

Water Systems in Society

AK 2215, VT2022, 7.5 credit points

Course Content

Water systems are of fundamental importance for all societies. They influence the society in numerous ways – and are at the same time influenced by various societal forces. In analogy with other socio-technical systems, such as energy systems and communication systems, water systems have historically been shaped – and continue to be shaped today – by ideologies, actors, institutions and politics. These strongly influence the systems, e.g. regarding the choice between large- and small-scale systems or about who controls the systems. Therefore, it does not suffice with only scientific and technical perspectives to understand the water systems and their dynamics, but we need also to analyse the systems from a societal perspective. The socio-technical perspective, which puts equal emphasis on the social and technical dimensions of the systems becomes particularly relevant when we try to understand and manage water-related crises in the form of e.g. pollution, epidemics, accidents, droughts, floods and climate change. Crises can give rise to conflicts, but they can also create new development opportunities, technical and organisational solutions and strategies and changed views on how the systems can and should function.

The course explores water systems in their societal complexity – historically, in the present and with outlooks to the future. The focus is on the systems' socio-technical properties and on the interplay between people, technology and environment, as well as on a number of central ideas that shape the development and dynamics of the systems (e.g. modernity, circularity, resilience and sustainability). Political aspects of hydraulic engineering will play a large role. The course starts out by analysing historical examples of water systems in order to understand the societal factors that have shaped them. Then follows a more present-day perspective, where the focus is on case studies of water systems in different parts of the world and different societal contexts to highlight, how different actors think about and manage water systems in different ways. The course draws on ongoing research in history and social sciences to develop an ability to think critically and deepen the understanding of water systems in a societal perspective.

Learning Outcomes

After passing the course, the student should be able to:

- Compare and contrast different historical and present-day ideas about water systems from a societal perspective (e.g. modernity, circularity, resilience and sustainability)
- Define and use theoretical concepts that explain the development and dynamics of water systems
- Account for how crises of different kinds contribute to water systems' further development with regard to actors, institutions, technology and politics
- Analyse and criticise scientific and non-scientific texts and statements about water systems locally, regionally and globally

- Formulate a historical or social sciences research question about water systems, carry out a literature study and write a paper that contributes to new insights about water systems in society

Course Organization

This course consists of 7 lectures and 4 seminars. Seminars and lectures take place during Monday and Wednesday evenings, between **17.15 -19.00**. Both seminars and lectures **will occur on-site** at KTH Campus with the support and guide of expert lecturers on water and society from KTH and the seminar leaders.

Examination is continuous and occurs through short text assignments and seminar participation, and at the end of the course through the completion of an individual essay. **The final grade is based 100% on the grade of the essay** and the whole course is therefore structured in a way that aims to train you to write a high-quality essay in the field of water systems in society.

Lectures: you prepare for these by reading the course literature for each lecture occasion (see the detailed schedule below), completing the related text assignments (submit them in Canvas) and then attend the lecture. **NOTE!** Lecture attendance is compulsory and required to complete the text assignments.

Seminars: A very important part of the course are the seminars, of which there are four. Seminars are convened by a seminar leader. Attendance at these is compulsory and you **are expected to participate actively!** You will also need to attend these seminars on-site at KTH Campus. At the seminars you will have the opportunity to *analyse texts, define your essay topic, formulate research questions, conduct literature source criticism and provide and receive feedback* on your essay.

All seminars require you to have completed preparatory assignments at the **latest 10.00 am the day before the seminar via Canvas**. Detailed instructions about preparation tasks for each seminar will be posted in Canvas!

Essay: During the course of the project, you will write an individual essay. **The essay should not exceed 2000 words** (excluding references and bibliography) and should take the form of a longer text on the theme of water systems in society. The essay can focus on historical examples of water systems, present-day examples or a combination of both. You can choose to write your essay on a topic of your interest but consider developing themes such as the historical emergence of a new water system, a technical or organisational water innovation, an important political decision or a response to a water related crisis.

To obtain a good grade in the essay, emphasis will be placed on being able to apply one or more theoretical concepts discussed in the lectures and developing your reasoning with good argumentation. Read carefully the assessment criteria for the essay that can be found at the end of this course memo.

We will work on the different parts of developing the essay during seminars:

- *Choosing an essay topic.* In the second seminar you will discuss your essay plan with your peers and refine your research questions. The essay plan is submitted by 10 am the day before via Canvas.

- *Literature source criticism*. In the third seminar you will work with comparing and contrasting different types of literature sources related to preselected thematic areas (i.e. flood management). A 300-600 word assignment will be submitted, latest 10 am the day before the seminar.

- *Discussion of essay draft*. In the fourth seminar you will discuss the draft of your essay with your peers. You will also give feedback on your peers' essay drafts. In your feedback, you should use the assessment criteria as a reference on how to work towards a high grade. You report your comments to peers during the seminar orally. The draft essay must be at least 1000 words (excluding references and list of sources) and submitted by 10 a.m. the day before via Canvas.

- The final version of your paper will be submitted via Canvas by **Tuesday 7 June 2022**. By the same date you must also have completed all assignments!

Late submission at any of the above three seminar assignments will result in your final essay grade being lowered by one grade point (from A to B, from B to C, etc.). If you are late for two submissions, your final grade will be lowered two grade points etc.

For questions about essay writing and course requirements you should take the opportunity to discuss with peers during the seminars (and via the essay and course requirements discussion board on Canvas). In addition, queries can also be directed to the course responsible and course assistant.

Course responsible: Timos Karpouzoglou (timothyk@kth.se)

Course assistant: Alicia Gutting, gutting@kth.se

Course examiner: Per Högselius (per.hogselius@abe.kth.se)

Course Schedule

Course Introduction

Time: Wednesday, 23/3, 17.15 – 19.00

Location: D32

Teacher: Timos Karpouzoglou and Alicia Gutting

What is the course about? What does it mean to analyse water systems in society? We will go through the objectives of the course and the different elements: lectures, modules, seminars, essay - and assessment criteria.

Recommended reading:

Karpouzoglou, T., & Vij, S. (2017). Waterscape: a perspective for understanding the contested geography of water. *Wiley Interdisciplinary Reviews: Water*, 4(3), e1210.

Assignment:

Reflect and bring to the lecture your own ideas about water and society and your expectations from the course. What is your view about water and society and how they are interrelated? In the paper under recommended reading, the concept of waterscape is introduced. What does a waterscape encompass and how do you relate this to real examples?

There is no written assignment for this lecture.

Lecture 1: Water and Sanitations in cities - a historical perspective

Time: Wednesday, 30/3, 17.15 – 19.00

Location: D32

Teacher: David Nilsson

Water supply and sanitation systems are critical for all cities and are closely related to the global sustainability goals. But how do these systems change, and how did they come about in the first place? This session looks at the evolution of modern water and sanitation technologies over the past two thousand years - as a backdrop for future development pathways.

Required reading:

Nilsson, D. (2022). *Water and sanitation in cities: continuity and change*. UN Habitat. (Original work published 2014). Required reading are chapters 1-3 of the paper (pages 6-28).

Assignment:

Use the historical examples in the text to identify differences but also similarities with today's system of urban water and sanitation. Think of technology, organisation as well as institutional framework (rules and laws). You should be able to pinpoint and discuss at least three similarities and/or differences.

Submit a 300-600 word reflection latest 10 am the day before the lecture.

Lecture 2: Transnational water relations

Time: Wednesday, 6/4, 17.15 – 19.00

Location: D32

Teacher: Per Högselius

In this session we analyse water in transnational perspective. This includes themes like cross-border canal-building, cooperation and conflict in shared river basins, inter-basin water

transfers and the infrastructural colonization of the seas. We will discuss both historical and present-day cases and cover geographical regions from Europe and Asia to Africa the Americas.

Required reading:

Högselius, P. H., Kaijser, A. K., & van der Vleuten Vleuten, E. (2016). Troubled waters. In P. Högselius, A. Kaijser, & E. van der Vleuten (Eds.), *Europe's Infrastructure Transition: Economy, War, Nature* (p. Chapter 7). Palgrave MacMillan.

Assignment:

The contested Crimea peninsula is a very dry place. Try to find out from where the Crimea sources its water, and how has its water situation changed through the Russian annexation in 2014 and the recent outbreak of war in mainland Ukraine?

Submit a 300–600 word reflection latest 10 am the day before the lecture.

Seminar 1: Analysing texts

Time: Wednesday, 13/4, 17.15 – 19.00

Location: D32

Teacher: Alicia Gutting

Preparation for the seminar:

Read the text and analyse how the author develops his argument. What are the main arguments of the author? Does the author answer his main questions? Do you see any strengths or weaknesses?

Submit a 300-600 word assignment latest 10 am the day before the seminar.

Required reading

Saravanan, V. (2020). Water and the Environmental History of Modern India. Bloomsbury Academic. Read chapter 4: Water supply schemes and conflict, p. 99-128.

Lecture 3: Thousand years of cooperation to control the flow of water in the Netherlands

Time: Monday, 25/4, 17.15 – 19.00

Location: D32

Teacher: Arne Kaijser

Windmills and dikes are characteristic features of the Dutch landscape. They have been crucial components in a complex system for controlling water flows and preventing floods. How did this system develop? How was cooperation between different actors necessary to build and maintain it? How did the system change over time? These are the main questions for this lecture.

Required reading:

Kaijser, A. (2002). System Building from Below: Institutional Change in Dutch Water Control Systems. *Technology and Culture*, 43(3), 521–548.

Assignment:

Discuss the similarities and differences between the development of Dutch water systems with some other kind of system demanding cooperation among many people, for example the

building of rural roads or urban sanitation in your own country. Try to use Elinor Ostrom's concepts in your discussion.

Submit a 300–600 word reflection latest 10 am the day before the lecture.

Seminar 2: Finding a topic for the essay and formulating research questions

Time: Wednesday, 27/4, 17.15 – 19.00

Location: D32

Teacher: Timos Karpouzoglou

Preparation for the seminar:

Write a short essay plan that contains stating your preliminary research question, a preliminary outline with a few lines about the intended content under each sub-heading, and a preliminary list of the sources you intend to use and how you will obtain them. Perhaps you have also already identified a theoretical concept that seems useful for your proposed paper? Be prepared to discuss and give feedback to each other on the essay drafts.

Submit your essay plan latest 10 am the day before the seminar.

Required reading:

Read carefully instructions in course document 'Tips for writing your essay on water and society'

Lecture 4: Thermal pollution: An overlooked risk or necessary evil of nuclear power?

Time: Monday, 2/5, 17.15 – 19.00

Location: D32

Teacher: Alicia Gutting

Cooling water is an essential part of nuclear power. Even if cooling systems are in use, the water returned is always warmer than the water body which constitutes thermal pollution. In this lecture, we will look at the case of the Rhine River and the debates around cooling water of the 1970s and 1980s. In times of climate change, heatwaves and drying out rivers, the discussion around nuclear power, its role in tackling climate change as well as its impact on water sources is timelier than ever.

Required reading:

Schiff, J. S. (2017). The evolution of Rhine river governance: historical lessons for modern transboundary water management. *Water History*, 9, pp. 279–294.

Assignment:

The required reading problematises transboundary water management and chemical pollution. Consider in your text reflection if different kinds of pollution also differ in quality as well as their risk perception. Are there different approaches to crisis? Can you think of two countries or organisations that differ in their water crisis approaches?

Submit a 300–600 word reflection latest 10 am the day before the lecture.

Lecture 5: Infrastructure heterogeneity and green/blue/grey infrastructure for water management in East African cities

Time: Wednesday, 4/5, 17.15 – 19.00

Location: D32

Teacher: Joe Mulligan

Required reading:

Mulligan, J., Bukachi, V., Clause, J. C., Jewell, R., Kirimi, F., & Odbert, C. (2020). Hybrid infrastructures, hybrid governance: New evidence from Nairobi (Kenya) on green-blue-grey infrastructure in informal settlements. *Anthropocene*, 29, 100227.

Assignment:

What are some of the intractable issues with "green infrastructure" in the context of rapidly urbanising cities? How applied a concept is blue/green infrastructure in your own city, and what were the factors for its relative stage of development or use? Who should have responsibility for drainage infrastructure?

Submit a 300–600 word reflection latest 10 am the day before the lecture.

Seminar 3: Literature source criticism

Time: Monday, 9/5, 17.15 – 19.00

Location: E33

Teacher: Alicia Gutting

Preparation for the seminar:

You will be assigned to a group based on preselected thematic areas (e.g. flood management) and you will be given 3-4 different texts (including newspaper articles, websites and reports) discuss what types of arguments the texts develop. What are the different positions of the authors? Before the seminar familiarise yourself with the texts and try to identify any key differences in how they argue their points.

Submit a 300-600 word assignment, latest 10 am the day before the seminar.

Lecture 6: Remaking wastewater into a resource: Opportunities and obstacles of circular water solutions

Time: Wednesday, 11/5, 17.15 – 19.00

Location: D32

Teacher: Timos Karpouzoglou

The idea of rethinking wastewater as a resource is becoming increasingly more influential as part of water governance. This has led to new kinds of designs that can help recover wastewater, energy, and nutrients but also creates new opportunities to minimise waste and pollutants. In this lecture we will explore how circular systems are implemented. What kinds of actors are involved and how are they interacting? We will also explore opportunities and obstacles associated with the notion of circularity by discussing real cases.

Required reading:

Wallin, J., Knutsson, J., & Karpouzoglou, T. (2021). A multi-criteria analysis of building level greywater reuse for personal hygiene. *Resources, Conservation & Recycling Advances*, 200054.

Assignment:

In the required reading one example of a circular water system is discussed. Can you think of other similar implementations of alternative circular systems? What types of potentials and limitations do you see can affect implementation? How do societal factors shape implementation?

Submit a 300-600 word reflection latest 10 am the day before the lecture.

Lecture 7: Water narratives and co-creative processes with a future perspective

Time: Monday, 16/5, 17.15 – 19.00

Location: E33

Teacher: Katarina Larsen

This session is focusing on everyday practices, routines and conceptualization of cleanliness in relation to water narratives. We address how narratives about water consumption change over time and how they can inform policy makers. Participants will discuss how new insights and policy advice for the future can benefit from experimental knowledge generated in co-creative processes involving citizens, policy makers and expert groups of engineers, planning professions, and politicians.

Required reading:

Shove, E. (2003) Converging Conventions of Comfort, Cleanliness and Convenience. *Journal of Consumer Policy* 26, 395–418.

Assignment:

Based on the article, discuss how changes in what it means to be clean has changed historically. Furthermore, what are your views on new interpretations of the concept of cleanliness and how they can influence everyday practices and water policy?

Submit a 300-600 word reflection latest 10 am the day before the lecture.

Seminar 4: Peer to peer feedback on essay drafts

Time: Wednesday, 18/5, 17.15 – 19.00

Location:

Teacher: Timos Karpouzoglou

Preparation for the seminar:

Prepare and submit your essay drafts. Your draft essay must be at least 1000 words (excluding references and list of sources). In addition you will also read and provide feedback to one of your assigned peers. A useful tip for preparing your feedback is to refer to the assessment criteria for the essay (end of this document) and to identify key areas of improvement based on this.

Essay drafts should be submitted by Friday (13/5), and feedback on the drafts provided by Tuesday 10 am (17/5) via canvas.

Examination and grading

Grading Scale

Essay Assignment, 4.0 credits, grading scale: A, B, C, D, E, Fx, F.

This part of the examination consists of the above mentioned essay.

Assignments for lectures and seminars, 3,5 credits, grading scale: Pass, Fail.

This part of the examination consists of all other assignments.

Fulfilling a compensation assignment

If for any reason you should miss a lecture or seminar, you need to make up for this with an extra assignment that will be no less demanding than attending the lecture/seminar. In that case, contact the course responsible for details.

Possibilities to submit missing assignments or improving essay grade

If for some reason you absolutely cannot submit your assignment on time, we may (reluctantly!) accept supplementary assignments. Supplementary assignments will first be corrected after the re-examination period in June.

Reporting of grades

The reporting of grades will occur via LADOK.

Assessment criteria for the essay assignment

The below table provides a description of how the essays will be graded. You must achieve at least an E in all seven criteria in the table to pass.

Once you have achieved this, your final grade is then determined by a weighting (average) of the seven component grades. For example, to achieve a final grade of A you must have an A in at least 4 of the 7 sub-grades.

	(F)	(E-D)	(C-B)	(A)
Research question	There is no analytical question or the question is too technical or not about water systems in society.	There is a social science focus with a link to water systems. There is also a historical or contemporary perspective or a combination of both	There is a clear and well-defined social science question on water systems.	There is a clear, well-defined and original social science question on water systems in society, with the potential to contribute genuinely new knowledge to the field.
Thesis and argumentation	The text lacks a thesis and shows no clear argumentation.	The text refers to a thesis found in the cited literature. The text presents arguments that support the thesis.	The text is developed with a very clear thesis that the student has formulated and that is supported by clearly stated and well-chosen arguments.	The text presents a very independent and innovative thesis, supported by well-chosen, clearly presented and convincing arguments.
Theoretical concepts	The text does not use any theoretical concepts presented in the course or uses theoretical concepts without having understood their meaning.	The text uses at least one theoretical concept presented in the course and demonstrates sufficient understanding of the meaning of the concept.	The text is able to combine different theoretical concepts from the course and applies them in a way that demonstrates a good understanding of how the concepts can be used to analyse water systems in society.	The text combines theoretical concepts from the course and applies them in a way that is very well integrated with the text and provides novel theoretical insights.
Use of literature sources	No or irrelevant source material has been used.	A few sources have been used and the sources mostly contribute to the argumentation.	Several different sources have been used with attention to source-criticism. The sources are well chosen and contribute to the argumentation. They are sufficient to support the conclusions drawn.	Several different empirical sources have been used with a nuanced source criticism that convincingly strengthens the conclusions of the text. The sources contribute strongly to the argument and the text demonstrates an awareness of the limitations imposed by the sources.
Essay structure	The text is not structured; introduction and conclusion is missing. The layout is not logical.	The text has an identifiable structure, with an introduction and a conclusion. There is some logic in the layout.	The text has a clear and logical structure with well-chosen sub-headings. The text shows a good flow. The conclusion is closely related to the research questions presented in the introduction.	The text shows a very good flow and a very clear structure and logic. The argument is built up systematically through each paragraph of the text, with subheadings that reinforce the logic of the text. The conclusion is closely related to the research questions presented in the introduction.
Language and syntax	Poor layout with many different language and syntax errors, making the text difficult to read.	Formalities and design do not show any major shortcomings. There are some language errors, but they do not prevent the reader from understanding the text.	Linguistic rigour: few or no linguistic errors. The text is drafted without major errors in a way that promotes comprehension.	Linguistic rigour: no traces of sloppiness, no linguistic errors and eloquent writing that strengthens the argument. The text is structured in a way that promotes understanding.
References and bibliography	Unclear references or incomplete bibliography. Sources are used without citation.	Acceptable references and bibliography.	Accurate citations that consistently follow a clear citation system. Well-designed bibliography.	Careful citation of sources, consistently following a clear system and used in a way that makes the argument convincing. Well-designed bibliography.