EVPP 434/534: Food-Energy-Water Nexus
Fall 2020
Tuesdays/Thursdays 12:00 pm-1:15 pm

Instructor
Dr. Jennifer Sklarew
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Office: DK 3019
Hours: Thursdays, 10:30 am to 11:30 am by appointment

Course description: Food, energy and water systems face individual challenges to their sustainability and resilience. The linkages between these systems can generate additional challenges. Integrative solutions that leverage these systems’ interdependencies are emerging. In EVPP 434/534: Food Energy Water Nexus, we’ll discuss resilience and sustainability challenges that involve the food, energy water nexus, as well as innovative solutions to these challenges. Our discussions will bridge multiple disciplines, as we examine the technological, economic, and institutional dimensions of the nexus in various places around the globe at local and national scales.

Course Learning Objectives:
1) understand linkages between food, energy and water systems;
2) understand interlinked challenges facing these systems;
3) understand some existing solutions to these challenges;
4) apply existing and new solutions to these challenges;
5) recognize how the parameters for 1-4 vary for different places.

Weekly Learning Objectives:
Weekly learning objectives will help us to move toward our course learning objectives.

Readings:
Required text:

Weekly readings: All students must read all of the required readings. Graduate students must also read the optional readings marked with **.
Assignments:
1) Article for discussion: At least once during the semester, each student will find an article (newspaper, journal, magazine, website posting, etc.) on the food-energy-water nexus for discussion in class. Please send the article to me as a PDF via email by midnight the Saturday before class so I can distribute it for everyone to read before class. Please also send me 2-3 questions for the class to discuss. Be prepared to lead a 15-minute discussion of the article and your discussion questions in class, including a brief summary of the article and how it relates to that week’s topic. Graduate students also must create a short slide presentation summarizing their article and how it relates to the food-energy-water nexus, and must send their slide presentations to me by midnight the day before class. Late penalties for all submissions apply (see deadlines below).

2) Semester project and interim assignments:
The semester project will enable you to explore the food-energy-water nexus challenges in a place or organization of your choosing. You also will examine solutions that leverage these systems’ interdependencies. You will have the opportunity to apply your own specific research interests.

Semester project:
The overall assignment is to examine a food-energy-water nexus problem and assess solutions in a place or organization you choose. Graduate students also must include identification of lessons on challenges and solutions that can apply to other organizations or places, including technical, economic, institutional, and/or other aspects. If you choose a place/organization that already has resolved a problem, you can conduct a case study of this place, including challenges they overcame and lessons for other places.

Interim assignments:
1. 3rd week: Project topic selection: Choose an organization, city, county, state or country that is facing or has faced a food-energy-water nexus challenge.

2. 7th week: Nexus challenge and actors involved: (3-5 pages for undergrads, 6-8 pages for grad students)
   a. Describe the food-energy-water nexus challenge on which you will focus in the organization or place you selected. Describe the ecological, economic, and institutional aspects of the challenge.
   b. Describe the actors involved in creating the challenge, including government, private sector, NGOs, citizens, and other entities. Describe these actors’ roles in creating the challenge.
   c. Describe the actors affected by the challenge, including government, private sector, NGOs, citizens, and other entities. Describe how they are affected.
   d. Graduate students also need to include: an analysis of how the challenge they have selected can apply to other organizations or places, including technical, economic, institutional, and/or other aspects.
   e. References/citations
3. 13th week: Nexus solutions, actors involved, and challenges to the solutions: (6-8 pages for undergrads, 10-12 pages for grad students)
a. Describe any solutions already attempted, and propose your own solution(s). These can include technical, economic, institutional, and other aspects.
b. Describe the actors involved in these solutions, including government, private sector, NGOs, citizens, and other entities.
c. Describe the actors affected – positively or negatively – by these solutions.
d. Assess challenges to these solutions, including technological, economic, and institutional aspects.
e. Graduate students also need to include: a description of lessons from a-d above that can apply to other organizations or places, including technical, economic, institutional, and/or other aspects.
f. References/citations

4. 15th week: Turn in final papers incorporating revision of the interim assignments.

3) Presentation: At the end of the semester, each student must give a short presentation that explains his/her semester project results. Graduate students’ presentations will include applied lessons for other places. More details will be provided later in the semester. (undergraduates: 15 minutes; graduate students: 20 minutes)

4) Extra credit presentation: Sometime during the semester, you may give a short guest lecture on your area of research as it pertains to the food-energy-water nexus (up to five extra credit points).

Deadlines: In fairness to all students, I will lower your grade by ten points for each day that any assignment is late without a previously approved extension, starting from the time of the deadline. E.g., if you hand in your assignment within 24 hours after the deadline, 10 points off; within 2 days, 20 points off, etc. Extensions will be granted only for written requests that involve an emergency or other reason deemed valid by the instructor.

Class participation/Group discussion: Aside from the textbook readings, I will post on Blackboard all of the required readings, including the article of the week chosen by you, along with questions for you to consider while reading. We’ll discuss these questions in class. Optional readings marked with ** are required for graduate students, who will summarize them in class. Your participation grade is based on your attendance in class and your active participation, which enables me to assess your understanding of the readings and concepts. One class session during the semester will be dedicated to discussion of FEW nexus challenges and solutions discovered through students’ semester project research. Graduate students will each provide 2 questions for this class discussion session.

Attendance:
Missing class: If you need to miss class due to illness, travel, family obligations, etc., please notify me ahead of time via email. To receive credit for the missed class, please choose two of the reading questions and email your responses to me before the next class. If you have an unexcused absence and do not send answers to the questions, you will receive
a zero for that day. If you have an excused absence but do not answer the questions, the class will not count toward your grade.

**Late arrival:** If you are more than 15 minutes late to class without a valid explanation, your participation grade for that day will be reduced by 10 points.

**Cell phone/computer use:** If you use a cell phone or computer during class time for purposes other than the class, you will receive an unexcused absence for that day. If you need to use one of these for an emergency, please step out of the room and/or let me know. (No need for personal details; just let me know that you are having a problem that necessitates phone/computer use.)

**Basis of Grading: EVPP 434**

- Class participation: 10%
- Article Discussion Leadership: 5%
- Interim paper 1: 3-5 pages: 15%
- Interim paper 2: 6-8 pages: 20%
- Semester Paper: 10-15 pages: 25%
- Final Presentation: 15 minutes: 25%

**Basis of Grading: EVPP 534**

- Class participation and Class Discussion Leadership: 10%
- Article Discussion Leadership and Slide Presentation: 5%
- Interim paper 1: 6-8 pages: 15%
- Interim paper 2: 10-12 pages: 20%
- Semester Paper: 18-25 pages: 25%
- Final Presentation: 20 minutes: 25%

**Grade table** (General grading criteria for writing assignments, class participation and presentation will be provided separately, and specific criteria for each assignment will be provided during the semester.)

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Plagiarism Statement:

What is it? Plagiarism means using the exact words, opinions, or factual information from another person or source without giving that person or source credit.

Plagiarism and the Internet: Copyright rules also apply to users of the Internet who cite from Internet sources. Information and graphics accessed electronically must also be cited, giving credit to the sources. This material includes but is not limited to e-mail (don't cite or forward someone else's e-mail without permission), newsgroup material, and information from Web sites, including graphics. Even if you give credit, you must get permission from the original source to include any graphic that you did not create on your web page. Shareware graphics are not free. Freeware clipart is available for you to freely use. If the material does not say "free," assume it is not. Putting someone else's Internet material on your web page is stealing intellectual property. Making links to a site is currently acceptable, but getting permission is strongly advised, since many Web sites have their own requirements for linking to their material. (Source: http://mason.gmu.edu/~montecin/plagiarism.htm)

How to avoid it? Authors must credit original sources through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes; a listing of books and articles is not sufficient. Direct quotations always require citations. So do paraphrases and summaries of opinions or factual information formerly unknown to the writers or which the writers did not discover themselves. Exceptions include factual information that can be obtained from a variety of sources; the writers' own insights or findings from their own field research; and what has been termed common knowledge. Common knowledge is sometimes difficult to determine, so feel free to ask. Work that requires citations is not limited to text. Templates, data (facts/figures) for charts, and even cartoons used in presentations require citations! If you are uncertain about whether information should be cited, please cite to be safe, or ask me before turning in your work.

Why avoid it? Plagiarism is a violation of Mason’s Honor Code: http://www.gmu.edu/facstaff/handbook/aD.html Plagiarism also reflects poorly on the intellectual capability of the person plagiarizing, and it is unfair to the original source of the plagiarized material. It also will earn you a failing grade in this class. I know professors who have failed students for plagiarism. Please don't turn me into one of them.

Writing Assistance
Mason’s Writing Center can provide tutoring and guidance on structure and grammar for course assignments, theses, and other projects. They provide in-person and on-line services. They are located in Robinson Hall, room 114A. Please see http://writingcenter.gmu.edu/ or contact them at wcenter@gmu.edu or 703-993-1200.
**General Support**

Student Support and Advocacy Center (SSAC) and Resources for Crises: OSSCM - https://ssac.gmu.edu -- provides comprehensive (and confidential) services for your safety and well-being.

Counseling and Psychological Services (CAPS): provides a wide range of services to students by a staff of professional counseling and clinical psychologists, social workers, and counselors. CAPS individual and group counseling, workshops and outreach programs are designed to enhance students’ personal experience and academic performance. http://caps.gmu.edu/

WAVES: helps students develop and maintain healthy lifestyles through one on one support, interactive programs and resources. Topics include healthy relationships, stress management, nutrition, sexual assault, drug and alcohol use and sexual health. http://waves.gmu.edu/

Gender-based/Sexual Discrimination: The 1-page George Mason University Title IX Resources sheet may benefit those of you seeking resources to prevent, address &/or recover from gender-based discrimination – including sexual harassment, sexual assault, stalking, domestic violence, and sexual exploitation. It includes 16 on- and off-campus sources of assistance, including confidential ones.
Session Topics and Readings:

Week 1: Syllabus Overview and Introduction: Defining the Food-Energy-Water Nexus

Session overview: We’ll discuss the concept of the food-energy-water nexus and its relevance to policymaking and private sector challenges in different locations and at different scales.

INTERCONNECTIONS

Week 2: System interconnections: overview

Session overview: We’ll discuss broad connections between food, energy and water systems and connections to sustainable development at global, national and local levels.

Reading Questions:
1) What are some of the approaches to food-energy-water nexus thinking, and what are some key areas that connect these three systems?
2) How is the food-energy-water nexus linked to resilience and sustainable development?
3) What types of priorities drive private sector interest in the food-energy-water nexus?

Required readings:


Optional Reading:
**Week 3: Ecological aspects**

**ASSIGNMENT 1 DUE**

Session overview: We’ll discuss the ecological aspects of the nexus at global, national and local levels.

Reading Questions:
1) What are some of the ecological aspects of the food-energy-water nexus at different scales?
2) How do ecological aspects of nexus thinking differ in developing vs. developed nations?
3) Which actors are interested in the ecological aspects of the food-energy-water nexus, and what are their priorities?

Required readings:

Dodds and Bartram, Eds. Part 1, chapter 5.
Allan, Tony, and Nathanial Matthews. The Water, Energy And Food Nexus and ecosystems: The political economy of food and non-food supply chains.


**Week 4: Economic aspects**

Session overview: We’ll discuss the economic aspects of the nexus at global, national and local levels.

Reading Questions:
1) What are some of the economic aspects of the food-energy-water nexus at different scales?
2) How do economic aspects of nexus thinking differ in developing vs. developed nations?
3) Which actors are interested in the economic aspects of the food-energy-water nexus, and what are their priorities?

Required readings:

Dodds and Bartram, Eds. Part 1, chapter 3.


**Week 5: Institutional aspects**

**Session overview:** We’ll discuss the institutional aspects of the nexus at global, national and local levels.

**Reading Questions:**
1) How do interactions between different actors and levels of government influence the food-energy-water nexus? Do they make it more challenging, more beneficial, or both?
2) How do institutional aspects of nexus thinking differ in developing vs. developed nations and wealthy vs. impoverished communities?

**Required readings:**

Dodds and Bartram, Eds. Part 6, chapter 16.
Norman, David, and Stuart Orr. Building partnerships for resilience.

Dodds and Bartram, Eds. Part 6, chapter 18.
Dodds, Felix, and Cole Simons. Principles for the integration of the Nexus within business.


**CHALLENGES**

**Week 6: System challenges: overview**

Session overview: We’ll broadly discuss food, energy and water system interconnection challenges in the context of sustainability and resilience of all three systems at global, national and local levels.

Reading Questions:
1) How do food-energy-water nexus challenges influence resilience and sustainable development?
2) How do nexus challenges differ in developing vs. developed nations?
3) Which actors are creating or contributing to these challenges?
4) Which actors are affected by these challenges, and how?

Required readings:

Dodds and Bartram, Eds. Part 3, chapter 9.

Dodds and Bartram, Eds. Part 3, chapter 10.
Lee, Sylvia. Natural resource security in an uncertain world.

Dodds and Bartram, Eds. Part 4, chapter 13.
Rodriguez, Diego, Anna Delgado Martin and Antonia Sohns. Adding to complexity: Climate change in the Energy–Water Nexus.

The National Academies Press. 8-top of 24.
[https://www.nap.edu/read/25121/chapter/3](https://www.nap.edu/read/25121/chapter/3)


**Week 7: Ecological aspects**

**ASSIGNMENT 2 DUE**

Session overview: We’ll discuss ecological aspects of food, energy and water system interconnection challenges at global, national and local levels.

Reading Questions:
1) What are some of the ecological aspects of food-energy-water nexus challenges at different scales?
2) How do these ecological challenges differ in developing vs. developed nations?
3) Which actors are creating or contributing to the ecological aspects of these challenges, and why?
4) Which actors are affected by these challenges, and how?

Required readings:


Optional Readings:


Week 8: Economic aspects

Session overview: We’ll discuss economic challenges associated with the nexus, including challenges specific to developing vs. developed nations and wealthy vs. impoverished communities.

Reading Questions:
1) What are some of the economic challenges of the food-energy-water nexus at different scales?
2) How do these economic challenges differ in developing vs. developed nations, wealthy vs. impoverished communities, and rural vs. urban areas?
3) Which actors are creating or contributing to these challenges, and why?
4) Which actors are affected directly or indirectly by these challenges, and how?

Required readings:


Optional Readings:


**Week 9: Institutional aspects**

**Session overview:** We’ll discuss institutional challenges associated with the nexus at local, national and global scales, including challenges specific to developing vs. developed nations and wealthy vs. impoverished communities.

**Reading Questions:**
1) What are some of the institutional aspects of food-energy-water nexus challenges at different scales?
2) How do these institutional challenges differ in developing vs. developed nations?
3) Which actors are creating or contributing to these challenges, and why?
4) Which actors are affected by these challenges, and how?

**Required readings:**


Optional Readings:


**SOLUTIONS**

**Week 10: Solutions: overview**

Session overview: We’ll discuss broad solutions to food, energy and water system interconnection challenges in the context of sustainability and resilience of all three systems at global, national and local levels.

Reading Questions:
1) How do nexus solutions parameters differ in developing vs. developed nations?
2) How do food-energy-water nexus solutions influence resilience and sustainable development?
3) What types of actors are creating or contributing to these solutions?

Required readings:

Dodds and Bartram, Eds. Part 4, chapter 12. 163-175.


Dodds and Bartram, Eds. Part 5, chapter 15. 204-218.

Drechsel, Pay, and Munir A. Hanjra. Green opportunities for urban sanitation: challenges through energy, water and nutrient recovery.


Optional Readings:

**Week 11: Technological aspects**

**Session overview:** We’ll discuss technological aspects of solutions to food, energy and water system interconnection challenges at global, national and local levels.

**Reading Questions:**
1) What are some of the technological solutions to food-energy-water nexus challenges at different scales?
2) How do these solutions differ in developing vs. developed nations?
3) Which actors are creating or contributing to these solutions?

**Required readings:**


**Optional Readings:**


**Week 12 (April 15): Economic aspects**

**Session overview:** We’ll discuss economic aspects of solutions to food, energy and water system interconnection challenges at global, national and local levels.

**Reading Questions:**
1) What are some of the economic solutions to food-energy-water nexus challenges at different scales?
2) How do these solutions differ in developing vs. developed nations and wealthy vs. impoverished communities?
3) Which actors are creating or contributing to these solutions?
4) Are there any challenges to these solutions?

Required readings:

Dodds and Bartram, Eds. Part 2, chapter 7.
Brekke, Kathrine, and Jeb Brugmann. Operationalizing the Urban Nexus: Increasing the productivity of cities and urbanized nations.


Optional Readings:

**Week 13: Class Discussion of Nexus Challenges**

**ASSIGNMENT DUE**

Session overview: Class discussion/brainstorming on nexus problems and solutions discovered through your research for assignments 2 and 3. Graduate students will each provide 2 questions for class discussion.

**Week 14: Institutional aspects**

Session overview: We’ll discuss institutional aspects of solutions to food, energy and water system interconnection challenges at global, national and local levels.

Reading Questions:
1) What are some of the institutional solutions to food-energy-water nexus challenges at different scales?
2) How do these solutions differ in developing vs. developed nations?
3) Which actors are creating or contributing to these solutions?

Required readings:

Dodds and Bartram, Eds. Part 2, chapter 6.
You, Nicholas. The contribution of innovation in urban resilience and sustainability to realizing the urban Nexus.


**Week 15: Concluding Thoughts on the Nexus**

**Session overview:** We'll discuss the effectiveness of the nexus in framing food-energy-water challenges and solutions in different types of communities at global, national and local levels.

**Week 16: Final Presentations**