



NYU

**ROBERT F. WAGNER GRADUATE
SCHOOL OF PUBLIC SERVICE**

Water Sourcing and Delivery in an Era of Climate Change

**URPL-GP.2666.001
Tuesdays 4:55-6:35pm**

**Fall 2021
Silver 412**

Instructor:

Natasha Iskander

Puck Building

295 Lafayette St., Room 3043

212-998-7479

natasha.iskander@nyu.edu

Office Hours: Wednesday 5:00-6pm or by appointment

1. Description:

In the coming decades, water will be the central issue in global economic development and health. With one in six people around the world currently lacking access to safe drinking water (1.2 billion people), and more than two out of six lacking adequate sanitation (2.6 billion people), water is already a critical factor affecting the social and economic well being of a sizable proportion of the world's population. However, with the world's population projected to double over the next fifty years, and with rapidly dwindling water supplies becoming both more scarce and more volatile as a result of global warming, we are likely to face a water crisis so severe it will reshape everything from our governance structures to our modes of economic and agricultural production to our patterns of social interaction. Water will be *the* axis around which all public policy revolves.

In light of the centrality of water as a current and future public policy issue, this course explores innovative and sustainable solutions for water harvesting and distribution to address the challenges presented by anthropogenic climate change. The field of water harvesting and delivery has generally considered water supplies to be fairly stable, available to be sourced in the same places. As a result, water infrastructure management has traditionally been concerned with efficient methods of water sourcing, delivery, and purification, and with effective methods of cost-recovery for those services. In this course, we will step out of this conventional framework and look at water provision from a new vantage point: Instead of taking water supplies as a constant, we will look at how water sources are changing as a function of global warming and increased population pressures, and then will ask what implications these shifts are likely to have for water sourcing and water distribution.

2. Design and objectives:

To address the central question of how to secure basic water needs when the water sources and use are undergoing fundamental and unpredictable shifts, the course is built around cases of local water harvesting and distribution systems that students will research collaboratively in small teams throughout the semester (cases are described below). Throughout the course, we will workshop these cases, and use them as concrete settings to accomplish the following three *learning objectives*:

- 1) to understand the challenges presented by changing water availability to existing systems of water sourcing and delivery;
- 2) to explore the political economy of water supply and delivery, and develop a solid grasp of the political and economic issues around the trade of water and around access to water;
- 3) to develop a broad understanding of the challenges of implementing new water harvesting and delivery technologies and institutions, and to develop frameworks for devising creative solutions to overcome those constraints.
- 4) to interpret findings from diverse fields (e.g. predictions in climate science, organizational structures of municipal utilities, technological innovation) and to integrate them in order to develop coherent policy recommendations
- 5) to design solutions for stochastic problems and challenges that cannot not be predicted precisely
- 6) to develop the ability to communicate complex information in accessible and compelling policy memos and presentations
- 7) to develop the ability to learn inductively, and discover and identify patterns and possibilities from the study of real-world examples
- 8) to reflect on the process of inductive learning to identify the practices and skills required for a process of continuous learning.

The course is organized in five segments: an introduction, three thematic modules, and a conclusion. The *introduction* provides an overview of the basic frameworks used by theorists and practitioners to plan and implement water sourcing and distribution systems. The *three thematic modules* hone in on three key aspects on water provision in the face of climate change and population pressures, including:

- Module 1: water sources and climate change;
- Module 2: the political economy of water sourcing and provision; and
- Module 3: technological, design, and institutional innovations for water management and delivery.

The modules, which are mapped out in the schedule summary below, draw on multiple teaching modalities. The first class of each module presents the emerging scholarship on the topic at hand through a participatory lecture format. Each module will feature a guest speaker who is a recognized expert on the issue covered in the module. There will be a class towards the end of each module that is devoted to student presentations on the aspects of their case

covered by the module. After the student presentations, the class will draw out common lessons from the cases about the topic covered in the module through an extensive class discussion. The *conclusion* segment is devoted to synthesizing the common lessons offered by the cases for water harvesting and distribution in an age of global warming.

The combination of these pedagogical approaches will simulate the practices involved in creative inquiring and problem solving. These practices include: developing profound familiarity with the case being researched, drawing on the expertise of researchers who study elements that emerge as critical in the case, brainstorming collaboratively with colleagues and enlisting multiple points of view on the problem at hand, and, finally, teasing out the significance of the lessons the case offers by situating it in a larger body of scholarship on the issue. Instead of outlining this process and imparting it through a traditional lecture format, the course will engage students in the process itself, enabling them to participate in a dynamic of *learning-in-action*.

3. **Assignments and grading:**

Case selection: Please note that you need to indicate your case selection on the google doc sign-up sheet by **Sept 14th at 5:00pm**. You will receive confirmation of your case assignments by September 16. Teams should be made up of three people. If you prefer to focus on a case other than those listed in the syllabus, please note this on the sign-up sheet where indicated.

Readings, class participation, blog posting, and feedback (30% of total grade): Students are expected to complete assigned readings. The readings are substantial, and students are encouraged to develop a practice of reading strategically – focusing in on some sections, skimming others. The goal is to learn how to analyze a large volume of research material and distill knowledge patterns and conceptual frames. Guidance on how to complete the readings will be provided at the beginning of each module. Students are also expected to review team memos, and to participate actively in class discussion. Feedback on student presentations and memos is expected to be constructive and timely. Specific information on feedback for memos is provided below. The completion of readings, class participation (including providing constructive, thoughtful, and detailed oral and written feedback to colleagues), and the blog postings account for *30 percent* of the final grade. Blog posting are not graded individually.

- **Blog posting on Fred Pearce When The Rivers Run Dry:** 500-700 words. Please choose one or two themes or one or two examples from the book. Briefly describe and summarize the themes or examples that caught your attention (no more than 200 words) and then reflect on why they resonated for you. Did they surprise you? Did they confirm or complement something that you believed or knew? Did they raise unexpected questions for you? Please write this essay thoughtfully and carefully.
Posting due September 13, 12pm
- **Blog posting on Module 2:** 700 words. Please choose one issue and discuss the way that climate change is magnifying inequities or existing power structures. You might

also consider discussing what policy or social actions might address these inequities. You may post this blog anytime before November 9.

Presentations and memos (55% of total grade): (see below for instructions on submission)

- **Module 1 Presentation (15% of total grade):** Students are expected to prepare a PowerPoint presentation on how the water sourcing and distribution systems in their cases are likely to be affected by changing patterns of water availability due to climate change. Focus on the watershed in your area and the specific climate pressures that will affect it. Presentations—including Q&A—should be 15 minutes in length. They should focus on areas that teams are still struggling to resolve. Please include a map in your presentation. **Due Tuesday, October 5.**
- **Module 2 Memo (15% of total grade):** Students are expected to prepare a 2,000-3,000 word memo on the political and economic factors shaping water sourcing and distribution, as well as sanitation provision, if applicable, in their water system. **Memo due Saturday Nov 13, midnight.** All students in the class need to read the memos of other teams and come to class prepared to give constructive and specific feedback. There is no presentation for this module. Teams will be paired up and will discuss each other's memos in detail. The second memo should build on the presentation for Module 1. Consider these deliverables building blocks for the final memo.
 - **Team-to-Team Feedback:** Each team is expected to review the memo of another team (team assignments will be made in class) and come to class with thoughtful oral and written commentary. Please prepare a document with synthetic commentary of at least 250 words. Please point out the strengths of the memo. Please also point out areas that could be further developed, questions that may have been overlooked or glossed over, inconsistencies or internal contradictions, factual and conceptual. Please feel free to also suggest helpful resources or readings. You may also refer to the presentation for Module 1 in your comments.
- **Module 3:** *Students are not expected to prepare a presentation or memo for the third module. Solutions to the problems raised in Module 3 should be incorporated into the final memo and final presentation.*
 - **Final Memo and Presentation (25% of total grade):** Student teams will write a final 10-page memo that will synthesize the lessons learned about the case throughout the course and make recommendations for how to adapt the existing water sourcing and delivery systems in their case to the changes foreseen due to climate change. Presentations—including Q&A—should last no more than 15 minutes, and will be delivered in class on **Tuesday December**

7. Final memos are due ***Friday December 10, midnight***. Final memos account for *25 percent* of the final grade.

- ***Final essay (15% of total grade)***: Each student will write a final individual 800 word essay on an aspect of water and climate change that he or she found particularly compelling. This essay is a reflective and analytic exercise. It does require additional research. This essay is due on ***Tuesday December 14*** and accounts for *15 percent* of the final grade. **See end of syllabus for schedule summary.**

Learning Assessment Table

Graded Assignment	Course Objective Covered
Participation	All
Blog posting/Goddell	5, 6, 7
Module 1 presentation	1, 4, 5
Module 2 memo	2, 4, 6, 7
Module 2 feedback	2, 4, 7
Final memo/presentation	All
Final memo feedback	1, 2, 3, 4, 5, 7
Reflection essay	8

Grading Scale and Rubric

Students will receive grades according to the following scale:

(A) Excellent: Work at this level is unusually thorough, well-reasoned, creative, methodologically sophisticated, and well written. Numeric value=4.0 points.

(A-) Very good: Work at this level shows signs of creativity, is thorough and well-reasoned, indicates strong understanding of appropriate methodological or analytical approaches, and meets professional standards. Numeric value=3.7 points.

(B+) Good: Work is well-reasoned and thorough, methodologically sound. This grade indicates the student has fully accomplished the basic objectives of the course. Numeric value=3.3 points.

(B) Adequate: Competent work for a graduate student even though some weaknesses are evident. Meets key course objectives but evidence suggests that understanding of some important issues is less than complete. Numeric value=3.0 points.

(B-) Borderline: Meets the minimal expectations for a graduate student in the course. Understanding of salient issues is somewhat incomplete. Numeric value=2.7 points.

(C/-/+) Deficient: Work is inadequately developed or flawed by numerous errors and misunderstanding of important issues. Methodological or analytical work performed is weak and fails to demonstrate knowledge or technical competence expected of graduate students. Numeric value = 2.3; 2.0; 1.7 points.

(F) Fail: Work fails to meet even minimal expectations for course credit for a graduate student. Performance has been consistently weak in methodology and understanding, with serious limits in many areas. Weaknesses or limits are pervasive. Numeric value = 0.0 points.

Cases:

A research folder on each of these cases can be found on the class site. The folder contains a few key articles and resources to get you started. Please review these folders before making your final selection.

- ***Water for the urban poor in Mumbai:*** This project examines alternative water supply methods that cover for the insufficient supply provided by the city's water department. Over half of Mumbai's population lives in slums, and two thirds of the households in the slums purchase water through informal distribution systems run by private vendors. The city reservoirs, which rely on the regularity of monsoon rains, are also becoming increasingly vulnerable due to climate change.
- ***Water stress in Amman:*** This project studies the challenge of making water available in a semi-arid region that needs to meet water needs for a growing population. The surge in population has been accelerated by the refugee crisis —1 million Syrian refugees in the last decade, who mostly congregate in the capital Amman. Jordan is one of the world's most water stressed nations and two-thirds of its water comes from aquifers, with charges that become less predictable with climate change. While controversial, the 2025 Red Sea–Dead Sea Water Conveyance Project plans to alleviate the pressure on groundwater supplies by bringing desalinated water to the city of Amman.
- ***Water conservation in Las Vegas:*** This project examines the policies and infrastructure works that have been put in place for managing water conservation; Las Vegas has reduced consumption in recent years despite the city's growing population. Ninety percent of Las Vegas drinking water comes from the Lake Mead reservoir, which is charged by the Colorado river —the river has been shrinking in the past decades due to persistent drought conditions in the state of Nevada.
- ***Water demand in Cape Town:*** Three successive years of drought almost depleted Cape Town's water reservoirs, having come close to reaching "day zero" in 2018. This project explores how water demand has been regulated and their effects (and limitations) in curbing consumption before and after 2018.
- ***Water scarcity and wastewater challenges in Mexico City:*** This project will explore both the water scarcity and the wastewater challenges in Mexico City, with its growing population and diminishing source of water. Adaptive plans of a sewage canal and well drilling for water are met with the challenge of the city sinking each year due to dry brittle land, that gets drier and brittle with a warmer climate and continual drought.

- **Speakers**

Five of our class sessions will feature researchers working on various aspects of hydrology, water sourcing and provision, and adaptation. Speakers will join the class via zoom, and so on speaker days, we will not meet in person. Some of these sessions will be open to the public (at the speakers' discretion) and some will be offered at times other than our regular class time to accommodate differences in time zone.

Fred Pearce

Fred Pearce is a freelance author and journalist based in London. He has reported on environment, science, and development issues from 64 countries over the past 20 years. Trained as a geographer, he has been environment consultant of New Scientist magazine since 1992. He writes regularly for the Guardian newspaper, including the weekly Greenwash column, and recently published a 12-part investigation of the 'climategate' emails affair at the University of East Anglia. Fred's books have been translated into at least 14 languages.

Madeline Youngs:

Madeline Youngs is a NOAA Climate and Global Change Postdoctoral Fellow at NYU Courant. She studies how atmospheric and oceanic storm tracks are responding to climate change through a dynamical systems perspective. Her research spans the fields of applied math, geophysical fluid dynamics, atmospheric dynamics, and physical oceanography. Her PhD Thesis from the MIT-WHOI Joint Program in Oceanography is focused on meridional overturning circulation and Southern Ocean dynamics.

Riccardo Fabiani

Riccardo Fabiani is North Africa project director for International Crisis Group, the independent conflict-prevention organization. Riccardo has more than ten years of professional experience as a political analyst and economist on North Africa, having worked for Eurasia Group, Energy Aspects and other consultancies. He has published articles for the Carnegie Endowment's Sada Journal, Jadaliyya, the Konrad Adenauer Stiftung and the Financial Times.

Ana Correa do Lago

Ana Correa do Lago is a researcher and economist focused on the response of cities to the extreme events posed by the climate crisis. She holds an MS in Urban Ecologies from Parsons School of Design, where she developed an investigation on alternative water supply systems that emerged in São Paulo, Brazil, following the water accessibility crisis of 2015. Her project earned the Student Research Award grant from The New School and was presented in the 2021 Latin American Studies Congress. Having worked at the BCorp Natura&Co —Brazil's leading developer of products based on the biodiversity of the Brazilian flora— Lago learned to implement public affairs strategies, and now reimagines how the concept of sustainability can move from corporate social responsibility initiatives to transforming cities that benefit people.

Masoud Ghanderani

Masoud Ghandehari serves on the Faculty of Civil and Urban Engineering at the NYU

Tandon School of Engineering and is an associate faculty at the NYU Center for Urban Science and Progress. His research focus is on urban systems engineering and the application of advanced instrumentation and data analysis targeting the aging, health, and performance of infrastructure systems. Through the application of sensing, and modeling, he works on methodologies that generate data on the interaction of physical, natural and human systems in cities. His research in optical spectroscopy, sensing, imaging, and data analytics has led to the development of applications and technologies suitable for diverse environments and multiple scales; ranging from the molecular to the urban landscape. Professor Ghandehari is author of [*Optical Phenomenology and Applications: Health Monitoring for Infrastructure Materials and the Environment*](#), 2018, the founding investigator of the [*New York State Resiliency Institute for Storm Events*](#), and founder of [*Chromosense LLC*](#)., which is supported by the National Institutes of Health for innovation in environmental sensing.

4. **Required Books**

- Pearce, Fred. 2018. **When the Rivers Run Dry, Fully Revised and Updated Edition**. New York: Penguin Random House. <https://www.penguinrandomhouse.com/books/567169/when-the-rivers-run-dry-fully-revised-and-updated-edition-by-fred-pearce/>
Please make sure to read the updated version – 2018. The ebook cost \$16 at the various sites listed on the publisher’s website. Please note that the author will be joining the class on September 14.
- Clark, A. 2018. **The Poisoned City. Flint's water and the American urban tragedy**. New York : Metropolitan Books. <https://us.macmillan.com/books/9781250125149>.
The ebook cost \$12 at the various sites listed on the publisher’s website.
- Sneddon, Christopher. 2015. **Concrete Revolution: Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation**. Available online through NYU Libraries.

5. **Recommended readings on hydrology (not required)**

- Brutsaert, Wilfried. *Hydrology: An Introduction*. <http://www.amazon.com/Hydrology-Introduction-Wilfried-Brutsaert/dp/0521824796>
- Loucks, D. et al. *Water Resources Systems Planning and Management: An Introduction to Methods, Models, and Applications*. UNESCO. <http://ecommons.cornell.edu/handle/1813/2804>
- Tindell J., Kunkel J. *Unsaturated Zone Hydrology for Scientists and Engineers*. http://wwwbr.cr.usgs.gov/projects/GW_Unsat/Unsat_Zone_Book/index.html
- Intergovernmental Panel on Climate Change. *Climate Change 2001: Chapter 4: Hydrology and Water*. <http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=159>

6. Modules:

Introduction: Water systems, water sourcing, water delivery	Sept 7 – Sept 14
<p><i>Readings:</i></p> <ul style="list-style-type: none"> Pearce, Fred. 2018. When the Rivers Run Dry. Fully Revised and Updated Edition. New York: Penguin Random House. https://www.penguinrandomhouse.com/books/567169/when-the-rivers-run-dry-fully-revised-and-updated-edition-by-fred-pearce/ Rosinger, Asher. 2021. “The Human Thirst.” Scientific American. July 2021. 	
<i>Speaker: Fred Pearce</i>	Sept 14
<i>Due: Blog posting on ‘When the Rivers Run Dry’ Case Preference Form</i>	Sept 13 5pm

Module 1: Climate Change, Water Availability, and Social Impacts	Sept 21, Sept 28, Oct 5
<p><i>Readings:</i></p> <ul style="list-style-type: none"> Alfieri, Lorenzo, Francesco Dottori, Richard Betts, Peter Salamon, and Luc Feyen. 2018. "Multi-Model Projections of River Flood Risk in Europe under Global Warming." <i>Climate</i> 6 (1):6. Ault, T. 2020. “On the essentials of drought in a changing climate.” <i>Science</i>. Vol. 368, no. 6488. Bales, Roger C., Michael L. Goulden, Carolyn T. Hunsaker, Martha H. Conklin, Peter C. Hartsough, Anthony T. O’Geen, Jan W. Hopmans, and Mohammad Safeeq. 2018. "Mechanisms controlling the impact of multi-year drought on mountain hydrology." <i>Scientific Reports</i> 8 (1):690. doi: 10.1038/s41598-017-19007-0. Brazil, Rachel. 2020. The Weirdness of Water. <i>Chemistry World</i>. April 6, 2020. De Conto, R. et al. 2021. “The Paris Climate Agreement and Future Sea Level Rise in Antarctica.” <i>Nature</i>. Vol. 593. De Graf, I. et al. 2019. “Environmental Flow Limits to Global Groundwater Pumping.” <i>Nature</i>. Vol. 574. 	

<ul style="list-style-type: none"> • Edwards, T. et al. 2021. “Projected Land Ice Contributions to Twenty-First Century Sea Level Rise.” Nature. Vol. 593. • Flörke, Martina, Christof Schneider, and Robert I. McDonald. 2018. "Water competition between cities and agriculture driven by climate change and urban growth." Nature Sustainability 1 (1):51-58. • Humphry, V. et al. 2021. “Soil Moisture-Atmosphere Feedback Dominates Land Carbon Uptake Variability. Nature. Vol. 592. • Kim, Tae-Woong, and Muhammad Jehanzaib. 2020. "Drought Risk Analysis, Forecasting and Assessment under Climate Change." Water. Vol. 12, no. 7 • McKinnon, K. et al. 2021. “Hot Extremes Have Become Drier in the United States Southwest.” Nature Climate Change. Vol 11. • Rodell, M. et al. 2018. “Emerging trends in global freshwater availability.” Nature. • Tollefson, J. et. al. 2019. “Oceans Under Threat from Climate Change.” Nature. Vol. 574. • Woolway. R. et al. 2021. “Lake Heatwaves Under Climate Change.” Nature. Vol. 589. 	
<i>Speaker: Madeline Young</i>	Sept 28
<p>Due: <i>Presentations:</i> Consider the water system in which the water sourcing and water delivery of your project is embedded. How will this system be affected by climate change? What impacts will this have on the water sourcing and delivery mechanisms of your project?</p>	Oct 5

Module 2: Political Economy of Water Sourcing and Delivery	Oct 19, Oct 26, Nov 2,
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	Nov 9, Nov 16
<p><i>Part 1: Political Economic of Water: Categories and Concepts</i></p> <ul style="list-style-type: none"> • Olsen, Tim. 2014. “Virtual Water: tracking the unseen water in goods and resources”. Earth Magazine. https://www.earthmagazine.org/article/virtual-water-tracking-unseen-water-goods-and-resources • Oki et al. 2017. “Economic aspects of virtual water trade”. Environmental Resource Letter 12 044002. http://iopscience.iop.org/article/10.1088/1748-9326/aa625f/pdf • Vidal, John. 2015. “Water Privatization: a worldwide failure?”. https://www.theguardian.com/global-development/2015/jan/30/water-privatisation-worldwide-failure-lagos-world-bank • Lappe, Anna. 2014. “World Bank wants water privatized, despite risks”. http://america.aljazeera.com/opinions/2014/4/water-managementprivatizationworldbankgroupifc.html • Thompson, K. et al. 2017. “Thirsty for change: The untapped potential of women in urban water management.” Deloitte Insights. Issue 20, January 23, 2017. https://www2.deloitte.com/us/en/insights/deloitte-review/issue-20/women-in-water-management.html • Mei Lin, M. and R. Hidayat. 2018. “Jakarta, the fastest-sinking city in the world.” BBC Indonesian. August 13, 2018. https://www.bbc.com/news/world-asia-44636934 • Galbraith, K. 2011. “How Energy Drains Water Supplies.” New York Times. Sept. 18, 2011. https://www.nytimes.com/2011/09/19/business/global/19iht-green19.html?smid=url-share <p><i>Part 2: Water Wars: Geopolitics of Dams</i></p> <p><i>Readings:</i></p> <ul style="list-style-type: none"> • “Water Wars: The Next Great Driver of Global Conflict.” 2015. The National Interest. http://nationalinterest.org/feature/water-wars-the-next-great-driver-global-conflict-13842 • Sneddon, Christopher. 2015. <u>Concrete Revolution: Large Dams, Cold War Geopolitics, and the US Bureau of Reclamation</u>. Chicago, IL: University of Chicago Press. Chapter 1 (p.1-13 only), Chapter 4, Chapter 6, Chapter 7. 	Oct 19
<i>Speaker: Riccardo Fabiani</i>	Oct 26
<i>Part 3: Water Access: Environmental Justice, Power, and Place</i>	

<p>Case study: Sao Paolo</p> <p><i>Readings:</i></p> <ul style="list-style-type: none"> • Cohen, Daniel Aldana. 2016. "The Rationed City: The Politics of Water, Housing, and Land use in Drought-Parched São Paulo." <i>Public Culture</i> 28 (2 (79)): 261-289. • Empinotti, Vanessa Lucena, Jessica Budds, and Marcelo Aversa. 2019a. "Governance and Water Security: The Role of the Water Institutional Framework in the 2013–15 Water Crisis in São Paulo, Brazil." <i>Geoforum</i> 98: 46-54. doi: • Millington, Nate. 2018. "Producing Water Scarcity in São Paulo, Brazil: The 2014-2015 Water Crisis and the Binding Politics of Infrastructure." <i>Political Geography</i> 65: 26-34. • Correa do Lago, A. 2020. "Unmapped responses to water security in Sao Paulo in the light of the drought of 2014-2015." <i>New School for Social Research</i>. • SABESP Sustainability Report 2018 (pages 24-33). https://api.mziq.com/mzfilemanager/v2/d/9e47ee51-f833-4a23-af98-2bac9e54e0b3/35e98123-ccd4-6031-7a53-b7d7d60d0206?origin=1 	
<p><i>Speaker: Ana Correa do Lago</i></p>	<p>Nov 2</p>
<p>Case study: Flint, Michigan</p> <p><i>Readings:</i></p> <ul style="list-style-type: none"> • Clark, A. 2018. <u>The Poisoned City. Flint's water and the American urban tragedy</u>. New York: Metropolitan Books. 	<p>Nov 9</p>
<p>Due: <i>Blog posting:</i> One blog posting on any of the readings or issues from this module is required.</p> <p><i>Papers:</i> Please evaluate the political economy of water as it applies to your case. How is water traded in the water sourcing and distribution system in your case? Consider pricing, ownership and distribution schemes. What kind of access to water do people who use the water in your case have? What are the factors that shape their access? Consider factors such as social identity (gender), social power (social class), and spatial location.</p>	<p>Blog: Oct 19-Nov 9</p> <p>Paper: Nov 13, Saturday - midnight.</p>

<p>Module 3: Technological and Institutional Innovation for Adaptation to Climate Change</p>	<p>Nov 23, Nov 30, Dec 7</p>
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<p><i>Readings:</i></p> <ul style="list-style-type: none"> • Godoy, Julio. 2011. Great Green Wall to stop Sahel desertification. The Guardian. https://www.theguardian.com/global-development/2011/feb/25/great-green-wall-sahel-desertification • O’Hare, Ryan. November 2016. “The ‘fog catchers’ in the Sahara that can make water out of Thin Air for hundreds of people”. http://www.dailymail.co.uk/sciencetech/article-3949572/The-fog-catchers-Sahara-make-water-AIR-hundreds-people.html • Temple, James. 2017. How to pull water out of thin air, even in the driest parts of the globe. MIT Technology Review. https://www.technologyreview.com/s/604137/water-from-desert-skies/ • Eisenstein, M. 2020. Natural Solutions for Agricultural Productivity. Nature. Vol. 588. • Klinenberg, E. 2021. “The Seas Are Rising. Could Oysters Help?” The New Yorker. August 2, 2021. https://www.newyorker.com/magazine/2021/08/09/the-seas-are-rising-could-oysters-protect-us?utm_source=onsite-share&utm_medium=email&utm_campaign=onsite-share&utm_brand=the-new-yorker • Malloy, C. 2021. How to Build a Water-Smart City. Bloomberg News. August 2, 2021. https://www.bloomberg.com/news/features/2021-08-02/how-to-build-a-water-smart-city 	
<p><i>Speaker:</i> Masoud Ghanderani</p>	<p>Nov 30</p>
<p>Considerations to be included in final presentation/memo: What are the technologies used to source and distribution water in your case? What are the institutions that govern how water is sourced and distributed? How might both of these be affected by climate change? Are technological and institutional alternatives that would facilitate adaptation to climate change available?</p>	<p>Final presentation: Dec 7 Final Memo: Dec 10</p>
<p>Conclusion: Synthesis and Recommendations</p>	<p>Dec 14</p>

7. Schedule Summary

Date	Course Section	Class Focus	In Person or Zoom
Sept. 7	Introduction	Course Overview and Discussion	
Sept 13	Introduction	<i>When the Rivers Run Dry</i> blog posting due	
Sept. 14	Introduction	Discussion of <i>When the Rivers Run Dry</i> Speaker: Fred Pearce	ZOOM
Sept 21	Module 1	Lecture and Discussion	
Sept. 28	Module 1	Speaker: Madeline Youngs	In person
Oct. 5	Module 1	<i>Team Presentations</i>	
Oct. 19	Module 2	Lecture and Discussion	
Oct. 26	Module 2	Speaker: Riccardo Fabiani	ZOOM 12pm
Nov. 2	Module 2	Speaker: Ana Correa do Lago	ZOOM
Nov. 9	Module 2	Lecture and Discussion <i>Module 2 blog posting due</i>	
Nov. 13		<i>Module 2 Memo Due, Midnight</i>	
Nov. 16	Module 2	<i>Module 2 Team to team discussion</i> <i>Written feedback due</i>	
Nov. 23	Module 3	Lecture and Discussion	
Nov. 30	Module 3	Speaker: Masoud Ghanderani	In person
Dec. 7	Module 3	<i>Case Presentations</i>	
Dec. 10	Module 3	<i>Final Memo Due, Midnight</i>	
Dec. 14	Conclusion	Reflection <i>Reflection Essay Due</i>	

8. Class Policies

Academic Integrity

Academic integrity is a vital component of Wagner and NYU. Each student is required to sign and abide by Wagner's Academic Code. Plagiarism of any form will not be tolerated since you have all signed an Academic Oath and are bound by the academic code of the school. Every student is expected to maintain academic integrity and is expected to report violations to me. If you are unsure about what is expected of you should *ask*.

Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the Moses Center for Students with Disabilities (CSD) website at www.nyu.edu/csd and click on the Reasonable Accommodations and How to Register tab or call or e-mail CSD at (212-998-4980 or mosescsd@nyu.edu) for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

NYU's Calendar Policy on Religious Holidays

NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.

Student Resources

The case study assignments require research beyond the readings assigned for the course. The NYU library system provides additional support for research using many different kinds of data. For more information about these services, please go to the guides link at Bobst library.

Class Policies

Attendance is required. If you need to miss a class, please email the instructor.

As we consider questions of water management in a time of climate change, we will be drawing on your casework in our classroom analysis. As a result, this class has a strict policy regarding late submission. Barring family emergencies and/or illness, late submissions of case-related assignments will not be accepted. Late submissions for other assignments will be accepted, but may result in a grade deduction.