

## Environmental Science

### Also relevant for Sustainability Science

Course: Sustainability Science, Environmental Science

Group of courses: Engineering

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## Course objectives:

Students should learn to critically analyse and evaluate concepts, methods, scientific approaches, procedures and findings of environmental and sustainability research from a gender perspective. They should become familiar with the basic premises of a feminist philosophy of (natural) science, environmental, technological and sustainability research as well as economy-critical approaches. The aim is to enable students to understand the significance of the category of gender (and other social differentiations such as social stratum and ethnicity) for scientific analytical and evaluative procedures, and its importance for generating concepts, strategies and programmes on environmental and sustainability policies. Students should be able to apply this understanding to their own research. The central teaching and course objectives are thus critical and reflective faculties as a basis for enabling students to carry out independent scientific study on inter- and transdisciplinary subjects and research fields in environmental and sustainability sciences, taking the findings of women's and gender studies into account.

## Teaching content/subject-specific gender studies content:

Understanding the interconnections and interactions between natural and gender relations in society is central for explaining the significance of gender as a category in environmental science. For the formulation of course content, this means that alongside application-oriented questions of critical environmental research from a gender perspective (e.g. in subject areas such as material streams and products, resource planning and conservation management), students should gain a basic understanding of how gender can be used as a critical analytical and conceptual category in environmental and sustainability sciences. This involves the following:

- Recognising the impact society and gender have on the focus, methods and processes of research. In ecological, environment-related contexts, for example, this would mean integrating social inequalities and related power relations (dichotomies/hierarchies), particularly unilateral gender ascriptions (dichotomies), into the analysis of causes and the search for solutions. It is important to make gender available as a category of analysis taking differential-theoretical, structural, process-related ('doing gender') and critical epistemological perspectives into account.
- As an 'eye opener' gender is taking new perspectives of environmental studies and implementing the need to integrate gender into sustainable development. Integrating eco-scientific and social science/humanities knowledge is at the forefront here.
- Implicit and explicit gender references in different fields of research and action in environmental and sustainability sciences should be identified: Implicit (hidden) gender aspects refer to structural symbolic dimensions of societal nature and gender relations, e.g. to men and women's tacit possibilities for influencing and shaping areas of production and consumption (among them the use of resources and products, risk perception and risk behaviour).

Women's and gender studies have made the following main contributions to the area of philosophy of (natural) science:

- contributions to the history and critique of natural sciences, particularly biology/ecology, showing that and how gender relations have been inscribed in theory building and in methods of generating knowledge of 'nature'
- critical reflections on the categories of objectivity, universality and (gender) neutrality in the

(natural) sciences

- critical approaches to knowledge generation from a gender perspective ('standpoint approaches', subject positions, 'situated knowledge')
- sex/gender differentiation and its significance for knowledge generation in environmental science
- disciplinarity, interdisciplinarity and transdisciplinarity in gender studies and environmental/sustainability sciences – gender as an integrative perspective
- theories on teaching approaches for nature and society, gender as a cross-sectional dimension of socio-ecological research
- Women's and gender studies have made the following main contributions to the area of (applied) environmental science:
- subjectivity of theories of social and natural sciences, methods and knowledge in this type of research (e.g. linking technological/risk research and research on everyday knowledge and skills)
- approaches to the history, sociology and philosophy of technology that enable insights into the 'gendered nature' of technologies and the social aspects of technological change with regard to social differentiations (e.g. effects of new technologies on the activities of women and men in paid and unpaid work)
- approaches to material stream analyses and management as well as to technology and product development that make critical reference to the division between development/construction/production and use/consumption (e.g. critical analysis of ecologically-oriented material stream analyses and approaches to material stream management, ecological balances, LCA, etc. with regard to the gender stereotypes inscribed in them); integration of women's and men's everyday knowledge and experience into technology and product development
- approaches to a critical analysis of environmental, energy- and technology-related policy concepts, strategies and measures (e.g. climate and energy policies, waste management and disposal) with regard to the different effects they have on women and men and their forms of agency
- gender-differentiated empirical studies on environmental consciousness/behaviour of women and men and gender-related differences in concepts and perceptions of nature (e.g. lifestyles and consumption, time patterns and time use)

The field of sustainability studies overlaps with many of the above topics in philosophy of science (e.g. interdisciplinarity, teaching approaches to relations between nature and society) and environmental science. However, political discourse on sustainability and scientific sustainability research imply additional explicit aspects of gender discourse (and vice versa: gender studies offer specific positions on sustainability). These go beyond the teaching content outlined above and strengthen the integrative perspective of socio-ecological aspects based on gender as a category. The following contributions of gender-oriented sustainability studies are of interest:

- theoretical and conceptual work on sustainability/sustainable development, e.g. 'eco-feminism', 'sustained livelihood', 'precautionary economics', 'gender & environment' as a cross-sectional dimension of socio-ecological research, (re)productivity as a category of conveyance of gender-oriented sustainability research
- participation theories of sustainable development (extending the concept of participation in the sustainability debate to include the issues of context-related knowledge production ('socially robust knowledge production') and retributive justice)
- gender-oriented analyses of processes of sustainability policy on international, national, regional and local levels (Agenda 21, national/regional sustainability strategies, Local Agenda 21)

- gender-oriented empirical studies (e.g. how the men and women can add their own ideas to conservation processes and environmental and sustainability policies)

Students should be given the opportunity to gain methodological skills in addition to those used in environmental and sustainability studies. These skills should enable them to integrate the category of gender (and other social differentiations such as social stratum and ethnicity) into environmental analysis and evaluation processes as well as into concepts, strategies and programmes of environmental and sustainability policies. This means teaching the following methodologies:

- methods of gender mainstreaming in environment-related fields of action (e.g. Gender Impact Assessment (GIA) for assessing the effects of political measures on women, men and gender relations; the 3R method for a systematically gathering of information on the implementation of gender mainstreaming in a specific area; gender budgeting for implementing gender-sensitive budget analyses and for analysing the effects of budgets on personnel and their targets)
- gender-sensitive methods and procedures of communication, participation and mediation
- situation/deconstruction/reconstruction analyses as a gender-analytical approach ('three-step analysis')

These subject areas are of course open to further research. There have been many recent contributions and studies on gender-oriented approaches to resource planning and management. They introduce strategies, e.g. for implementing sustainable/precautionary water use, for gender-sensitive research and policy design in the fields of energy supply and emission control, or for an approach to possible gender-specific effects of the European Emissions Trading System. Current work also includes gender-oriented approaches in the area of conservation, conservation design and conservation management, e.g. on gender-coded concepts of nature and ideas of what is worth conserving or on the relevance of gender aspects for work in environmental and conservation associations and organisations. Relevant studies have been carried out especially in the field of socio-ecological research, analysing environmental problems with interdisciplinary and transdisciplinary approaches and integrative aims, and placing them in the context of society and nature.

## **Integration of gender studies content into the curriculum:**

Gender issues cut across many different areas. The findings of women's and gender studies and gender perspectives should therefore be an integral part of environmental and especially sustainability studies curricula. In natural science subjects, both the basics of critical scientific theory from the gender perspective (e.g. 'objectivity') and discipline-specific positions of scientific theory from women's and gender studies should be taught. We also recommend integrating the above content in problem-focused and project-oriented teaching.

In addition, specific gender modules should be offered, which in scope and weighting should be adapted to the orientation of the degree course – environmental or sustainability studies – as well as to the specific layout of the respective degree course.

- 'Gender relations and sustainability': importance of gender equality in the context of sustainable development, the political, ethical and scientific backgrounds to the connection between gender relations, environmental and sustainability studies (basic module in sustainability studies, module element in environmental studies)
- 'Gender-oriented theory of science and technology': critical reflection on natural science findings that appear to be wholly scientific and thus 'objective' (e.g. evolution theories) and technology

research, e.g. by involving social-constructivist analyses providing insights into the gendered nature of nature and technology theories and studies, and by addressing socio-economic aspects of socio-technological change (module element in environmental and sustainability studies)

- 'Gender in social-ecological research': looking at research in the field of social ecology, students should learn that and how gender functions as an 'eye opener' and a conceptual category in the development of system, orientation and transformation knowledge, which (other) types of knowledge are generated and which (other) types of knowledge are involved in the process of knowledge generation (module element in the Bachelor's degree courses in environmental and sustainability sciences, basic module in research-oriented Master's degree courses in sustainability sciences)
- 'Sustainable use of resources and infrastructure development from a gender perspective': discourses on water use and management, climate and waste policies deal with questions such as whether and how gender is inscribed in problem analysis and problem-solving processes and how it is reflected in technical infrastructure systems in order to generate socio-ecological criteria for sustainable use strategies and infrastructure development (module element in environmental and sustainability sciences, module in research-oriented Master's degree courses in the field of sustainability sciences (depending on the study course design))
- 'Environmentally compliant and gender-neutral product development and use': students should become familiar with discourses on consumer research, material stream analysis and management as well as integrated product policy in sustainability research and possible gender-specific inscriptions. Furthermore, approaches that provide starting points for a precautionary approach to natural resources are being dealt with (module element in environmental and sustainability sciences).
- 'Sustainable spatial development and gender relations': with regard to the goals of sustainable urban and regional development, it is important to ask whether and how spatial patterns and structures are characterised by gender ascriptions, and how access to and use of the resource space/area reflect gender differences in order to identify the intersections of research fields such as feminist spatial research and space-related sustainability research (module element in environmental sciences, module in sustainability science (depending on the study course design))
- 'Protection and use of landscape and nature from a gender perspective': based on research results at the intersection of landscape, nature conservation and sustainability research with gender research, dichotomies and hierarchies in the assessment of nature and landscape must be detected and questioned with regard to implicit gender connotations. Based on this, students should deal with approaches to and questions of how goals and strategies for protection and use can be implemented (module element in environmental and sustainability sciences).

## Degree Stage:

The above content should be included in the Bachelor's degree courses. The module element 'Gender relations and sustainability' should be weighted differently, depending on the design of the particular course. The other issues should be taught in the second and third year of study (specialisation stage). It is recommended to deal with the research-based modules/module elements that use gender as a conceptual approach to environmental and sustainability topics in more detail in the Master's study courses. All gender-related modules or module elements should be project-oriented, if possible.

## Basic Literature/Recommended Reading:

- Haraway, Donna 1995: Die Neuerfindung der Natur. Primaten, Cyborgs und Frauen. Frankfurt/M., New York: Campus.
- Katz, Christine/ Heilmann, Sebastian/ Thiem, Anja/ Koch, Lea M./ Moths, Katharina/ Hofmeister, Sabine (Hg.) (2015): Nachhaltigkeit anders denken - Veränderungspotenziale durch die Geschlechterperspektive. Wiesbaden. VS Verlag für Sozialwissenschaften.
- Hofmeister, Sabine, Mölders, Tanja, Thiem, Anja 2014: Nachhaltige Raumentwicklung. In: Heinrichs, Harald, Michelsen, Gerd (Hg.): Nachhaltigkeitswissenschaften. Berlin, Heidelberg. S. 523-548. Springer Verlag.
- Hofmeister, Sabine/ Biesecker, Adelheid 2006: Die Neuerfindung des Ökonomischen. Ein (re)produktionstheoretischer Beitrag zur Sozial-ökologischen Forschung. München: oekom Verlag.
- Hofmeister, Sabine/ Christine Katz 2011: Naturverhältnisse. Geschlechterverhältnisse. Nachhaltigkeit. In: Groß, Matthias (Hg.): Handbuch Umweltsoziologie. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Hofmeister, Sabine/ Katz, Christine/ Mölders, Tanja (Hg.) 2013. Geschlechterverhältnisse & Nachhaltigkeit: Die Kategorie Geschlecht in den Nachhaltigkeitswissenschaften. Opladen, Berlin, Toronto: Verlag Barbara Budrich.
- Nebelung, Andreas/ Proferl, Angelika/ Schultz, Irmgard (Hg.) 2001: Geschlechterverhältnisse – Naturverhältnisse. Feministische Auseinandersetzungen und Perspektiven der Umweltsoziologie. Opladen: Leske+Budrich.
- Orland, Barbara/ Scheich, Elvira (Hg.) 1995: Das Geschlecht der Natur. Feministische Beiträge zur Geschichte und Theorie der Naturwissenschaften, Frankfurt/M.: Suhrkamp.
- Schäfer, Martina/ Schultz, Irmgard/ Wendorf, Gabriele (Hg.) 2006: Gender-Perspektiven in der Sozial-ökologischen Forschung. Herausforderungen und Erfahrungen aus inter- und transdisziplinären Projekten. Reihe Ergebnisse Sozial-ökologischer Forschung Bd. 1. München: oekom.
- Scheich, Elvira 1993: Naturbeherrschung und Weiblichkeit. Denkformen und Phantasmen der modernen Naturwissenschaften, Pfaffenweiler: Centaurus.
- Weller, Ines 2004: Nachhaltigkeit und Gender. Neue Perspektiven für die Gestaltung und Nutzung von Produkten. München: oekom.
- Weller, Ines/ Hofmann, Esther/ Hofmeister, Sabine (Hg.) 1999: Geschlechterverhältnisse und Nachhaltigkeit. Neue Perspektiven – alte Blockaden. Bielefeld: Kleine.

## Journals:

- GAIA. Ökologische Perspektiven für Wissenschaft und Gesellschaft. (occasional articles) | [Website](#)
- Gender Technology and Development. | [Website](#)
- Koryphäe. Medium für feministische Naturwissenschaft und Technik. | [Website](#)
- Nature + Culture (occasional articles) | [Website](#)
- OGJ – Open Gender Journal, | [Website](#)
- Politische Ökologie (occasional articles) | [Website](#)
- GENDER. Zeitschrift für Geschlecht, Kultur und Gesellschaft (occasional articles) | [Website](#)
- Femina Politica. Zeitschrift für feministische Politikwissenschaft (occasional articles and special issue No 1/2010) | [Website](#)