INTERNATIONAL WATER: ISSUES AND POLICIES

Instructor Information

Winston H YU
Phone: (202) 473 8536 | Email: wyu@worldbank.org.
Class: Every Monday 6:00 – 8:00 PM (unless otherwise noted)
Office hours: By appointment (at World Bank)

Course Purpose and General Description

Is it true as recent headlines suggest that our planet is on the loom of a grave WATER CRISIS, that our rivers are running dry and groundwater aquifers increasingly over-exploited, that wars will be fought between nations over this resource (more valuable than oil), and that this is likely to affect the development opportunities for a large share of the world population? Or is this looming crisis over-hyped, a matter of political will and proper pricing, and within the capacity of society to manage? Water is a classic renewable resource, essential to life on this planet. Water sustains the livelihoods of society and makes productive economic activity possible. For such an important resource, it is no wonder that its use (and abuse) can generate so much passionate controversy and concern. This course is a broad survey of the international water issues facing the 21st century. Topics to be covered include, water security, privatization of water service delivery, conflict and cooperation on trans-boundary rivers, the role of large multi-purpose reservoirs (for hydropower, water supply, irrigation), water as a human right, achieving the Millennium Development Goals on water supply and sanitation, the role of water in food security, water institutions and policies, and climate change. Any discourse today on sustainable development is not complete without a discussion of the important role of water to society, economic growth, and poverty reduction.

Course Requirements

This course is designed as a seminar with a chance for you to engage in discussions based on issues raised in the readings. Our objective in this course is to gain a broad overview of these issues, primarily from the sustainable development lens, and to critically evaluate these challenges from a multi-disciplinary perspective (e.g. economics, environment, social, engineering, public health). This is important as solutions to water problems will require many different disciplines and expertise working together. Periodically, guest speakers will be brought in to give the practitioner view on a number of identified topics. Students are partners in assuming responsibility for making the class discussions work. There is obviously no right or wrong answers in these discussions! Students, if they would like, are also encouraged to bring in papers that they would like to discuss. Each student is expected to do the following during the term:

1. Attend all classes prepared to discuss the readings.
2. Participate in class activities.
3. Prepare brief 1-2 page policy notes on topics identified in class and in the readings. Two will be required over the course term. More details about this during the term.

4. Complete a discussion paper of about 5,000 words (about 15 pages single-spaced) on one of the topics covered in the course. Topics are open to choice, but must be approved by me. The objective here is to go into depth on a particular issue of interest to you, explore the intrinsic complexity that is involved, and make policy recommendations. I will make myself available to you to provide guidance on this.

Final grades will be determined according to the following formula:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class participation</td>
<td>25%</td>
</tr>
<tr>
<td>Policy notes</td>
<td>25%</td>
</tr>
<tr>
<td>Final paper</td>
<td>45%</td>
</tr>
<tr>
<td>Overall attendance</td>
<td>5%</td>
</tr>
</tbody>
</table>

TENTATIVE COURSE SCHEDULE AND READING

<table>
<thead>
<tr>
<th>Session</th>
<th>Topics covered</th>
<th>Readings (Full citations in Annex)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction: Global water situation – Global water supply and demand – Is the world running dry?</td>
<td>Introduction to course; Overview of principle issues and debates; Scarcity versus Stress; Nexus; energy-food-water; water is more than access; basics of the hydrologic cycle; global water balances; indicators of scarcity and stress; groundwater – the hidden resource; integrated water resources management; blue-green water; virtual water</td>
<td>Rogers P, Water Crisis: Myth or Reality [First chapter only]; Rogers, P, Facing the Freshwater Crisis; Postel, S, and A Wolf, Dehydrating conflict; Dinar, A, S Dinar, S McCaffrey, D McKinney, Bridges over Water: Understanding Transboundary Water Conflict, Negotiation and Cooperation [Read 1-24 only]; World Economic Forum, The Global Risks Report – 2016 [Executive Summary]</td>
</tr>
</tbody>
</table>

EXTRA

UN/WWAP UN World Water Development Reports
[Reference – see web links for several resources]

2. Transboundary water: Source of conflict or cooperation? | International versus intra-national trans-boundary waters; international law; international agreements; Helsinki to UN Convention trans-boundary water principals; trans-boundary international organizations; historical record of wars over water examples of International agreements and cooperation; international river basin organizations; | Giordano, M et al, A Review of the Evolution and State of Transboundary Freshwater Treaties; Salman, S and K Uprety, Conflict and Cooperation on South Asia's International Rivers, a Legal Perspective [Read only pages 8-31]; Hamner, J, and A Wolf, Patterns in International Water Resource Treaties: The Transboundary Freshwater Dispute Database; Salman, S, The UN Watercourses Convention Ten Years Later: Why Has its Entry into Force Proven Difficult?; Eckstein, G (editor). Global Perspectives on the Entry into Force of the UN Watercourses Convention |
Wolf A. *International Water Conflict Resolution: Lessons from Comparative Analysis*  
*International Freshwater Treaties Database*  
http://www.transboundarywaters.orst.edu/database/interfreshwaterdatabase.html [Reference]

### 3-4. Transboundary waters: Selected case studies of international transboundary rivers and “federal rivers”

<table>
<thead>
<tr>
<th>Senegal River Basin</th>
<th>Senegal River Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia River Basin; Ganges River; Indus River; Federal Rivers</td>
<td>Nguyen, Q, <em>Development of the Senegal River Basin: An Example in International Co-Operation</em></td>
</tr>
<tr>
<td>Vick, M, <em>The Senegal River Basin: A Retrospective and Prospective Look at the Legal Regime</em></td>
<td></td>
</tr>
</tbody>
</table>

**Columbia River Treaty**  
USACE and BPA, *Columbia River Treaty: History and 2014/2024 Review*

**Ganges River Basin**  
Salman, S and K Uprety, *Conflict and Cooperation on South Asia’s International Rivers, a Legal Perspective* [Read Chapter 7]  
1996 Treaty on Sharing of the Ganges Waters at Farakka [Reference]

**Indus River Basins**  
Salman, S, *The Baglihar difference and its resolution process - a triumph for the Indus Waters Treaty?*  
Condon, M et al. *Challenge and Response in the Indus Basin*

**Federal Rivers**  
Salman, S. *Inter-states water disputes in India: An analysis of the Settlement Process*  

**EXTRA**

| 5. Water policy and economics 1: Market good or public good or human right? Policies that are pro-poor versus pro-growth? | Water as an economic good?; How this relates to cost recovery of infrastructure services; cost-benefit analysis; valuing “water” | Dublin Statement on Water and Sustainable Development  
Rogers P, et al., Water Crisis: Myth or Reality [Chapter 4]  
Rogers, P, A Huber-Lee, R Bhatia, Water as a Social and Economic Good: How to Put the Principle into Practice  
Batten, D, Can Economist value water’s multiple benefits?  
Maass, A, Benefit Cost Analysis: Its Relevance to Public Investment Decisions  
Aither, Valuing Water: A Framing Paper for the High-Level Panel on Water |
| 6. Water policy and economics 2: What tools do we have at our disposal? | Chile water markets; the U.S. and Australia water markets; system optimization tools as a way to get to values | Boulding, K, The Implications of Improved Water Allocation Policy  
Grafton, QR et al., A Comparative Assessment of Water Markets: Insights from the Murray-Darling Basin of Australia and the Western US  
Rogers and Fiering, Use of Systems Analysis in Water Management  
Whittington, D, X Wu, C Sadoff, Water Resources Management in the Nile Basin: The Economic Value of Cooperation  
Reuss, M, Coping with Uncertainty: Social Scientists, Engineers, and Federal Water Resources Planning |
|  |  | EXTRA ----------------------------------------------  
Hanak and Stryjewski, California’s Water Market, By the Numbers: Update 2012 [Reference]  
Loucks, DP, J Stedinger, D Haith, Water Resource Systems Planning and Analysis [Reference]  
Fisher, F and A. Huber-Lee, Economics, Water Management and Conflict Resolution in the Middle East and Beyond [Reference]  
Report of the President’s Water Resources Policy Commission, A Water Policy for the American People [Reference] |
### 7. Water Governance - 1
*What does water governance meaning and how do we know when it is “good”?

- Institutions for managing water resources (regional, national), political systems and water; IWRM; water rights
- Quibria, M, *Does Governance Matter? Yes, No or Maybe – Some Evidence from Developing Asia*
- Rogers and Hall, *Effective Water Governance*
- Meinzen-Dick, R, *Beyond Panaceas in Water Institutions*
- Schlager and Blomquist, *Embracing Watershed Politics*
- White, GF, *Reflections on the 50-year international search for integrated water management*
- Molle, F, *Defining Water Rights; by prescription or negotiation?*

**EXTRA -----------------------**

- Saleth, RM and A Dinar, *Water Challenge and Institutional Response (A Cross-Country Perspective)*
- Solanes, M et al, *The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resources Management*

### 8. Water Privatization:
*Does privatization lead to better service delivery?*

- History of privatization, forms of privatization, Is it good or bad? Water as a human right?
- Davis, J, *Private-sector participation in the water and sanitation sector*
- Parker, D, and C Kirkpatrick, *Privatization in Developing Countries: A Review of the Evidence and the Policy Lessons*
- Budds, J, and G McGranahan, *Are the Debates on Water Privatization Missing the Point? Experiences from Africa, Asia, and Latin America*
- Marin, P, *Public-Private Partnerships for Urban Water Utilities: A Review of Experiences in Developing Countries [Overview section only]*
- Barlow, M, *Water Warriors*
- Shultz, J, *Water in Cochabamba after the Water Revolt: A Legend with Mixed Results*
- Gleick, P, *The Human Right to Water*

**EXTRA -----------------------**

- Whittington et al, *Paying for Urban Services: A Study of Water Vending and Willingness to Pay for Water in Onitsha, Nigeria*
<table>
<thead>
<tr>
<th>9. Water Uses: Supply and Sanitation: World’s greatest water challenge?</th>
<th>Millennium Development Goals (MDGs); Water supply and sanitation technology issues; water quality; health issues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zwane and Kremer, What works in fighting diarrheal diseases in developing countries? A critical review</td>
</tr>
<tr>
<td></td>
<td>Moe and Rheingans, Global Challenges in water, sanitation and health</td>
</tr>
<tr>
<td></td>
<td>Wimpenny, Financing Water For All (from Report of the World Panel on Financing Infrastructure chaired by Michel Camdessus) [Executive summary]</td>
</tr>
<tr>
<td></td>
<td>WHO, Progress on Sanitation and Drinking Water: 2015 Update and MDG Assessment [Executive Summary]</td>
</tr>
<tr>
<td></td>
<td>DeFrancis, Marc P., 2012. Economic Impacts of Inadequate Sanitation in Bangladesh</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. Water, agriculture, energy: What is the right balance across uses? What does “efficiency” mean?</th>
<th>How we define efficiency and “saving water”; virtual water, unintended consequences with efficiency improvements, reforming the irrigation sector; water/energy nexus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cooley, H. et al., More with Less: Agricultural Water Conservation and Efficiency in California [Executive Summary]</td>
</tr>
<tr>
<td></td>
<td>Burt, C et al. Agricultural Water Conservation and Efficiency in California – A Commentary</td>
</tr>
<tr>
<td></td>
<td>Molle, F and J Berkoff, Cities vs. Agriculture: A Review of Intersectoral Water Re-allocation</td>
</tr>
<tr>
<td></td>
<td>Suhardiman, D and M Giordano, Is There an Alternative for Irrigation Reform</td>
</tr>
</tbody>
</table>

**EXTRA**

- Dominguez-Faus, R, S Powers, J Burken, P Alvarez, The Water Footprint of Biofuels: A Drink or Drive Issue?
- Rogers, D, et al. Efficiencies and Water Losses of Irrigation Systems [Reference]
- Johnson, S, Svendsen M, Gonzalez F, Institutional Reform Options in the Irrigation Sector
- Chapagain, A and A. Hoekstra, The global component of freshwater demand and supply: an assessment of virtual water flows between nations
<table>
<thead>
<tr>
<th>11-12. Dams - Big solutions or big problems?</th>
<th>Role of large multi-purpose infrastructure in development, findings from the World Commission on Dams, multipliers analysis, Alternatives to big dams; hydropower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooley, H and K Donnelly, <em>Hydraulic Fracturing and Water Resources: Separating the Frack from the Fiction</em></td>
<td></td>
</tr>
<tr>
<td>Keller, A, R Sakthivadivel, D Seckler, <em>Water Scarcity and the Role of Storage in Development</em></td>
<td></td>
</tr>
<tr>
<td>World Commission on Dams, <em>Dams and Development – A New Framework for Decision-Making</em> [Executive Summary]</td>
<td></td>
</tr>
<tr>
<td>DiFrancesco, K, <em>The Debate over Large Dams</em></td>
<td></td>
</tr>
<tr>
<td>Economist, <em>Dams are Making a Comeback, March 21, 2009</em></td>
<td></td>
</tr>
<tr>
<td>Iyer, R, <em>The Dams Debate in India and A Supply-side Conundrum</em></td>
<td></td>
</tr>
<tr>
<td>Stone, R, <em>Three Gorges Dam: Into the Unknown</em></td>
<td></td>
</tr>
<tr>
<td>Ansar A, et al. <em>Should we build more large dams? The actual costs of hydropower megaproject development</em></td>
<td></td>
</tr>
<tr>
<td>Awojobi, O and GP Jenkins, <em>Were the hydro dams financed by the World Bank from 1976 to 2005 worthwhile?</em></td>
<td></td>
</tr>
<tr>
<td>Bhatia, R, RPS Malik, M Bhatia, <em>Direct and Indirect Economic Impacts of the Bhakra Multipurpose Dam, India</em> [Reference]</td>
<td></td>
</tr>
</tbody>
</table>

#### EXTRA

Fearnside, P, *Social Impacts of Brazil’s Tucurui Dam*

World Commission on Dams, *Dams and Development – A New Framework for Decision-Making* [Chapters 1, 2, 9 for Reference]

<table>
<thead>
<tr>
<th>13. Climate Change and water-related disasters: “If it’s mitigation, it’s energy; If it’s adaptation, it’s water”</th>
<th>Climate change impacts on the water sector and other sectors; adaptation issues; uncertainty; Katrina floods, droughts; how do we define water security?</th>
</tr>
</thead>
<tbody>
<tr>
<td>US House of Representatives, <em>Flood Control in the Mississippi Valley</em></td>
<td></td>
</tr>
<tr>
<td>USACE, <em>Decision – Making Chronology For the Lake Pontchartrain and Vicinity Hurricane Protection Project - Final Report</em> [Executive Summary only]</td>
<td></td>
</tr>
<tr>
<td>Lobel, D et al., <em>Prioritizing Climate Change Adaptation Needs for Food Security in 2030</em></td>
<td></td>
</tr>
<tr>
<td>Purkey, D, et al., <em>Robust analysis of future climate change impacts on for agriculture and other sectors; case study in the Sacramento Valley</em></td>
<td></td>
</tr>
<tr>
<td>Stakhiv, E, <em>Pragmatic Approaches for Water Management Under Climate Change Uncertainty</em></td>
<td></td>
</tr>
<tr>
<td>Rogers, P, <em>Coping with Global Warming and Climate Change</em></td>
<td></td>
</tr>
</tbody>
</table>

#### EXTRA

Delli Priscoli, J, *Water Security, Global Water Issues and Climate Change*

Kundzewicz, ZW et al., *Freshwater Resources and Their Management* [Reference]

**ANNEX - READING LIST FULL CITATIONS**

**SESSION 1:**


**SESSION 2:**


*International Freshwater Treaties Database*
http://www.transboundarywaters.orst.edu/database/interfreshdata.html

**SESSION 3-4:**


1996 Treaty on Sharing of the Ganges Waters at Farakka


**SESSION 5:**

http://www.gwpforum.org/servlet/PSP?iNodeID=1345


**SESSION 6:**


**SESSION 7:**


Quibria, MG, Does Governance Matter? Yes, No or Maybe Some Evidence from Developing Asia, Singapore Management University, Institutional Knowledge at Singapore Management University, 2006: http://ink.library.smu.edu.sg/soe_research/866

SESSION 8:


SESSION 9:


World Health Organization, Progress on Sanitation and Drinking Water: 2015 Update and MDG Assessment.

SESSION 10:


**SESSION 11-12:**


Bhatia, R, RPS Malik, M Bhatia, *Direct and Indirect Economic Impacts of the Bhakra Multipurpose Dam, India*, Irrigation and Drainage, 56, 195-206, 2007


**SESSION 13:**


Delli Priscoli, J, *Water Security, Global Water Issues and Climate Change*