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Rising to the Challenge? The State of the Art and Future Research Directions of Polish Environmental Sociology

Abstract: Environmental sociology has been developing since the 1970s; however, it only recently became institutionalized in Poland with the establishment of a respective section in the Polish Sociological Association. We argue that environmental sociology in Poland and the broader area of Central and Eastern Europe has made an important contribution to international research on relations between humanity and nature in the Anthropocene. This paper presents the current state of the art in Polish environmental sociology and discusses future research questions. Our contribution is based on a literature review and the results of a workshop with Polish environmental sociologists. Future research areas discussed in this paper emerge from the following five main thematic domains: (I) social aspects of nature conservation; (II) environmental groups and movements; (III) sustainable development and the participation of local communities in rural and urban areas; (IV) environmental risks and threats and (V) and energy and society.

Keywords: Anthropocene, environmental sociology, future research, people and nature, sociology of natural resources

Introduction

The establishment of environmental sociology in the United States in the 1970s was driven by the emergence of the environmental movement (Dunlap 2002); subsequently, environment sociology has developed and the scope of analysis, theoretical perspectives and methodologies has expanded (Gross and Heinrichs 2010; Kasper 2016; Redclift and Woodgate 2010). In 20th century sociology (Studholme 2008), environmental topics were relatively peripheral; however, currently global environmental phenomena, such as climate change, ecosystem decline and pollution, are increasingly recognized as driving forces of social change in domains such as consumption, social movements, migration, inequality and justice (Urry 2009; Dunlap and Brulle 2015; Giddens 2011).

The developments in the field of environmental sociology have been regularly reviewed, however covering mainly US and Western European studies (Mol 2006; Lidskog and Sjödin 2014; Qin et al. 2020), with some insights from Asia and Latin America (Lidskog and Sjödin 2014), China (Qin and Flint 2009), Brazil (Ferreira 2002). The focus on the ‘western’ advances in this sub-discipline limits its potential when facing global environmental challenges (Lidskog and Sjödin 2014). There is a call for broadening such investigations to other areas (Prokopy and Hovardas 2020; Ulrich-Schad and Givens 2020). While early reviews argued for high convergence between the US and European traditions (Mol 2006), more current studies revealing the expanding differences (Lidskog and Sjödin 2014). Moreover, European environmental sociology is not well integrated, even within the ‘western’ scholarship (Lidskog and Sjödin 2014), therefore its developments in the Europe’s peripheries is especially interesting.

Polish sociologists and other social scientists have investigated specific topics within environmental sociology since the 1980s (Gliński 1996; Kaltenberg-Kwiatkowska 1982; Wódz and Wódz 1998), especially in the area of environmental awareness (Trempała 2016); however, no specific research field has been created and theoretical and organizational consolidation has not been achieved. This gap motivated the establishment of the Environmental Sociology Section within the Polish Sociological Association in 2017. Despite the increase in scholarship by Polish social scientists within the field of environmental sociology, Polish perspectives, as well as Central and Eastern European perspectives, have been nearly absent from mainstream discussions within this sub-discipline. However, such perspectives have the potential to provide an important contribution to research on social aspects of environmental protection and management, which, in turn, would function to counterbalance the dominance of the theoretical and empirical work of Western European and North American scholars.

This contribution is based on a unique analysis of human–nature relations in the context of the political, social and economic transformations that occurred in Poland and other Central and Eastern European countries in the 20th and the early 21st century. Such research has the potential to identify underlying social and political mechanisms that are often obscured under ‘normal’ conditions of environmental policymaking (Andersson 1999; Hall 1993; Hicks 1996). The identification of mechanisms specific to Central and Eastern Europe is increasingly important for understanding the rapidly changing world of the Anthropocene and responding to fundamental challenges, such as identifying regional pathways for social development amidst climate change (Lidskog and Waterton 2016). However, the protection of nature and the environment in post-communist countries is still dominated by a top-down approach that is based on hierarchical structures and formal, rigid policy instruments (Börzel 2009; Grodzińska-Jurczak and Cent 2011; Kluvánková-Oravská, Chobotová, and Smolková 2013). Such an approach limits the adoption of more participatory governance solutions (Ostrom 1999) that allows decision-making processes to be legitimated by society. However, a top-down approach may possibly accelerate the process of decision-making and enable the effective enforcement of certain solutions.

In the context of social-environmental studies, it is crucial to consider that Poland and other Central and Eastern European countries in general still possess significantly richer

and more diverse natural ecosystems compared to Western countries. These ecosystems include old-growth forests and large wetland areas that provide habitats for many species absent from more developed parts of Europe. Such a setting allows for scientific research on environmental conflicts, human-wildlife coexistence and human–nature relations in contexts where interactions between people and nature are historically continuous and relatively less disrupted by anthropogenic processes. By linking institutional changes and high levels of social and economic development with these natural settings, research in Polish environmental sociology provides an important link with research on sustainable transformation in developed and developing countries.

This paper seeks to (1) examine the current development of environmental sociology in Poland from an institutional perspective, (2) determine which important topics have been addressed by socio-environmental research and (3) inspire future studies by identifying research gaps and needs. The analysis is based on publications and expert opinions collected from members of the Environmental Sociology Section of the Polish Sociological Association.

Methods

Current scholarship and future research directions for environmental sociology were examined in two steps. First, we reviewed 288 publications (journal articles, books and book chapters) written by members of the Environmental Sociology Section of the Polish Sociological Association (either authored or co-authored by the members; 36 researchers were included in the search) and published during the period from 2017 to February 2022. Publications were identified by searching for authors' names in Scopus and Google Scholar. We focused on publications by section members to limit the target studies to those that were written by scientists who explicitly identify themselves as researchers of environmental sociology and who have participated in the institutionalization of the sub-discipline. Environmental sociology is very broad in both range of topics and theories and often utilizes interdisciplinary methods and concepts; therefore, given these challenges, we predicted that this method would be most effective at identifying the core research papers in environmental sociology in Poland. We recognise that such a decision favours particular work while excluding other, and there is a significant contribution to environmental sociology by the authors who are not the members of the section (see for examples: [Kronenberg et al. 2020](#); [Trempała 2016](#); [Wódz and Wódz 1998](#)), however it was necessary to define the scope of the analysis. Additionally, with the literature review, we sought to identify the topics and themes of the research; therefore, by we decided not to use keywords representing areas of interest as it would limit our findings only to those pre-defined topics. The analyzed period was proposed based on the year that the Environmental Sociology Section was established within the Polish Sociological Association (2017). The articles were open coded according to the following categories: year, publication language, methods, theoretical and conceptual approach and thematic domain. The literature review resulted in the identification of five major thematic domains, which were applied in the following steps. The most relevant

publications within each domain were selected based on *Methodi Ordinatio* guidelines, which consider for impact factor, the number of citations and publication year to clarify the state of the art: $\text{InOrdinatio} = (\text{IF}/1000) + \alpha * [10 - (\text{ResearchYear} - \text{PublishYear})] + (\Sigma \text{Ci})$, proposed by Pagani, Kovaleski, and Resende (2015). Web of Science™ was used for listing impact factor and the number of citations of 88 papers published in journals indexed in this data base; α was set to 1, as we compared studies from a narrow time period. The search was performed in May 2022.

In the second step, we organized an online seminar of the Environmental Sociology Section held on April 24, 2020 with 23 participants. The seminar aimed to 1) review current research interests and 2) identify emerging research directions in the five thematic domains identified via the literature review (based on preliminary results of the literature review in 2020). Moderators of group discussions took notes to summarize the results, and preliminary summaries were also presented and discussed with participants during the workshop. Finally, lists of prospective research questions (Jucker et al. 2018; Skórka et al. 2021; Ryghaug et al. 2020) for each research domain in Polish environmental sociology were developed based on the analysis of the discussions.

Results and Discussion

State of the Art in Polish Environmental Sociology

Among the 288 publications by members of the Environmental Sociology Section, 205 addressed topics of interest in environmental sociology. Environmental sociology was therefore identified as one of the main research areas of the authors. The majority of publications were in English and targeted an international audience; approximately a quarter of publications were published in Polish (Fig. 1). During the studied period, the number of publications published was similar for each year, with a slight increase in 2018.

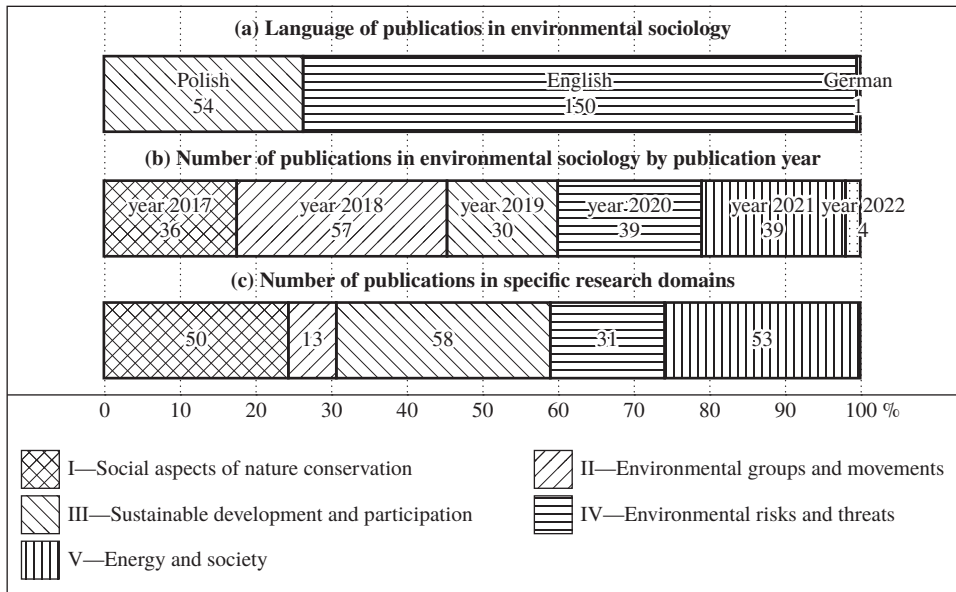
We identified a variety of methods used in published works (Fig. 2), with literature reviews (both narrative and quantitative, 89 cases) and qualitative interviews (62 cases) being the most frequently reported methods. The majority of papers used more than one method. Other methodologies included questionnaire studies (31), document or media content analysis (30), statistical analysis of secondary data (e.g. public data, 22 cases), observations (including participatory observation, 22 cases), spatial analysis of empirical or secondary data and group discussions (e.g. focus group interviews, workshops and debates, 20 cases).

A total of 67 papers explicitly mentioned their theoretical foundations in their abstracts. Among the most commonly used were institutional theories, general conflict theories and particular approaches to conservation conflicts, theories of energy and environmental justice, interdisciplinary frameworks of resilience and ecosystem services, gender perspectives, as well as social psychology concepts such as place attachment, connection to nature and environmental values.

We identified five main thematic domains of research in the discipline of Polish environmental sociology (Fig. 3): (I) social aspects of nature conservation, which included

Figure 1

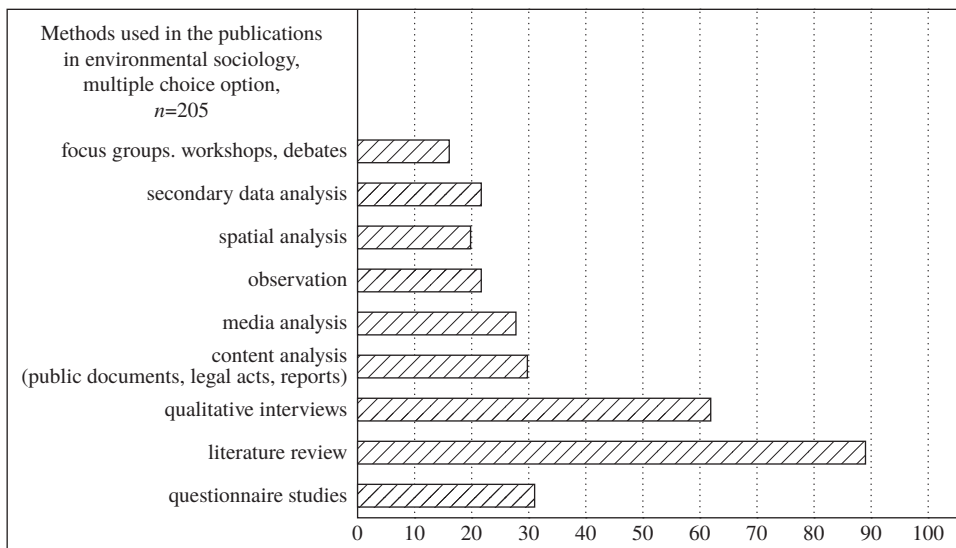
Share of publications in Polish environmental sociology by (a) language, (b) publication year and (c) research domain



The year 2022 was covered until the end of February. Absolute numbers of publications are included on the graph bars.

Figure 2

Number of publications in environmental sociology reporting a use of particular research methods. The graph presents results of a multi choice coding of publications in the literature review



human–nature and inter-species relations as well as animal welfare studies; (II) environmental groups and movements; (III) sustainable development and the participation of local communities in rural and urban areas; (IV) environmental risks and threats and (V) energy and society. Each of the domains was represented by at least five authors who belong to the Environmental Sociology Section and included studies that incorporated a variety of case studies and topics and used various methods. Also, each of the domain was represented by publications in highly influential international journals, with the top relevant papers summarized in the [Table 1](#). The most important findings regarding the domains were discussed at the seminar, which provided background information for the identification of research needs and prospective areas of future research in environmental sociology.

Perspectives on Future Research in the Identified Thematic Domains of Environmental Sociology

In the following sections, we first present the identified thematic domains and then discuss future areas of research, which are summarized as potential research questions in the [Figure 3](#). We also identified the most relevant literature within each domain and references to these papers are provided in the [Figure 3](#). The following sections discuss the domains within a wider range of publications.

Nature Conservation

Within the research domain of nature conservation, four subdomains were identified. The first subdomain concerns research on the social aspects of territorial protection. This field of research focuses on conflicts over protected areas, in particular the Białowieża Forest ([Blicharska et al. 2020](#); [Mikusiński and Niedziałkowski 2020](#); [Niedziałkowski et al. 2019](#)). While the Białowieża Forest is an interesting case of a long-term conflict, it is not necessarily representative of the social context of territorial nature conservation. Therefore, further research should address other areas with natural value that are not so politically controversial and can potentially generate new solutions to the inherent conflicts of values and interests ([Rechciński, Tusznio, and Grodzińska-Jurczak 2019](#); [Vintsek, Grodzińska-Jurczak, and Stanczyk 2020](#)). Similarly, failed initiatives to conserve particular natural areas ([Boćkowski et al. 2022](#)) could be investigated to explore the reasons for their failure, as well as environmental justice underpinnings of controversies and conflicts in nature conservation ([Strzelecka et al. 2021](#)). An important and largely unexplored subject is the socio-political context within which nature conservation administration occurs (e.g. national parks, landscape parks and regional directorates of environmental protection). Particularly, scholars should explore if and why involved organizations are perceived as effectively fulfilling their mandates and how mandates are constructed.

The second subdomain concerns the protection of wildlife, which, similar to the above subdomain, has been dominated by one conflict: wolf management ([Niedziałkowski et al. 2021](#); [Niedziałkowski and Putkowska-Smoter 2020](#)). This conflict has generated considerable social interest and requires further investigation. Moreover, further research concerning the social determinants of managing less charismatic species would contribute to a more comprehensive understanding of the social context of wildlife conservation in Poland. The issue of bird species protection is particularly interesting. This policy

Table 1

Five most relevant recent scientific publications in each research domain of Polish environmental sociology. The top relevant scientific publications were selected based on Methodi Ordinatio principles: InOrdinatio = (IF/1000) + α * [10 – (Research Year – Publish Year)] + (ΣCi), among publications indexed in Web of Science™, n = 88, searched in May 2022 (Pagani et al. 2015)

Research Domain	Publication title	Authors (members of the section in bold)	Journal	Journal Impact Factor	Publication year	No of citations in May 2022	InOrdinatio
(I) SOCIAL ASPECTS OF NATURE CONSERVATION	Empowerment and resident support for tourism in rural Central and Eastern Europe (CEE): The case of Pomerania, Poland	Strzelecka M. , Boley B.B., Stiz-elecka C.	<i>Journal of Sustainable Tourism</i>	7,968	2017	64	69,00797
	Between biodiversity conservation and sustainable forest management—A multidisciplinary assessment of the emblematic Białowieża Forest case	Blicharska M., (...) Niedziałkowski K. , et. al.	<i>Biological Conservation</i>	5,991	2020	14	22,00599
	Discourses on public participation in protected areas governance: Application of Q methodology in Poland	Niedziałkowski K. , Komar E., Pietrzyk-Kaszyńska A., Olszańska A., Grodzińska-Jurczak M.	<i>Ecological Economics</i>	5,389	2018	16	22,00539
	The ecosystem services concept as a tool for public participation in management of Poland's Natura 2000 network	Mączka K. , Chmielewski P., Jeran A., Mateczak P., Van Ripper C.J.	<i>Ecosystem Services</i>	5,454	2019	14	21,00545
	Protected area conflicts: a state-of-the-art review and a proposed integrated conceptual framework for reclaiming the role of geography	Rechciński M. , Tuzimio J. , Grodzińska-Jurczak M.	Biodiversity and Conservation	3,551	2019	12	19,003551
	The hedonic nature of conservation volunteer travel	Strzelecka M. , Nisbett G.S., Woosnam K.M.	<i>Tourism Management</i>	10,967	2017	26	31,01097
	Attention: smog alert! Citizen engagement for clean air and its consequences for fuel poverty in Poland	Frankowski J.	<i>Energy and Buildings</i>	5,879	2020	22	30,00588
	Examining Millennials' Global Citizenship Attitudes and Behavioral Intentions to Engage in Environmental Volunteering	Woosnam K.M., Strzelecka M. , Nisbett G.S., Keith S.J.	<i>Sustainability</i>	3,251	2019	9	16,00325
	Appealing to Goodwill or YOLO-Promoting Conservation Volunteering to Millennials	Nisbett G.S., Strzelecka M.	<i>VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations</i>	2,468	2017	10	15,00247
	Self-efficacy mechanism at work: The context of environmental volunteer travel	Strzelecka M. , Woosnam K., Nisbett G.S.	<i>Journal of Sustainable Tourism</i>	7,968	2018	7	13,00797

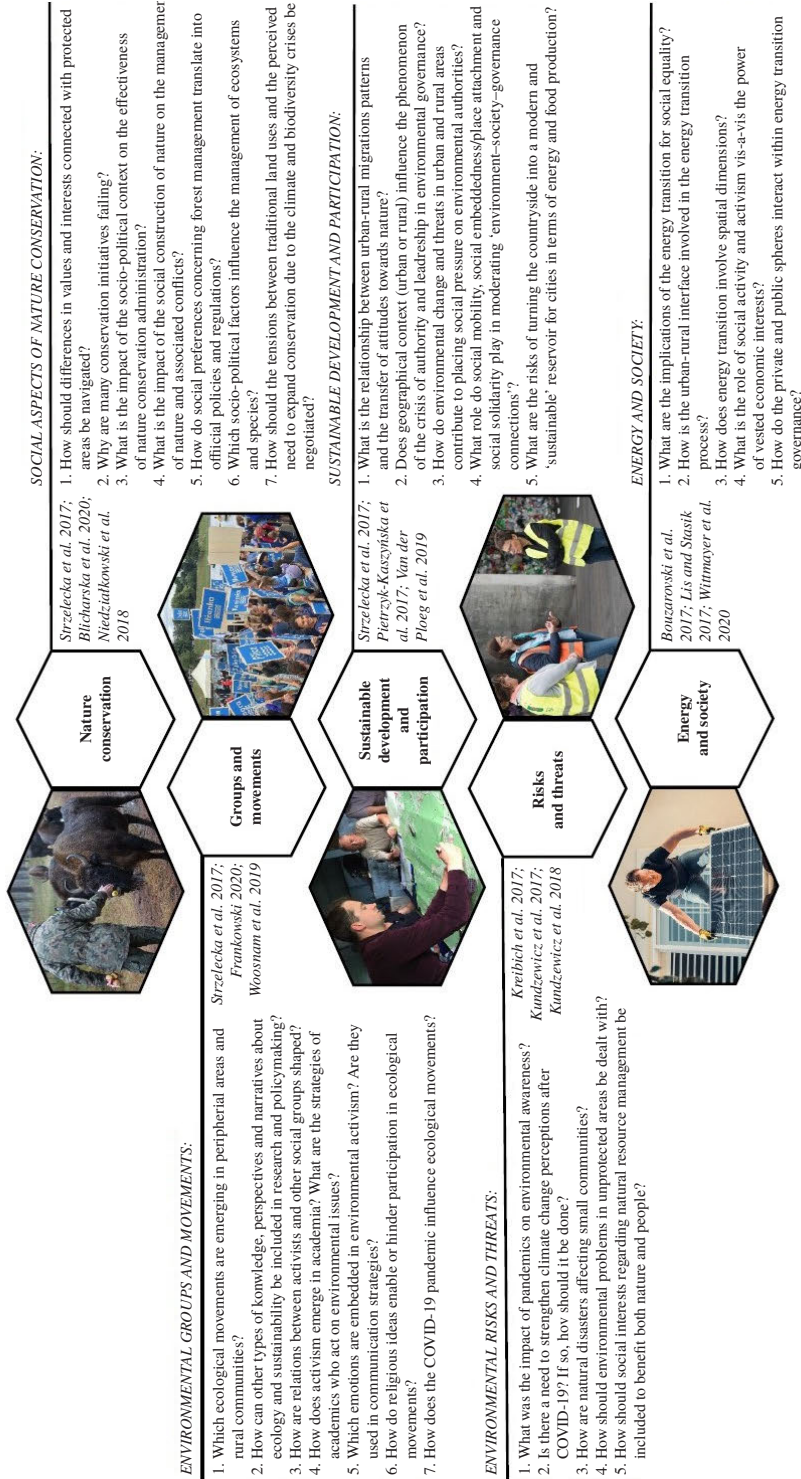
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Table 1 (continued)

Research Domain	Publication title	Authors (members of the section in bold)	Journal	Journal Impact Factor	Publication year	No of citations in May 2022	InOrdinatio
(III) SUSTAINABLE DEVELOPMENT IN RURAL AND URBAN AREAS AND THE PARTICIPATION OF LOCAL COMMUNITIES	Place attachment and empowerment: Do residents need to be attached to be empowered?	Strzelecka M. , Boley B.B., Woosnam K.M.	<i>Annals of Tourism Research</i>	9,011	2017	71	76,00901
	Eliciting non-monetary values of formal and informal urban green spaces using public participation GIS	Pietrzyk-Kaszyńska A. , Czepkiewicz M., Kronenberg J.	<i>Landscape and Urban Planning</i>	6,142	2017	60	65,006142
	The economic potential of agroecology: Empirical evidence from Europe	Van der Ploeg J.D., (...) Nowak P. , et al.	<i>Journal of Rural Studies</i>	4,849	2019	50	57,00485
	Knowledge, empowerment, and action: testing the empowerment theory in a tourism context	Joo D., Woosnam K.M., Strzelecka M. , Boley B.B.	<i>Journal of Sustainable Tourism</i>	7,968	2020	38	46,007968
(IV) ENVIRONMENTAL RISKS AND THREATS	Cycling in Warsaw, Poland—Perceived enablers and barriers according to cyclists and non-cyclist	Iwińska K. , Blicharska M., Piercotti L., Taimo M., de Nazelle A.	<i>Transportation research part A: policy and practice</i>	5,594	2018	34	40,005594
	Adaptation to flood risk: Results of international paired flood event studies: ADAPTATION TO FLOOD RISK	Kreibich H., (...) Matczak P. , et al.	<i>Earth's Future</i>	7,495	2017	104	109,0075
	Differences in flood hazard projections in Europe—their causes and consequences for decision making strategies	Kundzewicz Z.W., (...) Matczak P. , et al.	<i>Hydrological Sciences Journal</i>	3,787	2017	101	106,003787
	Flood-risk reduction: Structural measures and diverse Governance Strategies for Improving Flood Resilience in the Face of Climate Change	Kundzewicz Z.W., Hegger D., Matczak P. , Driessen P.P.J.	<i>Proceedings of the National Academy of Sciences</i>	11,2	2018	47	53,0112
	Varieties of flood risk governance in Europe: How do countries respond to driving forces and what explains institutional change?	Driessen P.P.J., (...) Matczak P. , et al.	<i>Water</i>	3,101	2018	38	44,0031
	Low-Carbon Gentrification: When Climate Change Encounters Residential Displacement	Wiering M.A., Kaufmann M., Mess H., Schellenberger T., Ganzevoort W., Hegger D., Larrue C., Matczak P.	<i>Global Environmental Change</i>	9,523	2017	36	41,00952
	Multiple transformations: Theorizing energy vulnerability as a socio-spatial phenomenon	Boutzarovski S., Frankowski J. , Tirado Herrero S.	<i>International Journal of Urban and Regional Research</i>	4,564	2018	35	41,004564
	Hybrid forums, knowledge deficits and the multiple uncertainties of resource extraction: Negotiating the local governance of shale gas in Poland	Boutzarovski S., Tirado Herrero S., Petrova S., Frankowski J. , Matousek R., Malby T.	<i>Human Geography</i>	1,953	2017	32	37,001953
	Beyond instrumentalism: Broadening the understanding of social innovation in socio-technical energy systems	Lis A. , Stasiak A.	<i>Energy Research & Social Science</i>	6,843	2017	21	26,00684
	“What is it for me?” A people-centered account of household energy transition co-benefits in Poland	Wittmayer J.M., (...) Wagner A. , et al.	<i>Energy Research & Social Science</i>	6,834	2020	15	23,00683
(V) ENERGY AND SOCIETY		Frankowski J. , Tirado Herrero S.	<i>Energy Research & Social Science</i>	6,843	2021	8	17,00684

Figure 3

The main research domains in Polish environmental sociology and potential future research questions. References to the top three most relevant recent scientific publications are provided for each research domain. The top relevant scientific publications were selected based on Methodi Ordinatio principles: $InOrdinatio = (IF/1000) + \alpha * [10 - (Research\ Year - Publish\ Year)] + (\Sigma Ci)$, (Pagani et al. 2015)



area is characterized by different forms of engagement involving various groups of social actors. It also involves innovative forms of participation such as citizen science. Birds are also an indicator group that provide information about anthropogenic influences on the environment. Because birds migrate, social research concerning bird management includes an interesting international context. Another potentially fruitful area of future research concerns the social dimensions of interactions between humans and carnivores (e.g. bears, seals and cormorants); this includes the significance of the social construction of these species and the roles of various groups of actors (e.g. hunters, environmental activists and journalists). The role of the hunting movement in the protection and management of wildlife species is also of particular interest.

The third subdomain includes questions regarding interactions between nature conservation and two other policy areas: forest management and land use planning. This subdomain became mainstream after emerging as an important issue in the conflict over the Białowieża Forest; however, it is representative of a more widespread clash in society. There has also been a recent proliferation of conflicts, as illustrated by the grassroots initiative “Forests and Citizens”. These tensions are likely to grow as a result of the renewed recognition of the recreational value of forests—particularly those close to urban areas—during the COVID-19 pandemic. An interesting and largely unexplored subject in this context is the factors influencing the use of forest ecosystem services by different social groups in different locations (Mączka et al. 2019). The question of land use planning has not been extensively explored within the context of social aspects of nature conservation, and planning tools remain crucial for the protection of land against development, which is an important driver of habitat loss. Therefore, new research should investigate the effectiveness of planning tools for nature conservation and identify associated best practices.

The fourth subdomain within social research on nature conservation addresses water and water management. Water is of central importance for the proper functioning of natural processes and is a key resource for human societies. Despite this, there is insufficient social research on water resources in Poland; in particular, there are few studies focusing on the challenges posed to water management in connection with climate change and depleting water biodiversity (Piwowarczyk et al. 2019). Therefore, future research on this topic could explore the socio-political factors influencing water management and the impact of beliefs and values on activities that limit the retention of water in the environment.

There is tension among all four subdomains of social research on nature conservation concerning the perceived need for social change connected with global environmental crises (e.g. climate change and biodiversity loss) and the tendency to maintain the status quo within particular policy fields that are dominated by historically developed relations of power and knowledge. Future research in environmental sociology should identify these dependencies and map opportunities for transition pathways to more sustainable policies and practices.

Environmental Groups and Movements

Research on social movements and groups acting to prevent the devastation of nature is well-established within Polish environmental sociology. Such research has generated a comprehensive historical perspective reaching back to the 1920s, and it has been

particularly focused on the period following democratic transformations in 1989 and the enlargement of the EU in 2004 (Łoś 2020). The emerging research focuses on the evolution of the environmental movement, especially new types of initiatives driven by the new generation of activists, such as Extinction Rebellion, Camp for the Forest and Climate Camp. A growing body of research has examined urban environmental groups and movements (Putkowska-Smoter and Frankowski 2020), air pollution activism, food networks (Kopczyńska 2020) and environmental volunteerism (Strzelecka, Nisbett, and Woosnam 2017; Strzelecka, Woosnam, and Nisbett 2018).

Environmental movements emerging on the periphery, such as in rural areas or among other groups that do not call themselves 'environmentalists,' have been overlooked. However, they in fact do act for the environment. Farmers protesting fracking and mining or rural food networks are examples of groups that elude the definitions of environmental social movements. Alternative narratives to academic and mainstream understandings of notions of 'ecological' or 'sustainable' as well as non-academic types of knowledge must be incorporated into Polish environmental sociology. The relationships between peripheral groups and activists from mainstream environmental movements remain unexplored; these relationships include the cooperation strategies used by people with different values (with a special focus on religious groups) but common environmental goals.

Prospective research should also provide deeper insight into how environmental groups and movements legitimize their actions and design strategies for implementing change. For example, some groups and individual activists are cooperating with political parties, while others are apolitical by principle. Such groups require different strategies for implementing their postulates. Grassroots environmental initiatives are emerging in religious communities, often against the wishes of their church's hierarchy. The participation of scientists (Cynk 2020) is another legitimization mechanism; however, activism can cause a range of unexplored consequences for scientists. These consequences may include influencing scientific performance, diffusing ideas (from the broader social environment to science and vice versa), creating new pathways of knowledge implementation and engaging in new power relations.

There is also a need for examining how environmental groups and movements can sensitively and effectively communicate their goals in the context of the COVID-19 pandemic. There is a risk of marginalizing environmental goals in the context of other current crises, such as the healthcare system overload and struggles at a labor market. However, the pandemic is also an opportunity to mainstream environmental issues by highlighting their role in maintaining ecological security and stability and preventing the appearance of new diseases.

Sustainable Development and the Participation of Local Societies in Rural and Urban Areas

Recently, scholars active in this research domain have shifted their concentration to urban areas (Kabisch et al. 2019; Putkowska-Smoter and Frankowski 2020; Marta Smagacz-Poziemska et al. 2019a; Marta Smagacz-Poziemska et al. 2019b) from rural areas (Peng, Prince, and Strzelecka 2020) in the context of sustainable development and the participation of local societies. Some studies (Putkowska-Smoter and Niedziałkowski 2021) have

addressed both contexts, and this line of research has great potential for future development. It stems from complexity and a variety of aspects that influence collective attitudes towards nature in urban and rural communities.

Starting from different patterns of the socio-economic development of cities and countryside (different social stratification and scale of social exclusion), these are urban-rural connections which seem to drive the process of change and require further attention from scholars. The nature of the relationship between urban-rural migration and the transfer of social attitudes towards nature requires additional research. The potential moderating effects of migrants' capacities to build social initiatives and networks are of particular interest. Another notable topic is the role of patterns of social solidarity in urban and rural societies, including the role of urban and rural leaders during crises of expert knowledge and authority.

When studying urban and rural environmental governance, 'environment–society–governance' dependencies require further attention. Of particular interest is the role of patterns of environmental changes and threats in each of the spatial contexts and how they can place social pressure on local authorities (Putkowska-Smoter and Niedziałkowski 2021). Another notable topic is the role of social mobility in moderating these connections, especially in the context of the rich diversity of studies on social embeddedness and place attachment (Strzelecka, Boley, and Woosnam 2017).

Finally, the differences between visions and the reality of rural transformation should be thoroughly analyzed. Do rural communities share urban expectations concerning the quality of the rural environment and the priorities of rural development? This is especially important in the context of sustainable energy and food production and flows (Kopczyńska 2020). The risk of turning the countryside into a modern and 'sustainable' reservoir for cities needs to be explored.

Simultaneously, research on public participation is already rather mature (Niedziałkowski et al. 2018); however, new perspectives on the challenges of public engagement in environmental governance must be explored (Morawski, Okulicz-Kozaryn, and Strzelecka 2022; Tusznio et al. 2020).

Environmental Risks and Threats

There is an established body of Polish sociological research on climate change risks, consequences and adaptation (Kundzewicz et al. 2020), flood risks and resilience (Piotr Matczak and Hegger 2020; P. Matczak et al. 2015), social consequences, governance and participation (Choryński et al. 2022; P. Matczak et al. 2017) as well as COVID-19 and the uses of plastic (Grodzińska-Jurczak, Krawczyk, Jurczak, Strzelecka, et al. 2020). The research focus is often international and comparative (Warachowska et al. 2021; Kreibich et al. 2017).

Currently, reevaluating threats has emerged as the core concern in this domain within environmental sociology. As a result of the COVID-19, public interest in climate change has faded. Placing epidemic safety concerns over climate issues has been expressed in various ways, such as returning to disposable packaging (Grodzińska-Jurczak, Krawczyk, Jurczak, Strzelecka, et al. 2020) and turning away from public transportation, often in favor of individual car usage. Climate security is receiving less attention from society and decision-makers despite the increasing urgency of the problem. Therefore, it is necessary to increase environmental perception and awareness (Kundzewicz et al. 2020). Future studies should

examine the state of environmental awareness in light of the profound changes caused by the pandemic as well as other forthcoming crises. Research in this area should focus not only on solving theoretical questions but also on applications and practical solutions.

Beyond climate change, there were also important areas identified for future exploration. They included environmental problems in unprotected areas; decision-making processes related to environmental risks and threats, including rapid changes and crises; and analyses of spatially limited natural disasters affecting small communities (Choryński et al. 2022).

Seminar participants also identified other responsibilities of social scientists interested in environmental risks and threats that go beyond research. The main responsibilities include popularizing knowledge and debunking myths and misinformation on climate change and its consequences. Knowledge popularization should be achieved by disseminating information to society, accounting for social needs and engaging stakeholders in research. This part of scientific activity should be promoted and mainstreamed in the academia and in the academic evaluation systems.

Energy and Society

The central problem of this domain of environmental sociology is transformation in the context of the climate, energy and decarbonization. This body of research is clearly related to the current societal and economic challenges (Lis 2018). Ongoing EU policies and various policies at the national level in these areas constitute an important context (Lis 2021). The potential impacts of these attempts on the representation of gender and women's perspective (Iwińska and Bukowska 2022), the role of media (Ruzzenenti and Wagner 2018) and innovative solutions (Wittmayer et al. 2020; Wagner and Gałuszka 2020) have been explored. Significant emphasis has been placed on inequalities related to the climate, energy and decarbonization policies. This has been accompanied by the growing prominence of traditional concepts, such as social class, and more focused concepts, such as environmental and energy justice and energy exclusion (Sareen et al. 2020; Iwińska, Lis, and Mączka 2021; Sokołowski and Frankowski 2020).

Recent studies have primarily focused on urban areas. Therefore, current research is limited by its underrepresentation of rural areas. The phenomena studied here, such as decarbonization and energy transformation, are involved in changes in the urban-rural relationship, and they require more attention. Other aspects that require more emphasis are a) the spatial and social distribution of analyzed phenomena, taking into account spatial and social characteristics and diversity; b) social activity and activism; d) the distinction between the private and public spheres; e) the role of new and old technologies and technological innovations as well as their social entanglements; f) the importance of power and economic strength (e.g. the role of large companies) in transformations and g) theoretical reflection on the issue of agency.

Existing research is both quantitative (e.g. household research on readiness to change heat sources) and qualitative. However, there is a need to strengthen the mixed method approach linking these two paths of research. A serious challenge is to overcome separation of disciplines, because comprehensive scientific inquiries in this domain demand interdisciplinary approaches.

Conclusions

Although there is a rich variety of topics and perspectives in Polish environmental sociology, some common themes and challenges can be identified. First, there is a need for deeper insight into local and peripheral actors who have been neglected in the existing research because they may become crucial agents of sustainable transformations. The ignoring of peripheral societies is also connected with the problems of injustice and power inequalities. Here the application of classical sociological concepts, such as social class and stratification, may be particularly fruitful (Lidskog and Sjödin 2014), as well as applying gender and ecofeminism perspectives (Kennedy and Dzialo 2015) to issues such as energy transition, which often focus only on a male-dominated working class. Additionally, this issue could be approached by including other forms of knowledge in the production of science by incorporating transdisciplinary studies or citizen science projects. Second, researchers in every thematic domain studied here responded to the most pressing issues in the studied period, such as the COVID-19 pandemic, and these researchers explored whether such issues can be considered 'game changers' in addressing social-environmental problems. Third, many of the examined studies produced results relevant to public decision-making and aimed to contribute to more effective policymaking and policy implementation. Thus, sociological research concerning environmental problems can improve societal responses to environmental issues (Lidskog and Sjödin 2014); however, this contribution must be highlighted and promoted by researchers themselves.

Referring to the two traditions in the area of sociological studies about socio-environmental interface (Buttel and Field 2002; Buttel 2002; Qin et al. 2020), we could roughly assess that the Polish scholarship lies in environmental sociology (Pellow and Nyseth Brehm 2013) rather than in sociology of natural resources, although some research practices provide an appreciated a synthesis of both of the approaches (Field, Luloff, and Krannich 2013). As in the tradition of international environmental sociology, Polish research is driven by the recognition of importance of environmental problems to society and provides an 'environmental' extension of certain areas of mainstream sociology (Qin and Flint 2009), such as social movements (Putkowska-Smoter and Frankowski 2020), networks (Kopczyńska 2020), justice (Iwińska, Lis, and Mączka 2021; Strzelecka et al. 2021), institutional analysis (Niedziałkowski and Putkowska-Smoter 2020) and governance studies (Grodzińska-Jurczak, Krawczyk, Jurczak, and Dybek 2020; Driessen et al. 2018; Niedziałkowski and Shkaruba 2018; Lis and Stasik 2017). The research is well grounded in sociological theory and focused on understanding social causes and impacts of environmental problems. Although the targeted audience is mainly academic, some studies, in line with tradition of sociology of natural resources, aim also for contributions to current environmental decision making (Blicharska et al. 2020; M. D. Boćkowski et al. 2020). Such studies often provide in-depth analysis of local and regional cases concluded with recommendations. Also, large part of the research reach beyond urban and metropolitan areas (a usual focus of the western environmental sociology traditions), concentrating on rural communities and stakeholders (Kopczyńska 2020; Mączka et al. 2021). It is also worth to mention that there are not only sociologists among the members of the Environmental Sociology Section, interdisciplinary research is practiced regularly and published in both

social and natural sciences journal (Blicharska et al. 2020; Iwińska, Jones, and Kraszewska 2018; Koprowska et al. 2020; Kronenberg et al. 2020; Matczak and Hegger 2020). Such practices consider an important share of European environmental sociology (Lidskog and Sjödin 2014; Lange 2002). However differently from e.g. French experiences (Candau and Deldreuve 2015), there is no deeper discussion on the relevance of classical sociological theories and a need to further engage with them in the Polish environmental sociology. Within each of the research domains, there are studies of local, regional, national cases (both Polish and non-Polish), as well as international comparisons, mostly within Europe.

The practical relevance of Polish environmental sociological research for society and the environment is connected to several issues. Sociological knowledge enhances our understanding of nature conservation and helps solves certain problems, such as controversies surrounding wild species management, the incorporation of social preferences in managing natural resources and deadlocks in establishing and enlarging national parks—all relevant internationally, for example as a part of implementation of EU biodiversity policy. It may improve the transition to a circular economy and the implementation of relevant EU policies, such as single-use plastic directives. Polish environmental sociological research can also benefit social advocacy for air quality and the transition to a carbon-neutral economy, at the same time providing important scientific insights into such processes from a highly coal-dependent economy. Sociological environmental research can also contribute to our understanding of environmental attitudes in times of crisis, such as during the COVID-19 the current war in Ukraine or refugee crises at the border with Belarus in the middle of Białowieża forest—one the oldest European old-growth forest. The Polish perspective shows how this sub-discipline help us respond to the new crises that affect the interlinkages between society and the environment, at the same time contributing to internationally relevant scientific developments.

To conclude, despite certain delay in the institutionalization and consolidation of the academic circles compared to the western environmental sociology, the Polish research in this area has its achievements, which not only has been growing quantitatively in the last five years, but also has an increasing influence on the global scientific debate concerning the social implications of the environmental crisis. The Environmental Sociology Section of the Polish Sociological Association has been contributing to this process by providing a space for knowledge exchange and collaboration for interdisciplinary scholars interested in a broad range of topics within this sub-discipline.

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Declaration of interest

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