

SUMA K7001- WATER GOVERNANCE

Instructor Information

Prof. Michael J. Puma

Email: mjp38@columbia.edu

Phone: 212-678-5667

Office Hours: By appointment, Armstrong Hall Room 246 (NASA Goddard Institute for Space Studies on 112th Street and Broadway)

Accessibility: Please contact me via e-mail. I will typically respond to you within 24 hours.

Course Overview

Water is widely recognized as the most essential natural resource for Earth's ecosystems and human society. Yet the relationship between water and society is complex. Water is a multifaceted resource that is important to all economic sectors and across a range of spatial scales from local to global. Water is also frequently a hazard; flooding, droughts, and contaminated water are formidable threats to human well-being. To deal with this seemingly dual nature of water, people have long modified the water cycle through engineering schemes like dams, reservoirs, irrigation systems, and interbasin transfer systems as well as through land use and land-cover change. To even the casual observer, a clear and robust plan is needed to manage and govern water given the multitude of ongoing human activities impacting the water cycle. This course will provide an overview of the political, social, economic, and administrative systems that affect the use, development, and management of water resources. Students will be introduced to current themes that influence water governance including sustainable development, integrated water resource management, water rights and pricing, corruption, and equity for marginal groups. These themes will be explored at the local, national, and international levels to provide students with a holistic understanding of water governance issues. This course will satisfy the M.S. in Sustainability Management program's public policy curriculum requirement and is a required course for the Certificate Sustainable Water Management.

Learning Objectives

The objective of this course is for you to understand present-day challenges to the governance and management of water resources. You will be able to demonstrate a working knowledge of the processes through which sustainability and water governance rules and regulations are created by governments and implemented by organizations. You will also gain experience in crafting solutions to these challenges, integrating the needs of multiple stakeholders, and analyzing water resources from

a multi-sectoral perspective. You will to work collaboratively to develop strategies promoting wide ranging sustainable solutions and to effectively communicate these plans in a professional environment. When you complete this course, you will have gained experience in:

- Interdisciplinary research related to water, linking together information from various disciplines and sources;
- Clear and succinct communication of ideas and findings; and
- Debating water-governance issues at the local, national, and international levels.

How this will happen: Each session is focused on a small number of key questions that are identified in the syllabus. Readings will be assigned for each session that expose you to various theories and practical examples related to these questions. The online lectures, together with interactive discussions, will develop your understanding of the specified topics as well as your communication skills. The term paper and end-of-semester presentation will help you hone your interdisciplinary research skills and provide you with experience in succinct communication of ideas and results.

Prerequisites

You should have familiarity with the fundamentals concepts of the hydrological cycle and environmental policy. Please contact me to discuss if you unsure, and we can determine if this is the right course for you.

Course Content

The course consists of fourteen 2-hour sessions. These sessions are listed below:

1. Course Overview and Expectations

Class topics: Introductions. What is water governance? What are the four dimensions of water governance?

Required readings:

Please read the syllabus in detail prior to the first class. Also, read the definition of water governance at:

<http://www.watgovernance.org/whatiswatgovernance>.

Recommended readings:

Pearce F (2007). *When the rivers run dry: water, the defining crisis of the twenty-first century*. Beacon Press.

Conca K (2006). *Governing Water: Contentious Transnational Politics and Global Institution Building*. MIT Press.

2. The Centrality of Water and its Global Dimensions

Class topics: What are the major threats to freshwater globally? What are three distinct water crises? How is recognition of these distinct crises valuable for managing and governing water?

Required readings:

- a) *Managing Water under Uncertainty and Risk, The United Nations World Water Development Report 4* (2012), Volume 1, Chapter 1, pp 22-42.
- b) Lall U., T. Heikkila, C. Brown and T. Siegfried (2008), Water in the 21st century: Defining the elements of global crises and potential solutions, *Journal of International Affairs*, 61(2), 1-17.
- c) Vörösmarty, C. J., P. McIntyre, M. O. Gessner, D. Dudgeon, A. Prusevich, P. Green, S. Glidden, S. E. Bunn, C. A. Sullivan, and C. R. Liermann (2011), Global threats to human water security and river biodiversity, *Nature*, 467(7315), 555-561.

Recommended readings:

Knowledge Base, The United Nations World Water Development Report 4 (2012), Volume 2, Chapter 15 (State of the Resource: Quantity) and Chapter 16 (State of the Resource: Quality).
Water, a Shared Responsibility, The United Nations World Water Development Report 2 (2006), Chapter 2, (*The Challenges of Water Governance*). Part 1, pp 45 – 53.

3. Water-Food-Energy-Climate Nexus I: Water, Food, and the Global Trade of Virtual Water

Class topics: What is the water-food-energy-climate nexus? How is water linked to food productions and the global trade of agricultural commodities? To what extent does international trade magnify water scarcity in some nations and in alleviate it other nations?

Required readings:

- a) *Managing Water under Uncertainty and Risk, The United Nations World Water Development Report 4* (2012), Volume 1, Chapter 2, pp 44-52.
- b) Hoekstra, A.Y. and Mekonnen, M.M. (2012), The water footprint of humanity, *Proceedings of the National Academy of Sciences*, 109(9): 3232–3237.
- c) Hoekstra, A.Y. (2009), Water Security of Nations: How International Trade Affects National Water Scarcity and Dependency. In *Threats to Global Water Security*, 27–36.

Recommended readings:

Visit the website <http://www.waterfootprint.org> and explore their efforts to understand the links between water use and food production.

Paolo D'Odorico, Francesco Laio, and Luca Ridolfi. Does globalization of water reduce societal resilience to drought? *Geophysical Research Letters*, Vol. 37, L13403, doi:10.1029/2010GL043167, 2010.

4. Water-Food-Energy-Climate Nexus II: Water, Energy, and a Changing Climate

Class topics: How are water and energy interrelated? What are the benefits and problems associated with hydroelectric power? How does a changing climate impact both food and energy security?

Required readings:

- a) *Knowledge Base, The United Nations World Water Development Report 4* (2012), Volume 2, Chapter 19, (ME Webber, The global nexus of energy and water).
- b) Hussey, K., and J. Pittock (2012). The Energy–Water Nexus: Managing the Links between Energy and Water for a Sustainable Future. *Ecology and Society* 17(1): 31.
- c) World Commission on Dams (2000). *Dams and Development: A New Framework for Decision Making*. London: Earthscan.
(<http://www.unep.org/dams/WCD/report.asp>).
- d) Stillwell, A. S., C. W. King, M. E. Webber, I. J. Duncan, and A. Hardberger. (2011). The energy-water nexus in Texas. *Ecology and Society* 16(1): 2.

Recommended readings:

Water Governance Facility, Water Adaptation in National Adaptation Programmes for Action - Freshwater in Climate Adaptation Planning and Climate Adaptation in Freshwater Planning, 2009.
([http://www.watergovernance.org/documents/WGF/Reports/Water Adaptation in NAPAs.pdf](http://www.watergovernance.org/documents/WGF/Reports/Water_Adaptation_in_NAPAs.pdf))
Olsson, G. (2011). Water and Energy Nexus. In *Encyclopedia of Sustainability Science and Technology*, Springer.
(<http://ac4ca.eie.ucr.ac.cr/data/uploads/Gustaf%20Olsson%20Water%20and%20Energy%20nexus.pdf>)

5. Understanding Water Institutions

Class topics: What are the main forms and functions of current water institutions? How do institutions respond to uncertainty?

Required readings:

- a) *Managing Water under Uncertainty and Risk, The United Nations World Water Development Report 4* (2012), Volume 1, Chapter 11, pp 289-308.
- b) Håkan Tropp (2007), Water governance: trends and needs for new capacity development, *Water Policy* 9 Supplement 2 19–30.

- c) *Knowledge Base, The United Nations World Water Development Report 4* (2012), Volume 2, Chapter 25, (Water and institutional change: Responding to present and future uncertainty), pp 567 – 575.

6. Integrated Water Resources Management: Past, Present, and Future

Class topics: What is integrated water resource management (IWRM)? How has IWRM evolved, and what role should it play in the future?

Required readings:

- a) Read through the online tutorial for IWRM at <http://www.thewaterchannel.tv/tutorial/index.html>.
- b) Ken Conca, 2005. "Growth and Fragmentation in Expert Networks: The Elusive Quest for Integrated Water Resources Management", in Peter Dauvergne, editor, *Handbook of Global Environmental Politics*. Cheltenham, UK: Edward Elgar.
- c) Bruce A. Lankford, Douglas J. Merrey, Julien Cour and Nick Hepworth, 2007. From Integrated to Expedient: An Adaptive Framework for River Basin Management in Developing Countries. IWMI Research Report 110. (http://www.iwmi.cgiar.org/Publications/IWMI_Research_Reports/PDF/PUB110/RR110.aspx).

Recommended readings:

Overview of IWRM: <http://waterwiki.net/index.php/IWRM>

7. Water Governance in Practice

Class topics: What are the current national water policies being implemented? How successful are current implementations of water governance?

Required readings:

- a) *Water, a Shared Responsibility, The United Nations World Water Development Report 2* (2006), Chapter 2, (*The Challenges of Water Governance*). Part 2, pp 54 – 60.
- b) *Water Adaptation in National Adaptation Programmes for Action*, Gunilla Björklund, Håkan Tropp, Joakim Harlin, Alastair Morrison and Andrew Hudson for UNDP The United Nations Development Programme (UNDP). (2009)
- c) Case Study: Four Rivers Project in South Korea

8. Water right: Custom and tradition in water rights

Class topics: Does it make a difference to recognize water as a human right? How do water rights vary from nation to nation (and within nations)?

Required readings:

- a) *Water, a Shared Responsibility, The United Nations World Water Development Report 2* (2006), Chapter 2, (*The Challenges of Water Governance*). Part 2, pp 61 – 65.
- b) Salman M. A. Salman, 2007. “The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law,” *Water Resources Development* vol. 23 no. 4 (December): 625–640.
- c) *Knowledge Base, The United Nations World Water Development Report 4* (2012), Volume 2, Chapter 22, (Allocating water), pp. 517- 532.

9. Water Pricing and Privatization of Water Services

Class topics: What are the key obstacles to valuation of water that promotes sustainable use of water resources? What are the benefits and drawbacks of the privatization of water?

Required readings:

- a) *Water, a Shared Responsibility, The United Nations World Water Development Report 2* (2006), Chapter 2, (*The Challenges of Water Governance*). Part 2, pp 69 – 73.
- b) *Managing Water under Uncertainty and Risk, The United Nations World Water Development Report 4* (2012), Volume 1, Chapter 10, pp 276-288.
- c) *Knowledge Base, The United Nations World Water Development Report 4* (2012), Volume 2, Chapter 23, (Valuing Water), pp. 533- 549.

Recommended readings:

Bakker K (2010). *Privatizing Water: Governance Failure and the World's Urban Water Crisis*. Cornell University Press.

10. Understanding and Preventing Weak and Poor Governance of Water

Class topics: What are the characteristics of corruption in the water sector? What are the consequences of corruption for development and water service provision? How do weak regulatory powers and poor governance lead to corruption?

Required readings:

- a) *Water, a Shared Responsibility, The United Nations World Water Development Report 2* (2006), Chapter 2, (*The Challenges of Water Governance*). Part 2, pp 65 – 68.
- b) Water Governance Facility, Policy Brief: Preventing Corruption in the Water Sector, 2012.
(http://www.watergovernance.org/documents/WGF/Reports/Policy-Brief-Integrity_web.pdf)
- c) Water Governance Facility, *Corruption Risks in Water Licensing*, 2009.
(http://www.watergovernance.org/documents/WGF/Reports/Corruption_Risks_in_Water_Licensing.pdf)

- d) Aeschbacher J et al (2005), River water shortage in a highland–lowland system: A case study of the impacts of water abstraction in the Mount Kenya region.

Recommended readings:

Water Governance Facility, *Promoting Transparency, Integrity and Accountability in the Water and Sanitation Sector in Uganda*, 2010.

(http://www.watergovernance.org/documents/Resources/Reports/WIN_WSP_Uganda_report.pdf)

Water Governance Facility, *Training Manual on Water Integrity*, 2011.

(http://www.watergovernance.org/documents/WGF/Reports/Trainin_Manual/Final_training-manual-English.pdf)

11. International Water Governance

Class topics: How do we approach transnational water governance? What are the main challenges to the implementation of effective international water governance?

Required readings:

- a) International Waters – Delivering Results

(http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Water%20and%20Ocean%20Governance/IW_DeliveringResults-2012.pdf)

- b) Ken Conca, 2006. “Transnational Dimensions of Freshwater Ecosystem Governance,” in A.R. Turton, J. Hattingh, G.A. Maree, D.J. Roux, M. Claassen, and W.F. Strydom, eds., *Governance as a Trialogue: Government-Society-Science in Transition*. Berlin: Springer-Verlag.

12. Water Decentralization and Institutional Change

Class topics: What are the benefits of water decentralization? How can institutions be changed to improve water governance? How can participatory and community-led approaches be effective?

Required readings:

- a) *Water, a Shared Responsibility*, *The United Nations World Water Development Report 2* (2006), Chapter 2, (*The Challenges of Water Governance*). Part 3, pp 74 – 80.

- b) *Knowledge Base*, *The United Nations World Water Development Report 4* (2012), Volume 2, Chapter 25, (Water and institutional change: Responding to present and future uncertainty), pp 575 – 581.

13. Water Governance Ahead

Class topics: Where to begin in water policy reform? How can we account for uncertainty in water-governance frameworks? What are the key water-governance challenges facing society over the next decades?

Required readings:

- a) *Water, a Shared Responsibility, The United Nations World Water Development Report 2* (2006), Chapter 2, (*The Challenges of Water Governance*). Part 4, pp 81 – 84.
- b) *Knowledge Base, The United Nations World Water Development Report 4* (2012), Volume 2, Chapter 26 (Developing knowledge and capacity).

14. Class Presentations

Textbook and Readings

All readings will be posted on Courseworks in the ‘Syllabus’ section. You do not need to purchase a textbook for this class, although some of the recommended readings will be from books that you might want to purchase. Each session will have its own page, so please be sure to check there before each class for relevant readings and other announcements. Students should read this material before each class (i.e. the readings should be done by start of lecture that it is associated with).

Resources and Software Packages

Courseworks will be used for communication of assignments, course material, and other information throughout the course. The Columbia University Libraries will be primary resources for course material.

Course Requirements and Evaluation

Class Participation

Each session consists of a lecture and discussion; your participation is expected in each discussion session. The goal of these discussions is to enhance our collective understanding of the session topics through the assigned readings. Therefore, comments should be related to each session’s readings. If you find participation in discussions challenging, please let me know and we can work together to find a strategy so that you can participate successfully. *Grading: For this component, can receive a maximum of 10 points for full participation in each discussion.*

Discussion Lead and Summary

A small group (2 to 3) of students will be responsible for leading the group discussion each week. The goal is to facilitate the flow of comments among the students. You do not necessarily need to interject your comments after each participant speaks, but you should periodically assist you colleagues with their contributions. Further advise on facilitating the discussions can be found here: http://brown.edu/Administration/Sheridan_Center/teaching/documents/10tipsfacilitatingdiscussion.pdf. Your group should prepare a 1-page (maximum) summary

of the class discussions and submit it by the following session (i.e. one week later). This summary will be graded based on its clarity in summarizing the discussions and will count for half of your 'Discussion lead and summary' grade. The other half of this grade will be based on how well you facilitate the discussions. In particular, I would like your group to strive to integrate the ideas from the readings into the discussions. *Grading: The 'Discussion Lead and Summary' component will be graded on a letter grade scale from A+ to F.*

Short-Answer Essays

Four short-answer essays will be assigned to reinforce the basic concepts presented in class and to ensure that students master the main concepts. These essays will consist of 4 to 6 questions. Answers to each question should be no longer than a paragraph (5 to 6 sentence). For example, you may be asked: *What are the main impacts of international trade on national water scarcity as discussed by Hoekstra?* The objective is to gain experience concisely identifying key concepts and arguments. *Grading: The 'Short-Answer Essays' component will be graded on a letter grade scale from A+ to F.*

Term Paper and Presentation

The term paper is a semester-long assignment on a case study in water governance. You should select a topic that is both interesting to you and will help you in developing your career. For example, you may choose to analyze governance policies of a region or nation (e.g. western United States, India) with recommendations on possible improvements to these policies. As another example, you may decide to analyze water governance issues in a particular river basin, looking at upstream versus downstream issues or even the impacts of large dam construction within a river basin. You may even focus on global water governance, analyzing the virtual water trade (associated with one or more commodities) and its relationship with local-scale water availability. A handout with more examples will be distributed early in the semester. Also, I will be available to discuss your interests with you. The term paper should be 8 to 10 pages in length (double spaced, excluding figures and references). Before handing in the final paper, you will first submit a summary or abstract of your topic as well as a progress report on your paper.

During the last session, you will present your findings in a Powerpoint (or equivalent) presentation. You should prepare a maximum of 5 slides (not including the title) and should plan to speak for 8 minutes maximum. Your presentation will be judged by how well you communicate your findings. You should practice your presentation, making sure not to exceed the time limit. The goal of the time limit is to train you to present research findings in a clear and succinct manner. *Grading: The 'Term-paper and Presentation' component will be graded on a letter grade scale from A+ to F.*

Relative Contribution of Assignments and Final Grade

The relative contribution of each of the assignments to your total grade for the course is as follows:

Class participation	= 10%
Discussion lead and summary	= 10%
4 Short-answer essays	= 40%
Term paper and presentation	= 40%

The final course grade will be computed using a weighted average of 'class participation', 'discussion lead and summary', '4 short-answer essays', and 'term paper and presentation'. This grade will then be scaled into a letter grade scale from A+ to F.

Policies and Expectations

Attendance, Late Assignments, and Missed Exam

Students are expected to attend (online) and participate in class discussions. Assignments should be submitted in a timely manner, so that students will be able to understand and benefit from course content. Late assignments will be penalized 10% per day of lateness. Extenuating circumstances should be brought to the attention of the Professor and will be handled on a case-by-case basis.

Academic Integrity and Community Standards

The School of Continuing Education does not tolerate cheating and/or plagiarism in any form. Those students who violate the Code of Academic & Professional Conduct will be subject to the Dean's Disciplinary Procedures. Students are required to comply with the School's policies related to Academic Integrity and Community Standards (details can be found at <http://ce.columbia.edu/node/217>). An excerpt is as follows: "Columbia University expects that its students will act with honesty and propriety at all times and will respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely."

APPENDIX A

Student Information Page

SUMA KTBD Water Governance

Please complete this information page and return it to me at the next class meeting. I will use this information to plan the semester, to get to know you, and to contact you by email or phone if the need arises. I will not share this information with anyone without your consent.

Name _____ Student ID# _____

Contact me by phone at: Home: _____
Work: _____
Other: _____

My UNI email address: _____
Backup email address: _____

Indicate the semester and year in which you completed these course prerequisites:

[Insert course name and number]: _____

[Insert course name and number]: _____

Identify the degree program or certificate program you are in:

Explain why you are you taking this course and how it fits into your degree or certificate program.

What are your expectations for the course?

Briefly describe related experiences or courses that are relevant to this course:

If you require special accommodations, please indicate that below and be sure to discuss them with me soon.

APPENDIX B

Accessibility Statement

Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process.

For more information regarding this service, please visit the University's Health Services website: <http://health.columbia.edu/services/ods/support>