

Civ_Env 395/JWSH_ST 390

Water in Israel and the Middle East:

Resilience, Sustainability, and Security

Syllabus

Course Time: Thursday 2-5 pm Location: Ann 101

Instructors: Dr. Aaron Packman, Department of Civil and Environmental Engineering
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Texts: Reading assigned each week

Course Objectives: The course will provide an overview of the climatic and geographical limitations on water availability in Israel and the Middle East, discuss ancient and modern societal responses to these limitations, and define opportunities for development of sustainable solutions for regional stability and prosperity.

Course description: This seminar will explore how the availability of water in the Middle East has shaped the development of civilizations, influenced political stability in the region, and driven innovation in water technologies. The course will investigate historical dimensions of water in Israel and the Middle East, focusing on ancient civilizations and the water infrastructures that are essential tools in aiding the development of water-poor societies. We will use this historical context as a stepping-stone will to transition into a more recent history of the Middle East, focusing on the challenges that the nascent state of Israel faced following the influx of millions of immigrants. We will then examine efforts to develop the necessary water resources needed to support the burgeoning population as well as the irrigation projects designed to convert barren desert land into cultivated agriculture. This more recent history will help to set the stage for discussions regarding geopolitical conflicts over land and water that continue to this day. We will evaluate regional climate and water in the context of current and future geopolitical conflicts, reviewing recent advances in water technologies spurred by these limitations as well as the potential for development of combined social and technological solutions for long-term water sustainability in Israel and the Middle East. We will end the course with discussions regarding opportunities for global translation of innovative water technologies and water-management solutions developed in Israel to other water-poor regions. In addition, the course will host a half-day conference featuring international experts. It will explore how water access and control contributes to trans-boundary politics and how recent advances in Israeli water technologies may serve as model for sustainable water development in other water-poor regions of the world.

Assignments and Expectations: 1. Weekly readings and position paper: Students will read relevant selections from the literature each week (2-3 journal articles or book chapters per week), and prepare a brief position paper (2-3 pages) exploring study questions for each set of readings. 2. Student presentations and a student-led discussion each week: each week, each student will present an overview of the major topics for the week and lead the discussion based on the position papers. The

course explicitly cross-cuts historical, social, geopolitical, scientific, and technological themes, so students are expected to lead discussions within their primary domain(s) of interest and contribute to broader class discussions of cross-cutting themes. 3. Seminar paper due at the end of the term exploring a major course theme within each student’s primary interest. This will result in a fully researched and referenced 10-15-page paper that explores one of the course’s major themes.

Grading: Weekly written synopses of study questions (20%). Weekly presentation and discussion (20%). Mid-term written background material for seminar paper (20%). Final seminar paper (40%).

Class schedule

Week	Date	Speaker	Topic
1	3/30	Elie Rekhess	Water in ancient times: Geography of Israel and the Middle East, water use, religious and cultural aspects
2	4/6	Aaron Packman	Ancient water infrastructure systems in Israel and the Middle East
3	4/13	Elie Rekhess	Water in Israel’s formative years (1948-1960)
4	4/20	Aaron Packman	Climate and water resources of the Middle East: Past, present, and future
5	4/27	Elie Rekhess	Current water conflicts and transboundary rights in the Middle East
6	5/4	Sera Young Aaron Packman	Water security in the Middle East: Collaboration in science and politics
7	5/11	Seth Snyder	Recent innovations in water technology for arid lands
8	Wed 5/18	Aaron Packman Elie Rekhess	Pathways to long-term water sustainability in Israel and the Middle East
9	5/24	<i>Symposium</i>	Water in Israel and the Middle East: regional water sustainability and resilience

Week	Date	Topic & Reading List	Discussion Leaders
1	3/30	<p>Water in ancient times: Geography of Israel and the Middle East, water use, religious and cultural aspects – Prof. Elie Rekhess</p> <ol style="list-style-type: none"> Hopkins, David. “Geomorphology of Highland Canaan,” <i>The Highlands of Canaan: Agricultural Life in the Early Iron Age</i>. Sheffield: Almond Press, 1985. Mithen, Steven J., and Sue Mithen. “The Water Revolution: The origins of water management in the Levant, 1.5 million years ago to 700 BC,” <i>Thirst: Water and Power in the Ancient World</i>. London: Weidenfeld & Nicolson, 2012. 	
2	4/6	<p>Ancient water infrastructure systems in Israel and the Middle East – Prof. Aaron Packman</p> <ol style="list-style-type: none"> Ashkenazi E, Avni Y, Avni G. A comprehensive characterization of ancient desert agricultural systems in the Negev Highlands of Israel. <i>Journal of Arid Environments</i>. 2012;86:55-64. 	

		<p>2. Biswas AK. Ancient urban water supply systems. <i>GeoJournal</i>. 1985;11(3):207-13.</p> <p>3. Gill D. Subterranean waterworks of biblical Jerusalem: Adaptation of a karst system. <i>Science</i>. 1991;254(5037):1467.</p>	
3	4/13	<p>Water in Israel's formative years (1948-1960) – Prof. Elie Rekhess</p> <p>1. Morag, Nadav. "Water, Geopolitics and State Building: The Case of Israel" <i>Middle Eastern Studies</i> 37, no. 3, 2001.</p> <p>2. Siegel, Seth. "The National Water Carrier," <i>Let There be Water</i>. New York: Macmillan, 2015.</p>	
4	4/20	<p>Climate and water resources of the Middle East: Past, present, and future – Prof. Aaron Packman</p> <p>1. Kaniewski D, Van Campo E, Weiss H. Drought is a recurring challenge in the Middle East. <i>Proceedings of the National Academy of Sciences</i>. 2012;109(10):3862-7.</p> <p>2. Kelley CP, Mohtadi S, Cane MA, Seager R, Kushnir Y. Climate change in the Fertile Crescent and implications of the recent Syrian drought. <i>Proceedings of the National Academy of Sciences</i>. 2015;112(11):3241-6.</p> <p>3. Lelieveld J, Proestos Y, Hadjinicolaou P, Tanarhte M, Tyrlis E, Zittis G. Strongly increasing heat extremes in the Middle East and North Africa (MENA) in the 21st century. <i>Climatic Change</i>. 2016;137(1-2):245-60.</p>	
5	4/27	<p>Current water conflicts and transboundary water issues in the Middle East – Prof. Elie Rekhess</p> <p>1. Jan Selby, "The Geopolitics of Water in the Middle East: Fantasies and Realities," <i>Third World Quarterly</i> 26, no. 2 (March 2005): 329-349.</p> <p>2. Mark Zeitoun, <i>Power and Water in the Middle East: The Hidden Politics of the Palestinian-Israeli Water Conflict</i>, (London: I.B. Tauris, 2008), Chapter 8: "Hydraulic Power – Dominance of Production," pp. 125-144.</p>	
6	5/4	<p>Water security in the Middle East: Collaboration in science and politics – Prof. Aaron Packman</p> <p>1. Erika Weinthal. "Securitizing Water, Climate, and Migration in Israel, Jordan, and Syria." <i>International Environmental Agreements: Politics, Law and Economics</i> 15, (3), (September 2015): 293-307.</p> <p>2. Alon Tal. "The Evolution of Israeli Water Management: The Elusive Search For Environmental Security." <i>Water Security in the Middle East: Essays in Scientific and Social Cooperation</i>, edited by Jean Axelrad Cahan, Anthem Press, London, UK; New York, NY, USA, 2017, 125–144</p>	
7	5/11	<p>Recent innovations in water technology for arid lands – Prof. Seth Snyder</p> <p>1. USGS Saline Water: Desalination Fact Sheet, http://water.usgs.gov/edu/drinkseawater.html</p> <p>2. Carter, 2015, <i>Desalination and Membrane Technologies</i>, US Congressional Research Service, 40477</p>	

		3. World Bank, MENA <u>Development Report, Renewable Energy Desalination: An Emerging Solution to Close the Water Gap in the Middle East and North Africa</u> , Chapter 4: Desalination in MENA and Its Energy Implications, 63-86.	
8	5/18	<p>Pathways to long-term water sustainability in Israel and the Middle East – Profs. Aaron Packman & Elie Rekhess</p> <ol style="list-style-type: none"> 1. K. Elgendy (2015). How sustainable is your oasis?: A review of Water Resources in Middle East cities, <i>Carboun Journal, Middle East Sustainable Cities</i>, www.carboun.com/energy/how-sustainable-is-your-oasis/ 2. Israel Sustainability Outlook 2030 (2011), http://www.jiis.org.il/.upload/KayamutEnglish.pdf 3. R. de Man (2016). Transboundary wastewater governance – Options based on an uncertainty perspective. The Hague Institute for Global Justice, Working Paper 15, March, 2016. 	
9	Wed. 5/24	Water in Israel and the Middle East: regional water sustainability and resilience – <i>Symposium</i>	