Instructor

Graded or Pass/Fail: Graded

Course Description

Description: In this Practicum we will conduct a Participatory Planning Process and Situation Analysis with a focus on one to three major cities in Ghana: Tamale, Accra and Kumasi, engaging the sanitation challenge through the lens of innovation, gender, technology and development. We will review existing sanitation conditions in these cities, then collaboratively evaluate with local Ghanaian partners the **decentralized options** as potential solutions for Ghana put forward in the Gates Foundation “Reinventing the Toilet” Round 2 Challenge Winning Technologies as well as others that meet certain criteria (no piped connection, cost <\$0.05/day per user) and compare those options to **meso-scale solutions** as per “Thinking out of the Pot - Meso-Scale Solutions” (Proposal by MIT researchers Carolini, Green and Murcott). Outcomes will include: learning quantitative and qualitative planning skills in a challenging, international, multi-cultural setting, as well as evaluation and comparison of the latest technology innovations and socio-cultural, behavioral and financial dimensions in a systems context. Deliverable includes: Planning Report due: May 16, 2013.

Problem: The Millennium Development Goal (MDG) Target 7.C set in 2002 includes reducing by half the proportion of population without sustainable access to basic sanitation by 2015. Access to clean water and sanitation is critical to human health. In many countries, one-third or more of international development planning focuses on the provision of life sustaining services related to water and sanitation. Ghana had the 4th lowest rate of sanitation coverage in the world in 2008 (UNICEF/WHO, 2008) and has only 14% national improved sanitation coverage in 2010, representing 19% urban and 8% rural coverage; Ghana is seriously “off-track” for reaching the MDG sanitation target by 2015 (UNICEF/WHO, 2012). Yet, Ghana, one of 47 developing countries of sub-Saharan Africa, possesses a stable, peaceful and democratic government, ranks 135 out of 187 on the Human Development Index and is among only a few

countries worldwide that have been re-classified from low-income to low-middle income (World Bank, 2011).

For almost a decade MIT has been involved in Ghana working to implement innovations in water and sanitation practices and technologies. Much remains to be done. This Practicum tackles that challenge through its focus on the core question: “Can Ghana meet the Millennium Development Goal for sanitation by 2015?”

We will:

- Conduct a Participatory Planning Process and Situation Analysis with a focus on urban locations in Tamale, Accra and Kumasi, Ghana – engaging with local partners to systematically collect data, research existing conditions and proposed solutions, technologies, innovations, trends and conditions to assess the possibility of reaching the 2015 MDG sanitation goal.
- Review existing sanitation conditions in one to three major cities in Ghana.
- Collaboratively evaluate with local Ghanaian partners **decentralized solutions** such as the Gates Foundation “Reinventing the Toilet” Round 2 Challenge Winning Technologies as well as others that meet certain criteria (no piped connection, cost <\$0.05/day per user) as potential solutions for Ghana (See available handout).
- Collaboratively evaluate the **meso-scale solutions** such as those in “Thinking out of the Pot - Meso-Scale Solutions” (Gates Letter of Intent by MIT faculty/researchers Carolini, Green and Murcott) (See available hand-out).

Outcomes

- Partners in Ghana will collaboratively engage with MIT team to evaluate latest innovations.
- Students will learn quantitative and qualitative planning skills in a challenging, international, multi-cultural setting (multiple ethnic groups domestically and players nationally and internationally).
- Deliverable: Planning Document. Due: May 16, 2013 (last day of class).

Special Emphases and Support Components

- Innovation, gender, technology and development issues will be centrally addressed through a participatory planning and evaluation process;
- DUSP Faculty Collaboration Committee (Carolini and Glasmeier): Team Work Plan and progress will be reviewed on a regular basis by a member(s) of this DUSP Collaborative Committee.

Partners and Potential Collaborators

- Government of Ghana (GoG) (via contacts in Ministry of Finance, Ministry of Health, Ministry of Local Government and Rural Development, Ministry of Water, District Assemblies)
- NGOs and Religious Organizations: Pure Home Water (PHW), Methodist Church of Ghana, Coalition of Muslim Organizations and Ghana Congress of Religions and Peace
- International Donors: UNICEF-Ghana. Gates Foundation: Reinventing the Toilet Campaign

- Ghanaian Universities: University of Development Studies, Kwame Nkrumah University of Science and Technology, Ashesi University College
- MIT Civil and Environmental Engineering Department, Master of Engineering Program, Water and Sanitation in Developing Countries Projects
- Business: Rotary Club of Ghana; Ghana Trade Associations

Course Objectives Fulfill Core Practicum Criteria

This course fulfills the criteria of a Core Practicum Course, as follows:

- Confronts difficult trade-offs with real impacts on people's lives and well-being;
- Considers a variety of perspectives and alternate courses of action (existing conditions, decentralized solutions, meso-scale solutions);
- Interfaces with stakeholders in a specific location (one to three cities in Ghana);
- Engages with a multidisciplinary team;
- Provides opportunities to put theory into practice;
- Focuses on various state-of-the art innovations: Gates Foundation "Reinventing the Toilet" options, a MIT proposed option ("Thinking out of the Pot"), and local options, enabling the exploration of costs and benefits, user demand, gender issues, challenges and risks;
- Provides opportunity for reflection on beliefs, assumptions, cultural attitudes, biases;

In addition, this Practicum has the potential to be of great service to people who urgently need new solutions in a context where 19th and 20th century centralized solutions that serve urban areas of the Global North are unavailable, unworkable and/or unaffordable.

Course Policies

- Attendance – Regular attendance in class is expected of all students.
- Courtesy – Please ensure that your phones, computers, PDAs, music, and/or pagers are turned off during class.
- Academic Honesty – Students will work as a team to develop the final deliverable Planning Report. However, individual assignments must be completed individually. Plagiarism, the use of writings or ideas of another as one's own, is unacceptable. Special care should be taken not to borrow and modify materials taken from the Internet or any electronic or printed source. Any student who violates this code of academic honesty will be cited immediately.
- Late Work Policy –We do not accept late work.
- Evaluation and Grading – In determining determine grades, we follow the criteria described on the following website: <http://web.mit.edu/faculty/governance/rules/2.60.html>
- Special Needs – Please advise us early on of any special needs or disabilities so that appropriate accommodations can be made.

IAP Course Evaluation (6 units)

The IAP course will entail 3 weeks of student's engagement and travel during January 2013. DUSP students will be one part of a larger team including Civil and Environmental Engineering, Masters of Environmental Engineering students. DUSP students will be graded for the 6 unit portion of the class on the basis of their participation, engagement, team-spirit, cultural respect, enthusiasm and resilience under adversity.

Spring Course Evaluation (12 units)

The spring term course has a round-table/discussion and project-based learning format. Each week, we will mainly focus on different facets of the project itself, not lectures or a seminar format.

Assignments and grading:

1.	Field Notes	0%
2.	In-class Participation in Round-table Discussions (30% total)	30%
3.	Round-table Discussion Leadership	10%
4.	Two Progress Reports (February and March)	30%
5.	Final Planning Report (individual contribution to team report)	<u>30%</u>
		100%

1. Field Notes – Student are expected to keep field notes and to turn those in by the end of the 1st week of February. These are not graded.
2. In-class participation – Active in-class participation is highly valued and graded. Class participation includes regular attendance in class, assignment reading and/or preparation in advance of class, involvement in class discussions, willingness to examine and question cultural assumptions and one's own biases, creative thinking.
3. Round-table Discussion Leadership: Students will take turns leading class sessions.
4. Progress Reports will be due on the last day of February and March. These reports will be reviewed by the DUSP Faculty Collaboration Committee (Carolini and Glasmeier). Feedback will be provided.
5. Draft and Final Planning Report The Draft Planning Report should be in 12 point font and no more than 50-100 pages in length, inclusive of all text, photos, design drawings. **The Draft Planning Report is due in hardcopy and e-copy on April 29.** Befitting the subject – sanitation, which is the basis of health, dignity and well-being for large numbers of people in our project areas, it should be a beautiful, living document. Written comments/feedback will be given on the draft within one week of receipt. Guidance on content, structure, etc. will be provided on Stellar and in class. **The Final Planning Report is due in hardcopy and e-copy by May 16, 2013.**

Course Required Texts

Students are encouraged to purchase required texts. Copies will also be on reserve at Rotch Libraries.

Brock, K and Pettit, J. Eds. 2008. **Springs of Participation: Creating and Evolving Methods for Participatory Development.** Practical Action. ISBN: 978 1 85339 647 2

Gamble DN and Weil M. **Community Practice Skills: Local to Global Perspectives.** Columbia University Press. ISBN: 978-0-231-11003-7. Paper, \$45.00

Course Readings

Course readings will be available on the Stellar course website and/or on reserve in Rotch Library.

Accra Sewerage Improvement Project: Implementing Agency: Accra Metropolitan Assembly
<http://www.afdb.org/en/projects-and-operations/project-portfolio/project/p-gh-e00-004/>

Accra Sanitation Status – International Water Association (IWA) Wiki
<http://www.iwaterwiki.org/xwiki/bin/view/Articles/2%29+ACCRA+%28Ghana%29+3>

Flores, Amparo. 2010. Towards Sustainable Sanitation: Evaluating the Sustainability of Resource-Oriented Sanitation. PhD. Cambridge University. Cambridge UK

Gates Foundation: Reinventing the Toilet Campaign. 2012.
<http://www.gatesfoundation.org/watersanitationhygiene/Pages/Reinventing-the-toilet.aspx>

Green, J. 2011. Sustainable Urban Sanitation: Simulating a Desludging Service in Senegal. POMS 23rd Annual Conf. Chicago, IL. April 20 – 23, 2011.
http://www.pomsmeetings.org/ConfProceedings/025/FullPapers/FullPaper_files/025-1473.pdf

Jenkins, Joseph The Humanure Handbook: A Guide to Composting Human Manure.
ISBN-13: 978-0-9644258-3-5 ISBN-10: 0-9644258-3-1

Mara, Duncan. 2003. Domestic Wastewater Treatment in Developing Countries. Earthscan. Sterling Va (On Reserve in Rotch). ISBN: 1-84407-019-0.

Questad, Adam. 2012. Investigation of I-WASH's Community-led Total Sanitation and Alternative Decentralized Sanitation Models in Rural Ghana. MIT Civil and Environmental Engineering, Master of Engineering Thesis. Cambridge, MA.
http://web.mit.edu/watsan/docs_theses_ghana.html (See Ghana 2012, Questad)

Sanin FD, Clarkson WW, Vesilind PA. 2011. Sludge Engineering. DEStech Publications Inc. Lancaster, PA.

SWITCH (Sustainable Water Management in the City of the Future): Accra, Ghana. 2012.
<http://www.switchurbanwater.eu/cities/1.php> (accessed 11/3/12)

SWITCH (Sustainable Water Management in the City of the Future). Antwi-Agyei, P. 2009.
Fecal sludge management: the case of Madina, Ghana. KNUS M.Sc. Thesis.
http://www.switchurbanwater.eu/outputs/pdfs/W5-3_GEN_PHD_D5.3.12_MSc_Antwi-Agyei_Faecal_sludge_management_madina.pdf

Tarr, JA et al. 1984. Water and Wastes: A Retrospective Assessment of Wastewater Treatment in the United States, 1800-1932. Society for the History of Technology. 0040-165X/84/2502-0005

Tilley, Elizabeth et al, 2008. Compendium of Sanitation Systems and Technologies. Swiss Federal Institute of Aquatic Science and Technology (EAWAG). Dübendorf, Switzerland. ISBN: 978-3-906484-44-0 Eawag/Sandec; Swiss Federal Institute of Aquatic Science and Technology / Water and Sanitation in Developing Countries, Dübendorf, Switzerland, www.sandec.ch

IAP Travel Readings

Black M and Fawcett B. 2008. The Last Taboo: Opening the Door on the Global Sanitation Crisis. Earthscan. Sterling, VA.

George R. 2008. The Big Necessity: the Unmentionable World of Human Wastes and Why it Matters. Metropolitan Books: Henry Holt and Co. New York.

Melosi M. 2008. The Sanitary City: Environmental Services in Urban American from Colonial Times to the Present. University of Pittsburg Press, Pittsburg PA