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Aysan, Ahmet Faruk, Bakkar, Yassine, Ul-Durar, Shajara and Kayani, Umar Nawaz (2023) Natural resources governance and conflicts: Retrospective analysis. *Resources Policy*, 85. p. 103942. ISSN 03014207

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# Natural resources governance and conflicts: Retrospective analysis

Ahmet Faruk Aysan<sup>a</sup>, Yassine Bakkar<sup>b</sup>, Shajara Ul-Durar<sup>c,e,\*</sup>, Umar Nawaz Kayani<sup>d</sup>

<sup>a</sup> Islamic Finance and Economy, Hamid Bin Khalifa University, Qatar

<sup>b</sup> Queen's University Belfast, 185 Stranmillis Rd, Belfast, BT9 5EE, UK

<sup>c</sup> University of Sunderland, The School of Business Management, Edinburgh Building, Chester Road, Sunderland, SR1 3SD, UK

<sup>d</sup> College of Business, Al Ain University, Abu Dhabi, United Arab Emirates

<sup>e</sup> Durham University, Durham Business School, Durham, DH1 3LB, UK

## ARTICLE INFO

### Keywords:

Natural resources

Governance

Conflicts

Systematic literature review

Future dimensions

## ABSTRACT

Rapid increases in natural resources globally during the 1970s have had far-reaching environmental consequences. The rising exploitation of environmental assets has progressively detrimental societal effects. Therefore, the current study aims to identify the nexus between natural resources and governance conflicts while assessing the role of governance in natural resource management. The results identify three significant categories of governance challenges (associated with capacity, connectivity, and knowledge) and three domains of good governance (effectiveness, involvement, and efficiency). The results highlighted that developing countries would likely need more decision-making power, financial and human resources, leadership on crucial resource challenges, and conflict resolution mechanisms. On the contrary, research into natural resource management governance structures in industrialized countries has often shown problems with policy clarity and the alignment of stakeholder institutions' goals and aims. The study adds to the existing literature by summarizing new organizational capacities and governance frameworks essential for better natural resource management.

## 1. Introduction

The rising exploitation of environmental assets has progressively had detrimental societal effects. With a rise from 30 billion tons in 1970 to 70 billion tons in 2010, the world's yearly material extraction has increased dramatically (Bai et al., 2021). As of 2000, material extraction has increased despite a slowing international market and population. Business, as usual, predicts that 125 billion tons of resources will be needed to drive the world market in 2030 and 180 billion tons will be needed in 2050 (Daehn et al., 2022). This is due to an expanding worldwide population and a rising middle class, particularly in emerging nations. Altogether, the estimated recovery of raw materials in 2030 is between 300 and 335 billion tons (Alam et al., 2022). It does not comprise the elements mobilized during the extraction procedure but is not further employed commercially. It is becoming increasingly concerning that the rapid growth of extraction facilities, optimizing and production operations, and final waste decommissioning are leading to increased public community conflicts resulting from environmental perturbations and social dislocation. These regional conflicts, for example concerning resource extraction, are generally driven by the

need in far-off locations and result from irresponsible production and consumption patterns. Furthermore, the success in meeting the sustainable development goals (SDGs) is hinted at in the post-2015 economic plan by the countries. Disentangling macroeconomic development and natural resource usage (SDG target 12.2), waste reduction (SDG target 12.5), and sustainable use of natural resources (SDG target 12.2) are just a few examples of the many objectives and targets that aim to improve these areas (SDG target 8.4) (van Zanten and van Tulder, 2021).

Scholars and professionals have seen governance as vital for effective natural resource planning in recent years. In fact, in the past 20 years many management organizations and administrations have embraced more interactive, co-operative, and multidimensional governance structures in response to the glaring deficiencies of the traditional top-down, bureaucratic, and typically government-led, management approaches (Lotfalipour and Salehnia, 2022; Wang et al., 2023). With this seismic upheaval in how societies are governed, many new ways of making decisions have been tried with various degrees of effectiveness and impact on social-ecological results (Bodin et al., 2016; Markolf et al., 2018). Along with this paradigm change came much talk about what

\* Corresponding author. University of Sunderland, The School of Business Management, Edinburgh Building, Chester Road, Sunderland, SR1 3SD, UK.

E-mail addresses: [aaysan@hbku.edu.qa](mailto:aaysan@hbku.edu.qa) (A.F. Aysan), [y.bakkar@qub.ac.uk](mailto:y.bakkar@qub.ac.uk) (Y. Bakkar), [Shajara.ul-durar@sunderland.ac.uk](mailto:Shajara.ul-durar@sunderland.ac.uk), [shajara.ul-durar@durham.ac.uk](mailto:shajara.ul-durar@durham.ac.uk) (S. Ul-Durar), [umar.kayani@aau.ac.ae](mailto:umar.kayani@aau.ac.ae) (U.N. Kayani).

<https://doi.org/10.1016/j.resourpol.2023.103942>

Received 4 March 2023; Received in revised form 14 June 2023; Accepted 12 July 2023

Available online 19 July 2023

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constitutes good governance when managing natural resources. However, studies show that implementing these ideas is still a significant barrier to the efficiency of natural resource management. The probability of governance network collapse is increased and the ability of natural resource governance systems to provide ecological, cultural, and macroeconomic objectives across scales is severely constrained by the prevalence of governance issues. The sustainability of natural resources must be protected by enhancing the functioning of governance systems in places where environmental destruction persists despite considerable foreign investment in creative ways to accomplish environmental goals and on-ground initiatives (Soliman and Nasir, 2019).

Although there may be just a few obstacles in a governance system's ability to achieve its goals, in most situations many interrelated governance problems must be overcome before the system can achieve its objectives. Issues in governance can come in the form of disagreements between interested parties (Wang et al., 2023), a dearth of funds to implement specific approaches (Tsani, 2013), a complete absence of governmental assistance for specified green initiatives (Leal Filho et al., 2019), or a failure to include or use native knowledge to better understand ecological systems (Bodin et al., 2016). Even though much effort has been put into recognizing and fixing these governance problems in the last several years, environmental deterioration has persisted all over the globe. It indicates that efforts to alleviate environmental degradation must be improved by the inadequacy of global natural resource governance frameworks to react to environmental pollution and management concerns.

Several studies in the field of managing natural resources have been conducted in order to detect and analyze governance conflicts (Dogan et al., 2021; Huynh et al., 2020; Majeed et al., 2021; Ni et al., 2022; Redmond and Nasir, 2020; Song et al., 2019, 2020; Wang et al., 2021). These studies examine governance issues in isolation without considering the broader context of a specific location, governance system, or region. While these studies help learn about the pros and cons of certain governance structures they cannot shed light on systemic problems with governance or global tendencies in the governance of natural resources. To address this gap in existing literature this literature review was conducted to provide a comprehensive overview of the settings that shape the use of natural resources. The data performers must adapt to more sustainable resource management over space and time. For this purpose, this study uses a qualitative systematic literature review approach to determine what problems need to be addressed, where more information is needed, whether governance difficulties are impacted by geography, and how these problems have changed over time. For this study, the following research questions have been formulated; (1) What governance challenges are encountered when sustainably managing natural resources? (2) Are there distinct geographical barriers to natural resource management governance? (3) How have the difficulties associated with governance in managing natural resources changed throughout time?

This study indicates that the most significant factor affecting the efficiency of governance systems is the existence of obstacles to communication and co-ordination among the many stakeholders engaged in natural resource management. The existing literature emphasizes the significance of these ties in defining the degree to which institutions may collaborate in the creation of strategies, the distribution and use of resources, and the co-ordination of their strategic efforts. The existing studies did not suggest that the challenges posed by poor governance were insurmountable or that they would permanently impede the review's aims. Despite the constraining impact of various governance difficulties in their respective case studies, several publications revealed a spectrum of success stories in achieving results.

The rest of the paper is structured as follows. Section 2 explains the literature review. Section 3 discusses methodology. Section 4 interprets the results. Section 5 provides a discussion. Finally, Section 6 provides a conclusion and future dimensions.

## 2. Literature review

The literature review holds a key position to provide oversight of the theoretical framework and available academic literature on the subject (Linnenluecke et al., 2020). Context is key when defining and categorizing the idea of natural resources. Therefore, it is necessary to first establish a common understanding of the term natural resources before carrying out the bibliometric analysis. For this purpose, the literature review was split into four basic categories as discussed and analyzed below.

### 2.1. Natural resource-conflict nexus

The World Trade Organization's annual report defines natural resources as 'stocks of elements that exist in the natural environment that are rare and commercially useable in production or consumption, either in their raw forms or after minimum processing' (Khan et al., 2020). There are two primary categories of natural resources: those that are renewable and those that are not. Land, trees, and water are examples of renewable resources whereas diamonds, fossil fuels, and minerals are examples of non-renewable resources. Scholars have developed a variety of categories, such as fuel and non-fuel, lootable and non-lootable, and point and diffuse, to quantify the impact of non-renewable resources on violence (FU et al., 2022).

The link between natural resources and war is a heated dispute among academics. Three main categories may be used to categorize the literature on conflict: (1) works that claim natural resources cause intrastate conflicts (Bayramov, A. 2018; Collier and Hoeffler, 2004; Fearon, 2005; Ross, 2006); (2) works that claim natural resources cause interstate conflicts (Borgerson, 2009; Kleveman, 2004; Klare, 2001a, 2001b; Moyo, 2012); and (3) works that highlight both intrastate and interstate conflicts (Colgan, 2014; De Soysa, 2007; Peters et al., 2020). The second faction is often referred to as great powers or blood oil supporters. The term resource war was coined in the early 1980s in the United States of America (USA) (Bull, 2021). According to Sakib et al. (2021), academics at the time incorrectly predicted the dangers posed by these materials, especially oil. Under the current circumstances of the cold conflict, the propaganda of war would drown out any effort at resource grabbing by one of the great powers.

### 2.2. Historical overview

The phrase resource war did not appear until the 1980s; the Arab oil embargo and the nationalization of crucial natural resource businesses in the early 1970s sparked a discussion among academics about the resource-conflict nexus much earlier (Akins, J. E., 1973; Brosche, H., 1974; Daoudi, M. S and Dajani, M. S., 1984; Klinghoffer, A. J., 1976; Mitchell, T., 2010). The Iranian Revolution of 1979 came on the heels of the oil embargo and disrupted oil production worldwide. The oil output of both nations fell due to the outbreak of war between Iran and Iraq a year after the revolution. These incidents exacerbated academics' already heightened anxiety about the shifting nature of the conflict (Smith, 2022). As a result, various theoretical notions such as oil weapon, energy nationalization, and oil conflicts developed in the 1980s. Since the end of the 1980s, the phrase resource war has been modified and reframed multiple times in response to various political and economic events such as Iraq's invasion of Kuwait and the subsequent invasion of Iraq by the USA. Terms like great game, resource curse, resource disputes, conflict resources, blood oil, strategic oil, and environmental clash are all relatively recent additions to the literature (Akpan and Umoh, 2021).

For instance, some researchers in the mid-1990s argued that resource-rich locations like the Caspian Sea and the Arctic Sea had seen a second emergence of the so-called great game. One explanation is that since the early 1990s, when the area around the Caspian Sea was opened to foreign investment in its natural resources, it has been seen as a viable

alternative to the Persian Gulf. The second is because of fleets' growth in the Arctic Ocean; even if it has been shown that the Caspian Sea does not possess the same resource potential as the Persian Gulf and that the Arctic Sea area does not allow for the development of such resources, the resurgence of the great game theory is another erroneous exaggeration. Thus, some of the works argued that there was a link between resources and the conflict without any real investigation thereby rendering their claims more journalistic than scientific (Akpan and Umoh, 2021).

Meanwhile, the phrase resource curse, developed in the late 1980s, describes the economic downturns that resource-rich nations suffered. Richard Auty initially proposed the resource curse concept in 1993 (Auty, R.M., 1994; Yates, 2022). The resource curse thesis, however, got widespread attention in the famous study by Sachs and Warner in 1995. Proponents of the resource curse claim that the presence of natural resources, especially oil, reduces the strength of national governments and increases the likelihood of violent conflict in emerging nations. Omeje (2021) is credited with popularizing the words resource conflict and conflict resources. The resource conflict theory associates using and controlling natural resources with the emergence of armed conflict. In contrast, the conflict resources hypothesis posits that the significant market price of the resource base provides economic opportunities for hostilities, individuals, or rebel parties. As a result, they are more likely to pick up guns or prolong armed engagements.

### 2.3. Resource scarcity

When resources are few, what causes instability and war? Scarcity results from a mismatch between the available resources and the ever-increasing demand for those resources. The interplay between supply and demand is central to any definition of scarcity. However, even with this wide-ranging definition, the concept of scarcity is still debated among academics. The three significant camps within this view are (1) neo-Malthusians who believe that an excessively high human population poses a threat to human welfare and the environment, (2) the distributionists; and (3) the cornucopian who are resource optimists. Those unfamiliar with Malthusianism may wonder what it is and when it started generating debate (Sone et al., 2022). Thomas Malthus, in 1798, hypothesized that the growth of the human population was exponential whereas that of food production was linear. According to the neo-Malthusians, a population explosion outpacing the expansion of available natural resources is a recipe for unrest and war. The central claim is that there is a finite supply of natural resources and that as the gap between demand and supply widens society will degenerate into rivalry and, inevitably, bloodshed. The environmentalists and peak oil/gas advocates make up the Neo-Malthusianism movement (Kipchumba, 2019).

In contrast, distributionists think that the fair transmission of power and income, instead of the presence or absence of natural resources, is the most critical factor in achieving economic success. Even though other academics have embraced this concept, Marxists and neo-Marxists are especially favorable to the arguments of distributionists. Cornucopians are the third faction; they are both technophiles and free-market advocates. In response to the preceding schools of thought, this group of academics suggests that market and technology improvements can solve the scarcity issue. Natural resources, according to scholars, are neither plentiful nor scarce as neo-Malthusians would have us believe. People say cornucopia is the ultimate resource and human creativity can effectively mitigate the adverse effects of scarcity. Market processes and technical advancements may enhance how people deal with resource constraints and place technological progress and market forces at the center of their theories. Likewise, liberal thinkers argue, based on the principles of democracy and collaboration, that competition for shared resources is more costly than co-operation (Moreland, 2019).

The second concern is how these factions connect a need for more resources to unrest and warfare. According to Martin (2021), resource constraints may spark three different forms of war: civil war, ethnic

strife, and insurgency. Regarding the first, the ongoing discussion suggests that renewable resources seldom cause war between countries. Water is the only renewable resource that has been extensively studied in the context of international conflict as stated by Llamas and Sovacool (2021). Water is crucial for expanding agricultural production and building and operating military installations. The present research suggests possible conflict over water resources like political contestation amongst downstream and upstream neighbors. Nielsen (2019) argues that it is very improbable that contemporary governments would go to war over renewable resources.

Followers of the peak oil/gas theory make this claim which connects the shortage of natural resources with the global struggle between superpowers (Joshi, 2022). These academics argue that resource-rich regions are more likely to experience war because of the inherent rivalry between major powers. Bayramov (2018) believes that the rise of emerging powers like China, India, and Russia has increased rivalry for scarce resources like oil. The rapid depletion of natural reserves, especially oil, and the uneven distribution of these resources between the global north and global south are cited by Bond and Basu (2021) as a new danger to future global security in the international arena.

Several researchers have refuted the scarcity advocates' qualitative and quantitative claims. Abbey and Vitalis (2021) argue that the scarcity idea is based on irrational assumptions such as exaggerating the dangers of oil ownership owing to faulty market data. In addition, Johnson et al. (2021) highlight that, notwithstanding scarcity scholars' robust empirical theories, they need more quantitative research results to establish the connection between resource depletion and intra-national or international conflicts. The basis for this is that the relationship between scarcity and conflict is more nuanced than scarcity researchers would have us think since some large-N studies contradict early conclusions. Meanwhile, Tang et al. (2022) suggest that competition for scarce natural resources might motivate countries to work together. However, researchers in the field of scarce natural resources have, up until now, yet to consider how scarcity might increase the likelihood of collaboration.

### 2.4. Governance and natural resource management

Decisions and results are produced using governance structures, interconnected webs of statutory and informal procedures, relationships, and arrangements. Governance examples are self-regulatory processes, deliberative forums, authoritative decision-making, and negotiated compromise. It is anticipated that governance systems comprise several overlapping and mutually influencing sociological, environmental, and commercial spheres operating at varying spatial and temporal dimensions. Through experience, how deeply intertwined these spheres are needs to be examined; for instance, how social instability and economic deficits may contribute to environmental deterioration. Similarly, a thriving economy is only sometimes good for the planet or society. While the interconnected nature of these silos is well acknowledged, governance research and evaluation often treat them independently. Policy and activity might be directed toward various goals within the greater silo framework such as social or economic growth, training, healthcare, commerce, or environmental protection. These niches need the involvement of specialized stakeholders or communities of interest, each bringing its unique experience and expertise to the table. Depending on the circumstances, they may span various geographic, historical, and political dimensions. There has been a lot of talk in governance and planning research about how crucial it is to understand the many levels of complexity at which governance occurs. There is a lot of nuance and interdependence between the various geographical and chronological dimensions. Acting out over one geographical scale, governance systems have the potential to (and are very likely to) affect other governance sub-systems. Many factors including nonlinear dynamics, uncertainty, interconnectedness, development, and competition add complexity to environmental and social

systems making it challenging to manage natural resources.

Complexity is also a feature of the governance systems that oversees the management of natural resources because of their decentralized nature, the wide range of stakeholders and objectives they represent, and the interdependence between different spheres of authority. The distribution of resources, influence, and organizational level among stakeholders must be more balanced, adding to the already present diversity of opinion. Stakeholder power dynamics may significantly impact the effectiveness of governance frameworks for natural resource management. The idea that ‘effective environmental management is the result of bottom-up activity by transnational players nested inside government structures’ (Mountford et al., 2021) has widespread scholarly backing. However, creating and maintaining such a governance structure remains difficult which limits the effectiveness of such systems in improving environmental factors.

### 3. Methodology

The search methodology, data processing, and exploration of the management constraints in transnational natural resource management governance structures were all organized using the governance systems analysis framework created by Dale et al. (2016). The researchers here used a qualitative systematic literature analysis approach. Publications relevant to the topic and meeting a predetermined inclusion criterion are culled from scholarly indexes and search engines. The resulting bibliometric and material analyses are used in systematic literature reviews to analyze patterns in the field and define knowledge gaps. Given its strict a priori approach and reliance on predetermined criteria, it is considered a potent and impartial tool for finding patterns in the literature. In addition to its widespread use in research within the fields of medicine and health sciences the technique is also becoming more frequent in environmental science research.

#### 3.1. Inclusion and exclusion criteria

The inclusion and exclusion criteria used for the current systematic literature review have been tabulated in Table 1 below. Challenges to good governance were first classified using those proposed by Dale et al. (2016) with additional classes added based on a literature review. Issues with the governance system’s decision-making capability, communication among essential players, and the accessibility and use of various forms of information in decision-making were grouped into the

**Table 1**  
Inclusion and exclusion criteria.

S. N.	Panel A Inclusion criteria	Panel B Exclusion criteria
1	Consider a specific example of effective natural resource management.	The study needed to meet the inclusion criteria.
2	Determine at least one barrier (a governance issue) between current governance practices and achieving environmental goals.	The study is a literature review.
3	Explain where in the planning phase governance problems were encountered.	The written language needs to be English.
4	The root causes of the governance issues must be found primarily inside the framework used as a benchmark.	The research does not examine governance’s role in conflicts over natural resources.
5		The study needs to look at the governance challenges in a more unbiased way.

**Note:** Table 1 provides the inclusion and exclusion criteria for this study. Panel A lists 4 criteria based on which the articles were selected for this study. Similarly, Panel B list 5 criteria which are reasons for excluding articles in the study. S.N. means serial numbers.

categories derived from Dale et al. (2016). The search terms were further narrowed by excluding specialized academic research, conference proceedings, novels, book reviews, policy documents, and surveys. Using these standards led to the identification of a total of 240 items.

#### 3.2. Coding criteria

The thematic analysis approach has been used for assessing the findings reported in the selected studies. After personally reading and analyzing each document, its content was tagged according to many factors such as:

1. Detailed information on the research’s publication such as the year, the institution, and the journal.
2. Governance issues and the methods employed to investigate them.
3. The geographical boundary and goal of case studies employed in the publications.
4. Problems with governance. At each stage of the investigation, the categorization of the governance problems was tested and amended to account for any overlaps or discrepancies — the data after coding was stored in an Excel database.

#### 3.3. Search string

Scopus, Web of Science, and Google Scholar are among the databases of scholarly journal articles that may be used to gather data for a systematic quantitative literature review. Google Scholar was chosen for this research because it indexes social and political science journal articles more thoroughly than the other two databases. Employing the Boolean search phrases ‘natural resource management conflicts’ AND ‘governance’, an unrestricted Google Scholar scan for English-language publications published in 2018 yielded 2900 results. These key search phrases were chosen to concentrate on governance in natural resources management systems without creating prejudice towards the type of governance difficulties that were investigated. It is essential to note that the objectives, keywords, and search terms were discovered via a quick literature search instead of a comprehensive systematic evaluation to determine how previous research has approached the topic of the linkages that exist between natural resource governance and conflict. Below, Table 2 presents the keywords used which resulted in the generation of the search strings.

This research’s scope included articles that analyzed the problems with resource governance and other conflicts to give a comparative analysis. Data collection and storage were handled in Excel, reference management in Mendeley, and analysis in VOSviewer. These tools have been invaluable in streamlining the first stages of study selection. A time span from 2010 to 2022 was selected to provide all the necessary background information. Publication eligibility criteria were established because of their usefulness in evaluating the articles’ importance. The evaluation did not include works collated for over a year but needed to garner citations from other sources (Google Scholar) or was published in journals with an H Index of 15 or below (Scimago Journal and Country Rank).

#### 3.4. Data evaluation process

Each article has been reviewed independently to determine which will be utilized to evaluate the data gathered. The data was gathered using the following procedure. Fig. 1 demonstrates the method for the PRISMA analytic framework that was utilized to assess the data.

##### 3.4.1. Title analysis

The significance of the article’s title was used to determine whether the article was relevant to the topic. The next step was scanning the titles of the publications for keywords related to the research question and objectives. The reviewers have now decided whether to continue

**Table 2**  
Keywords of the study.

Primary	Secondary			
Natural resource governance Conflicts	Natural resources management Governance conflicts	Natural resources Challenges	Renewable resources Management	Non-renewable resources Resource management policies

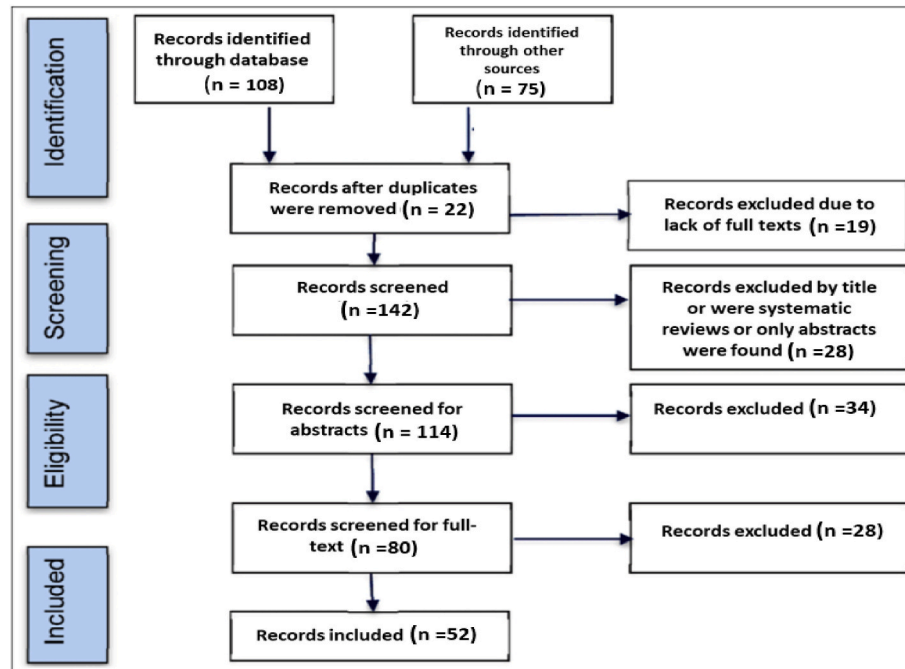


Fig. 1. Prisma flowchart.

working on the manuscript. Articles unrelated to the search topic must be removed from the results.

3.4.2. Abstract assessment

The publications that made it through the first cut will next be assessed based on their abstracts to determine whether they answer the research topic.

3.4.3. Diagonal reading

The abstract, introduction, figure and table captions, and findings are the most crucial parts of a paper. Evaluators of an SLR seek essential issues that advance the SLR’s overarching goals. They also reviewed the results to ensure the correct terms were used while searching the databases.

3.4.4. Full-script review

The next step was a thorough review of each paper followed by a grading system. Each document’s reviewers have their questions about the paper. Reviewers will provide a score of two (2) or one (1) for each question depending on how well it is answered; a score of zero (0) is given if the research fails to fulfil any of the three criteria. This assessment is empirical and grounded on the reviewer’s experience and expertise. The SLR list will consist of works rated six or higher out of 10. (60 per cent).

3.5. Biasness risks

Articles that provide contradictory findings must be given equal weight and bias must be eliminated via a systematic review. The most up-to-date version of the McMaster critical review form was used to lessen the potential for bias in the user research literature, especially

that which included quantitative data. Since it provides a basis for making impartial assessments, many experts rely on this research.

4. Results

4.1. Overview of studies and trends

There were 52 papers that were found to be eligible for inclusion after using the aforementioned method. Resources Policy, Journal of Cleaner Production, and Journal of Environmental Management were the most frequently cited journals in publication. Environmental economics and management, land use policies, global warming, coastal and freshwater resources, and environmental legislation were all represented in the publications considered in this study, all of which were published in multidisciplinary journals. Natural resource management governance concerns have attracted much attention as shown by the large volume of papers on the topic and the broad variety of journals in which they have appeared. Between 2013 and 2016, there was a sharp uptick in articles addressing the governance difficulties of natural

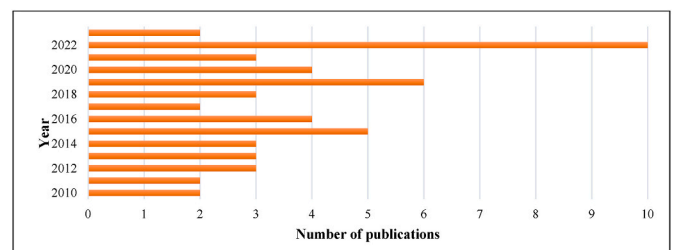


Fig. 2. Bi-yearly distribution of the selected research publications.

resource management (Fig. 2). This uptick coincides with global gatherings like the Rio+20 Summit in 2012, COP21 in Paris, and COP26 in Glasgow that highlighted environmental problems and related governing structures (Morgan, 2016; Mountford et al., 2021). In 2017, there was a modest decrease in publications but in 2018 the increasing trend continued.

#### 4.2. Geographic distribution

The physical, political, and cultural aspects of planning systems worldwide provide a wide range in the prevalence and distribution of governance difficulties. Literature has focused chiefly on comparing natural resource management and governance conflicts in natural resource management regimes across various nations with less research from North America, South America, and Australia (Fig. 3). There was a substantial change in the geographical origins of research investigating governance concerns in natural resource management across the 12 years covered by this analysis.

Numerous scholarly journals have published articles exploring the topic of natural resources governance and conflicts. There is a corpus of work that investigates the topic under investigation and many well-known scholars have made essential contributions to this volume. The top 10 journals that were found to have the highest impact are listed in Table 3 below based on the number of citations they have received. Table 3 contains information that may be used to assess the significance and influence of each author including their h-index, number of citations, years active, and the total number of publications. Table 4 lists the most frequently cited authors for this subject.

The study examined the difficulties of governance in setting a broad range of natural resources. Most case studies examined forestry with fewer studies examining land use, water bodies, agriculture, marine resources, and irrigation as examples of governance issues (Fig. 4). Energy, marine, and natural parks, which have well-defined borders and resource kinds, received fewer research efforts. Few studies also examined the difficulties in governing weeds and pests.

#### 4.3. Governance challenges and good governance

The research on governance issues may be broken down into five major groups with each corresponding to a particular phase of the planning and management process. During the vision and target establishing and strategy creation phases, significantly fewer governance concerns were discovered. Identifying governance difficulties as a barrier to managing natural resources was least likely to occur during monitoring and assessment as well as during research and analysis. According to the literature analyzed for this research, several governance obstacles prevent governance systems from efficiently managing natural resources and achieving their intended management results. The top three identified governance difficulties are all linked to a lack of communication across different governance systems as seen below in Table 5. Some of these issues include the absence of, or inadequacy of, coordinated policy-making processes and the misalignment of institutions' visions and aims. However, only a few articles acknowledged

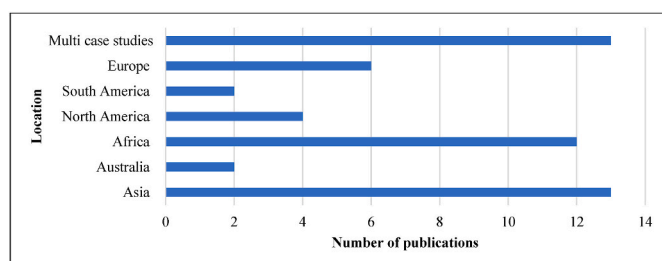


Fig. 3. Geographic distribution of the selected research publications.

Table 3

Top 10 influential journals in the field of natural resource governance and conflict.

Journal	Publisher	Cite score*	Impact factor
Resources, Conservation and Recycling	Elsevier	17.9	13.716
Journal of cleaner production	Elsevier	15.8	11.072
Journal of Environmental Management	Elsevier	11.4	8.91
Corporate Social Responsibility and Environmental Management	Wiley online library	11.5	8.464
Resources Policy	Elsevier	7.6	8.222
Environmental Science & Policy	Elsevier	10	6.424
Land Use Policy	Elsevier	9.9	6.189
Construction Innovation	Emerald Publishing	5.8	5.22
Sustainability	MDPI	5.0	3.889
Journal of Environmental Planning and Management	Taylor & Francis	5.6	3.371

Note: \*Cite Score is calculated annually, showing the average citations for a full calendar year. The impact factor (IF) measures the frequency with which the average article in a journal has been cited in a particular year. The table is cited based on the highest impact factor.

Table 4

Top 10 influential authors in the field of environmental governance.

Author	H Index*	Citations	Publications	Years active
Sarah Wheeler	38	4772	195	2010
Erin Bohensky	28	4719	110	2007
Kerry Waylen	28	4715	87	2012
Cathy J. Robinson	35	4509	168	2006
Althea L Davies	24	2196	89	2008
Stella Tsani	17	2051	76	2012
Kirsten Maclean	21	1537	74	2011
Vladimir S. Litvinenko	20	1523	208	2004
Gladman Thondhlana	20	1461	55	2015
Monika Suskevičs	14	874	51	2012

Note: \*H-index measures the author's output and influence based on how often other researchers cite their works. The table is cited based on highest number of citations.

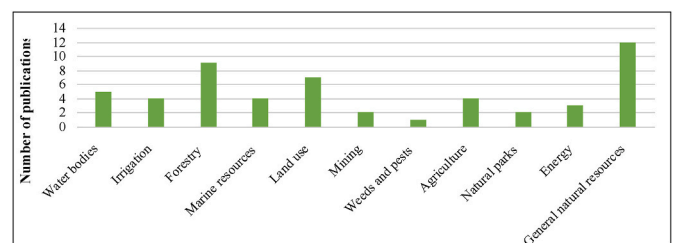


Fig. 4. Types of natural resources discussed in the literature.

the difficulty of governing information, specifically the restrictions on using indigenous knowledge, the scarcity of decision-support instruments, and the difficulty retaining information over time. Literature has identified three significant domains of good environmental governance concerning natural resources conflict. These include efficient, involved, and effective governance (Table 6).

## 5. Discussion

### 5.1. Governance challenges in the research

This study's results lend more credence to the idea that governance problems plague all efforts to organize and control the use of natural resources. By delving into the details of 52 worldwide case studies on governance problems, the researchers found that many of these

**Table 5**  
Governance challenges highlighted in existing literature.

Governance conflicts	Description	Percentage of studies
Challenges associated with capacity	Lack of high-level goals	59%
	Lack of resources	
	Research limitations	
	Lack of vivid objectives	
	Poor implementation	
	Poor corporate governance	
Challenges associated with knowledge	Inadequate surveillance	55%
	Poor leadership	
	Knowledge availability limitations	
	Lack of use of local expertise	
	Longevity of memory retention	
Challenges associated with connectivity	Poor use of and access to tools for making decisions	47%
	Involvement of stakeholders in decision-making	
	Lack of harmonization of institutional goals	
	Absence of frameworks for collective policymaking	
	Conventional methods for resolving conflict	
	No associations between theory and application	
	Poor balance in the vertical and horizontal dimensions	
	Lack of collaborations for action	
	Absence of a relationship between the various phases of planning.	

**Note:** Table 5 provides the challenges faced by the existing studies in the area of governance studies. The table is cited based on the highest percentage of studies.

**Table 6**  
Good governance domains highlighted in existing literature.

Good environmental governance domains	Percentage of studies
Efficient governance	86%
Effective Governance	69%
Involved governance	44%

**Note:** Table 6 provides the good governance domains mostly used in the existing literature. The table is cited based on the highest percentage of studies.

problems are intricately intertwined. The ability of a natural resource management governance system to provide social, environmental, and other intended results is typically affected not by a single governance difficulty but by a collection of difficulties that interact with and rely on one another (Adams et al., 2019; Chen et al., 2023). This topic is developed further below.

### 5.1.1. Capacity

Findings from this study indicate that insufficient human, financial, technological, and knowledge-based assets are the primary factor preventing institutions from delivering the expected outcomes in natural resource governance. Over half (59%) of the governance issues found across all 52 publications were associated with insufficient decision-making authority. Several articles highlighted the cumulative effect of limited resources on the ability to decide and act on environmental problems. For example, Roberts et al. (2021) found that in their research on weed control in Australia's northeast, a dearth of monetary and human capital lowered landowners' prospects of confronting urgent concerns like fire risk and monitoring continuing and surfacing weed outbreaks. The second most significant difficulty with governance linked to capacity was the inability to define clear objectives. Another area for improvement with governance that hinders institutions' ability to produce intended results is defining sufficiently ambitious goals. Case studies in Canada (Tymstra et al., 2020), Sweden (Larsen and Raitio, 2019), and Australia (Wheeler et al., 2020) acknowledged the difficulty

in creating both implicit and top management goals due to a lack of accessibility to reliable and location-specific data. For example, in Canada's Great Bear Rainforest planners needed more records to set definite or long-term goals for ecosystem-based planning. They did not have enough specific local, interdisciplinary data or comprehensive inventories of ecological systems and focal life forms habitats (Henry et al., 2022). The findings revealed a need for more capacity to apply various strategic options.

Poverty, transboundary differences in management, rules, political will, and property ownership were all factors restricting the ability to adopt a wide range of strategic solutions. Many publications that raised these concerns also acknowledged institutions' limited potential to execute diverse strategic solutions because of scarce human, infrastructural, knowledge, and financial resources (Flechtsig et al., 2022). The least commonly mentioned difficulties in governance impact the ability to make decisions arising from insufficient leadership, monitoring, corporate governance frameworks, and research and analytical skills. Since these governance problems are seldom discussed it is possible that they are not seen as a danger to the governance systems but rather as an impediment to the efficiency of the decision-making institutions that are charged with achieving those results. In addition, particular capacity concerns, including the ability to regulate, may be seen as troublesome in a more general sense of governance capacity. However, the need for more available resources to begin planning and implementing solutions to environmental concerns is seen as a more severe impediment to the operation of the governance system. It also suggests the aforementioned areas are under studied, suggesting that further research may be required to fully understand how they constrain decision-making within governance systems (Williams, 2021).

### 5.1.2. Connectivity

Limitations associated with stakeholder connectedness in eight significant groups formed the majority (47%) of governance challenges found among 52 articles. More institutional agreement on connectivity-related vision and goals was the most considerable governance difficulty. The problems arose from several institutions' divergent priorities and philosophies. In the Greater Yellowstone ecosystem in the USA, disagreements over the best methods for managing elk have created vast chasms amongst the organizations responsible for making decisions (Bergstrom and Harrington, 2019). One of the problems with governance is the disconnection of stakeholders from the decision-making process. Poor stakeholder connectedness severely hampered the success and efficacy of planning and implementation operations according to case studies in Canada, Australia, Madagascar, and Chile (Kineber et al., 2023). Ngongo et al. (2022) conducted a study of governance in the east African highland region of Areka. They found that technology distribution initiatives predominantly targeted affluent male farmers, excluding female farmers from participating in the creation and implementation of resource management by-laws. One of the problems with governance is the need for more or disjointed structures necessary for cooperative policymaking. Multiple causes contributed to this dispersion, including the hybridization of governance institutions, conflicting stakeholder interests, and uneven border conditions.

This study's results imply that connection problems arise mainly during the strategy creation phase when implementation partnerships must be improved. For instance, Oakley et al. (2016) discovered that the overall capacity to implement this was constrained by insufficient collaborative relationships and an absence of incentive schemes for regulatory stakeholders to work cooperatively on sustainability issues. According to the published works there are problems with the lateral synchronization of the governing systems. Case studies in south Asia, China, and New Zealand suggest that misalignment may arise from the fact that natural resource management issues are handled in isolated strategy silos (Koch et al., 2020; Saklani et al., 2020; Specht et al., 2019), there is a lack of trust between crucial policy-making entities, and there are discrepancies between the goals and objectives of different levels of



government. Korhonen-Kurki et al. (2012) discovered a considerable vertical disconnection between the various tiers of governance in their research on synchronizing actions to minimize and control forest degradation in seven nations. According to the report, the absence of institutional cohesion and communication slowed strategy execution and exacerbated local capacity problems.

One of the most difficult aspects of governance was the absence of or problems with formal dispute resolution processes. Dispute settlement procedures between local state and public partners over the administration of nature reserves in Norway are scarce due, in part, to financial constraints as noted by Stokke and Haukeland (2018). Poor dispute settlement processes and a lack of chances for shareholder dialogue may contribute to 'past animosity re-igniting and old disputes getting more ingrained' (Mountford et al., 2021), limiting or preventing the attainment of intended governance system objectives. More communication across the various phases of design and administration has also been identified as an obstacle to the success of governance structures. Implementation, surveillance, assessment, and target formulation were only two examples of phases in the planning and administration process where connectivity problems were identified. The capacity of the governance structure to respond flexibly and solve sustainability problems over time was hindered by Litvinenko et al.'s (2022) discovery of poor links between the surveillance, vision, and goal-establishing procedures. Notably, some scholars have argued that the failure of governance mechanisms to combine research and practice adequately limits their ability to provide the intended results (Liu et al., 2022). Some studies found that poor connections between knowledge and practice reduced the ability of governance systems to create and execute successful policies in the field (Bennett and Dearden, 2014).

### 5.1.3. Knowledge

The most often cited difficulty with knowledge-related management was a dearth of accessible cultural, financial, ecological, indigenous, and institutional information. The inability to access has been credited to several factors including a bias toward accumulating scientific information instead of socioeconomic data, more collaborative partnerships between organizations, and inconclusive records. One of the challenges in governance is better incorporating indigenous expertise (Glynn et al., 2017). Indigenous awareness was discovered to be especially difficult to incorporate into decision-making in research on indigenous knowledge use in irrigation processes in Tanzania (Kangalawe et al., 2014). This was because of cultural rules surrounding the direct exposure and application of such awareness and the demand for exploring how typical local expertise coincides with scholarly conceptions of water sources.

Bohensky and Maru (2011) note that integrating indigenous and western forms of knowledge can be tricky since, in contrast to western knowledge systems, the dissemination of indigenous understanding is often constrained by culturally specific guidelines and rituals concerning distinct representatives of social structure and their obligations in relation to various forms of knowledge. Innovations to endorse pioneering methods of communicating environmental challenges to stakeholder communities (Guoyou et al., 2013), understanding datasets (Laniak et al., 2013), and geographic information systems (GIS) (Ramano, 2022) and other modelling techniques were the most common forms of decision-assisting techniques recognized. Robinson et al. (2011), discussing Australian and American natural resource management institutions, assert that a lack of available or applied technologies for integrating scientific understanding into planning and supervision practices can have severe consequences for the range of managerial activities deemed and executed for transaction fees and overall resilience of the governing system. The ability of governance systems to provide intended results on a global scale is significantly impacted by the loss of knowledge. Ghadami et al. (2022) discovered that inefficient structural organization of official and unstructured organizations might decrease knowledge acquisition when they studied the governance mechanisms concerning land-use management in wilderness areas of

Iran.

## 5.2. Dimensions of good governance

### 5.2.1. Effective governance

For governance to be effective, researchers have identified that choices must be made at the proper levels, roles should be clearly defined, enough resources must be provided, and consistent policies should be developed (Keovilignavong, 2019; Atari et al., 2019; Wheeler et al., 2020). A common approach to resource management is known as subsidiarity which involves delegating decision-making authority to the most localized tier of government that is nonetheless competent to act in that position and is seen as a positive development since it increases the likelihood that governance choices will be appropriate for and reflective of local conditions (Glynn et al., 2017).

Forming a new organization to assume governance responsibilities is an expensive endeavor. New organizations are typically created around pre-existing structures to lighten this responsibility's load (Korhonen-Kurki et al., 2012; Olaniyi et al., 2019). Decentralizing governance operations with significant social and legal effects (such as energy service or freshwater supply) often necessitates that the legally responsible organization preserves formal decision-making authority by clearly outlining roles and duties. For example, when Ontario charged special working groups with developing plans for safeguarding critical information, those committees kept the authority to review all plans. They often sent back particular decisions for further discussion before giving their stamp of approval (Tymstra et al., 2020). This governance model used local expertise and resources to regulate a decentralized network that the authorities needed help managing while maintaining formal responsibility, prompting some criticism.

### 5.2.2. Involved governance

The hallmarks of good governance include trustworthiness and openness as well as the participation of a wide range of interested parties in decision-making and assessment. Since many issues with resource management cannot be resolved by a single actor acting alone, good governance involves the active participation of all relevant parties (Musavengane and Simatele, 2016). Responsibility for standards and procedures co-created in this way also increases the likelihood of being followed. The expenses of monitoring, regulating conduct, and disciplining noncompliance with norms imposed by a central authority are generally significantly greater than those associated with a more collaborative strategy in several resource governance scenarios (Tsani, 2013). As a result, several models of fragmented resource governance place a premium on public input and consensus-building (Ali et al., 2023).

Trade-offs between actors may be managed effectively with the help of participatory techniques. Consensus-oriented governance in Chile's source water protection planning prioritized open discussion and debate to reach agreements (Bauer, 2015). Many different participative methods may be utilized to create governance choices and comprehensive cognitive procedures are not necessarily required to settle all trade-offs. A wide range of approaches is highlighted in south east Asia by Li et al. (2022) from simple sharing of data to more involved forms of collaboration. Whether or not people need to become involved depends on whether widespread collaboration is needed to accomplish goals. The presumption is that more distributed methods are more honest and open to scrutiny (Abboud, 2016).

### 5.2.3. Efficient governance

It is crucial to emphasize records, funding, legal frameworks, and innovations to meet The Organization for Economic Cooperation and Development's (OECD) effectiveness governance factor. Accurate data is needed to manage a resource, whether centralized or not, correctly. Distributed organizations require access to accurate system data to make sound choices. For Thailand, this entailed monitoring surface and

groundwater flow, identifying potential sources of contamination, and determining water needs (Nitivattananon and Srinonil, 2019). Based on the situation's specifics, evidence may be withheld or protected to safeguard vested interests (such as contamination data) or due to bureaucratic customs or inefficiency (Haufler, 2010). Groups claiming proprietary status for information might negotiate disclosure of this data. On the other hand, gaps in knowledge reduce governance's efficiency (Suskevičs, 2012).

Historically, centralized governments tend to assign responsibility for activities within the natural resource domain without delegating the power or funding necessary to make and execute decisions. This frequently results in governance failures when the entities tasked with performing specific governance responsibilities fail to do so. Local governments often push back against the devolution of authority since, in the past, it has occurred without a corresponding devolution of funding. Consequently, reforms to legal and policy frameworks are required with the devolution of responsibilities (Wang et al., 2023).

## 6. Conclusion

Natural resource conservation and management for the long term is increasingly recognized as dependent on well-functioning and effective governance structures. During the last 15 years scholars have devoted much time and energy to studying what makes for excellent, successful, and functioning forms of governance. The deterioration of natural resources on a global scale persists despite these challenges and governance systems need help addressing the issue and generally maintaining or improving the state of interdependent ecological, social, and cultural systems. This research analyzed 52 scholarly articles that focused on the challenges of governing the use of natural resources. The research examined the regional and chronological distribution of governance studies in natural resource management systems and the general difficulties associated with governance. This research shows that over 12 years governance concerns have been increasingly emphasized in the literature. There needs to be more studies addressing natural resource management governance concerns in affluent and developing nations.

According to case studies of governing structures, developing countries are more likely to have insufficient decision-making power, insufficient financial and human resources to assist implementation activities, insufficient leadership on key resource challenges, and insufficient conflict resolution mechanisms. On the other hand, research into natural resource management governance structures in industrialized countries has often shown problems with policy clarity and the alignment of stakeholder institutions' goals and aims. The results show that capacity building and recognizing and accessing various types of capital are essential at the beginning phases of a governance system's growth and functioning. Subsequently, more subtle phases might emerge and establish knowledge systems and connectedness across different institutions, paving the way for more geographically and temporally planned and coordinated management methods. It may mean distinct pieces of a functioning governance system emerge and evolve at distinct speeds and in different stages as the system develops over time.

Even though there are many obstacles to effective governance that natural resource managers must overcome, it is abundantly evident that stakeholder relationships remain a significant obstacle to governance's overall effectiveness. This article finds that barriers to communication and co-ordination between different parties involved in natural resource management have the most significant impact on governance systems' effectiveness in achieving their global goals. Most importantly, the research reviewed here highlights the importance of these connections in determining how well institutions can work together to develop strategies, share and use resources, and coordinate their strategic choices despite differences in mandate and capability. The studies included in this review did not imply that governance obstacles were insurmountable or would forever halt efforts to achieve the study's

objectives. Despite the constraining impact of various governance difficulties in their respective case studies, several publications revealed a spectrum of success stories in achieving results. Many factors will continue to hinder the decision-making abilities of international governance systems but a better knowledge of these factors will open up significant chances for strategic governance reform leading to better on-the-ground results.

### 6.1. Future research dimensions

This literature survey has shown that there needs to be more agreement on addressing and conceiving resource-related challenges. The prevalent ideas also have yet to be subjected to rigorous examination. Future research should investigate how conflicts affect resource governance mechanisms, how these structures determine people's accessibility to and influence on resources, and how communities respond to these paradigms. In addition, the armed players' role in structuring these resource arrangements needs to be understood. Most analyses assume these individuals are motivated by opportunistic ambition and pay little heed to their efforts to establish or strengthen local government mechanisms. Thus, the most pressing problem is to include resource-related concerns in studies of stability, justice, and post-conflict rebuilding and to provide a complete micro-perspective on hybrid resource governance structures. It is an essential subject for researchers to focus on. There needs to be an underestimation of the micro-level complexity of governmental and socioeconomic dynamics. The research needs to pay more attention to the consequences of various resources' geographical and politico-economic aspects. Future studies must thus abandon simplistic assumptions about the various motivations, ambitions, and behavioral patterns of conflicting parties to gain a more nuanced knowledge of the connection between natural resource availability and war. As an added note, future research needs to differentiate between various types of financial involvement and take account of the entire spectrum of financial rewards and behaviors in conflict-affected places to cater to the complexities of conflict economies.

### Ethical approval

The entire research process is in line with our institutional research ethics policy. We declare that all ethical standards are met and complied with in true letter and spirit.

### Informed consent

All participants in this study volunteered themselves during the entire research process, and their consent was taken at inception.

### Funding

The authors would like to thank all CSHIPP project partners and all the CSHIPP conferences' participants for their valuable and constructive comments. We also thank the CSHIPP platform for generous financing support.

### Author statement

Conceptualization; **Ahmet Faruk Aysan, Yassine Bakkar, Umar Nawaz Kayani and Shajara UI-Durar.**

Data curation; **Ahmet Faruk Aysan, Yassine Bakkar, Umar Nawaz Kayani.**

Formal analysis; **Ahmet Faruk Aysan, Yassine Bakkar, Umar Nawaz Kayani and Shajara UI-Durar.**

Funding acquisition; **No funding associated.**

Investigation; **Ahmet Faruk Aysan, Yassine Bakkar.**

Methodology; **Umar Nawaz Kayani and Shajara UI-Durar.**

Project administration; **Yassine Bakkar and Shajara UI-Durar.**

Supervision; **Ahmet Faruk Aysan and Umar Nawaz Kayani.**

Writing - original draft; **Ahmet Faruk Aysan, Yassine Bakkar, Umar Nawaz Kayani and Shajara Ul-Durar.**

Writing - review & editing; **Ahmet Faruk Aysan, Yassine Bakkar, Umar Nawaz Kayani and Shajara Ul-Durar.**

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### References

- Abbey, T., Vitalis, R., 2021. Oilcraft: the myths of scarcity and security that haunt US energy policy. *Nav. War Coll. Rev.* 74 (4), 18.
- Abboud, S.N., 2016. Conflict, governance, and decentralized authority in Syria. *The Levant in Turmoil: Syria, Palestine, and the Transformation of Middle Eastern Politics* 57–77.
- Adams, D., Adams, K., Ullah, S., Ullah, F., 2019. Globalization, governance, accountability and the natural resource 'curse': implications for socioeconomic growth of oil-rich developing countries. *Resour. Pol.* 61, 128–140.
- Akins, J.E., 1973. The oil crisis: this time the wolf is here. *Foreign Aff.* 51 (3), 462–490.
- Akpan, O., Umoh, U.E., 2021. "Resource curse" and "resource wars" and the proliferation of small arms in Africa. *The Palgrave Handbook of Small Arms and Conflicts in Africa* 245–264.
- Alam, P., Sharholy, M., Khan, A.H., Ahmad, K., Alomayri, T., Radwan, N., Aziz, A., 2022. Energy generation and revenue potential from municipal solid waste using a system dynamic approach. *Chemosphere* 299, 134351.
- Ali, S.H., Clifford, M., Kniveton, D., Zickgraf, C., Ayeb-Karlsson, S., 2023. *Adaptive governance to manage human mobility and natural resource stress*. Elements in Earth System Governance. Cambridge University Press.
- Atari, S., Bakkar, Y., Olaniyi, E.O., Prause, G., 2019. Real options analysis of abatement investments for Sulphur emission control compliance. *J. Entrepreneursh Sustain Issues* 6 (3), 1062–1086.
- Auty, R.M., 1994. The resource curse thesis: minerals in Bolivian development, 1970–90. *Singapore J. Trop. Geogr.* 15 (2), 95–111.
- Bai, Z., Ma, W., Zhao, H., Guo, M., Oenema, O., Smith, P., Velthof, G., Liu, X., Hu, C., Wang, P., 2021. Food and feed trade have greatly impacted global land and nitrogen use efficiencies over 1961–2017. *Nature food* 2 (10), 780–791.
- Bauer, C.J., 2015. Water conflicts and entrenched governance problems in Chile's market model. *Water Altern. (WaA)* 8 (2).
- Bayramov, A., 2018. Dubious nexus between natural resources and conflict. *J. Eurasian Stud.* 9 (1), 72–81.
- Bennett, N.J., Dearden, P., 2014. Why local people do not support conservation: community perceptions of marine protected area livelihood impacts, governance and management in Thailand. *Mar. Pol.* 44, 107–116.
- Bergstrom, R.D., Harrington, L.M., 2019. Embedded in nature: challenges to sustainability in communities of the greater Yellowstone ecosystem. *Sustainability* 11 (5), 1459.
- Brosche, H., 1974. The Arab oil embargo and United States pressure against Chile: economic and political coercion and the Charter of the United Nations. *Case W. Res. J. Int'l L.* 7, 3.
- Bodin, Ö., Robins, G., McAllister, R.R., Guerrero, A.M., Crona, B., Tengö, M., Lubell, M., 2016. Theorizing benefits and constraints in collaborative environmental governance: a transdisciplinary social-ecological network approach for empirical investigations. *Ecol. Soc.* 21 (1).
- Bohensky, E.L., Maru, Y., 2011. Indigenous knowledge, science, and resilience: what have we learned from a decade of international literature on "integration". *Ecol. Soc.* 16 (4).
- Bond, P., Basu, R., 2021. Intergenerational equity and the geographical ebb and flow of resources: the time and space of natural capital accounting. In: *The Routledge Handbook of Critical Resource Geography*. Routledge, pp. 260–273.
- Borgerson, S.G., 2009. *The Great Game Moves North*, vol. 25. Foreign affairs.
- Bull, H., 2021. Force in international relations: the experience of the 1970s and prospects for the 1980s. In: *New Directions in Strategic Thinking*. Routledge, pp. 17–33.
- Chen, Y., Khurshid, A., Rauf, A., Yang, H., Calin, A.C., 2023. Natural resource endowment and human development: contemporary role of governance. *Resour. Pol.* 81, 103334.
- Collier, P., Hoeffler, A., 2004. Greed and grievance in civil war. *Oxf. Econ. Pap.* 56 (4), 563–595.
- Colgan, J., 2014. Oil domestic politics and international conflict. *Energy Res. Social Sci.* 1, 198–205.
- Daehn, K., Basuhi, R., Gregory, J., Berlinger, M., Somjit, V., Olivetti, E.A., 2022. Innovations to decarbonize materials industries. *Nat. Rev. Mater.* 7 (4), 275–294.
- Dale, A.P., Vella, K., Pressey, R.L., Brodie, J., Gooch, M., Potts, R., Eberhard, R., 2016. Risk analysis of the governance system affecting outcomes in the Great Barrier Reef. *J. Environ. Manag.* 183, 712–721.
- Daoudi, M.S., Dajani, M.S., 1984. The 1967 oil embargo revisited. *J. Palest. Stud.* 13 (2), 65–90.
- De Soysa, I., 2007. Resource wealth and risk of civil war onset: results from a new dataset of national resource rents, 1970–1999. *Conflict Manag. Peace Sci.* 24 (3), 201–218.
- Dogan, E., Majeed, M.T., Luni, T., 2021. Analyzing the impacts of geopolitical risk and economic uncertainty on natural resource rents. *Resour. Pol.* 72, 102056.
- Fearon, J., 2005. Primary commodities and civil war. *J. Conflict Resolut.* 49 (4), 483–507.
- Flechsig, C., Anslinger, F., Lasch, R., 2022. Robotic Process Automation in purchasing and supply management: a multiple case study on potentials, barriers, and implementation. *J. Purch. Supply Manag.* 28 (1), 100718.
- Fu, Y., Tan, C., Liu, X., Sun, X., Yuan, Z., Zheng, Y., 2022. Definition, classification, observation and monitoring of natural resources and their application in territorial planning and governance. *Chin. Geol.* 49 (4), 1048–1063.
- Ghadami, M., Dittmann, A., Pazhuhan, M., Aligholizadeh Firouzjaie, N., 2022. Factors affecting the change of agricultural land use to tourism: a case study on the southern Coasts of the Caspian Sea, Iran. *Agriculture* 12 (1), 90.
- Glynn, P.D., Voinov, A.A., Shapiro, C.D., White, P.A., 2017. From data to decisions: processing information, biases, and beliefs for improved management of natural resources and environments. *Earth's Future* 5 (4), 356–378.
- Guoyou, Q., Saixing, Z., Chiming, T., Haitao, Y., Hailiang, Z., 2013. Stakeholders' influences on corporate green innovation strategy: a case study of manufacturing firms in China. *Corp. Soc. Responsib. Environ. Manag.* 20 (1), 1–14.
- Haufler, V., 2010. Disclosure as governance: the extractive industries transparency initiative and resource management in the developing world. *Global Environ. Polit.* 10 (3), 53–73.
- Henry, A., Hagerman, S., Kozak, R., 2022. The effects of institutions on perceptions of legitimacy in the Great Bear Rainforest, British Columbia. *Can. J. For. Res.* 52 (1), 11–18.
- Huynh, T.L.D., Burggraf, T., Nasir, M.A., 2020. Financialization of natural resources & instability caused by risk transfer in commodity markets. *Resour. Pol.* 66, 101620.
- Johnson, M.F., Rodriguez, L.A., Hoyos, M.Q., 2021. Intrastate environmental peacebuilding: a review of the literature. *World Dev.* 137, 105150.
- Joshi, A., 2022. What Makes "Difficult" Settings Difficult? Contextual Challenges for Accountability. *Development Policy Review*, e12681.
- Kangalawe, R.Y., Mlele, M., Naimani, G., Tungaraza, F.S., Noe, C., 2014. Understanding of Traditional Knowledge and Indigenous Institutions on Sustainable Land Management in Kilimanjaro Region (Tanzania).
- Keovilignavong, O., 2019. Mining governance dilemma and impacts: a case of gold mining in Phu-Hae, Lao PDR. *Resour. Pol.* 61, 141–150.
- Klare, M., 2001a. Resource Wars. *Metropolitan Books*, New York.
- Klare, M., 2001b. The new geography of conflict. *Foreign Aff.* 80 (3), 49–55.
- Kleveman, L., 2004. *The New Great Game*. Grove Press, New York.
- Khan, Z., Hussain, M., Shahbaz, M., Yang, S., Jiao, Z., 2020. Natural resource abundance, technological innovation, and human capital nexus with financial development: a case study of China. *Resour. Pol.* 65, 101585.
- Kineber, A.F., Othman, I., Oke, A.E., Chileshe, N., Zayed, T., 2023. Value management implementation barriers for sustainable building: a bibliometric analysis and partial least square structural equation modeling. *Construct. Innovat.* 23 (1), 38–73.
- Kipchumba, B.J., 2019. An Analysis of Local Dynamics in Conflicts over Use of Natural Resources in the Marakwet-Pokot Border Region of Kerio Valley. *Kenya University of Nairobi*.
- Klinghoffer, A.J., 1976. The soviet union and the Arab oil embargo of 1973-74. *Int. Relat.* 5 (3), 1011–1023.
- Koch, J., Zhang, W., Martinsen, G., He, X., Stisen, S., 2020. Estimating net irrigation across the North China Plain through dual modeling of evapotranspiration. *Water Resour. Res.* 56 (12), e2020WR027413.
- Korhonen-Kurki, K., Brockhaus, M., Duchelle, A.E., Atmadja, S., Pham, T.T., 2012. Multiple levels and multiple challenges for REDD+. In: *Analyzing REDD+: Challenges and Choices*. Center for International Forestry Research, Bogor, Indonesia, pp. 91–110.
- Laniak, G.F., Olchin, G., Goodall, J., Voinov, A., Hill, M., Glynn, P., Whelan, G., Geller, G., Quinn, N., Blind, M., 2013. Integrated environmental modeling: a vision and roadmap for the future. *Environ. Model. Software* 39, 3–23.
- Larsen, R.K., Raitio, K., 2019. Implementing the state duty to consult in land and resource decisions: perspectives from Sami communities and Swedish state officials. *Arctic Review on Law and Politics* 10, 4–23.
- Leal Filho, W., Shiel, C., Paço, A., Mifsud, M., Ávila, L.V., Brandli, L.L., Molthan-Hill, P., Pace, P., Azeiteiro, U.M., Vargas, V.R., 2019. Sustainable Development Goals and sustainability teaching at universities: falling behind or getting ahead of the pack? *J. Clean. Prod.* 232, 285–294.
- Li, Y., Alharthi, M., Ahmad, I., Hanif, I., Hassan, M.U., 2022. Nexus between renewable energy, natural resources and carbon emissions under the shadow of transboundary trade relationship from South East Asian economies. *Energy Strategy Rev.* 41, 100855.
- Litvinenko, V., Bowbrik, I., Naumov, I., Zaitseva, Z., 2022. Global guidelines and requirements for professional competencies of natural resource extraction engineers: implications for ESG principles and sustainable development goals. *J. Clean. Prod.* 130530.
- Liu, H., Saleem, M.M., Al-Faryan, M.A.S., Khan, I., Zafar, M.W., 2022. Impact of governance and globalization on natural resources volatility: the role of financial development in the Middle East North Africa countries. *Resour. Pol.* 78, 102881.
- Linnenluecke, M.K., Marrone, M., Singh, A.K., 2020. Conducting systematic literature reviews and bibliometric analyses. *Aust. J. Manag.* 45 (2), 175–194.
- Llamas, C., Sovacool, B.K., 2021. The future of hydropower? A systematic review of the drivers, benefits and governance dynamics of transboundary dams. *Renew. Sustain. Energy Rev.* 137, 110495.
- Lotfalipour, M.R., Salehnia, N., 2022. Natural resources: a curse on welfare? *Resour. Pol.* 79, 103056.

- Majeed, A., Wang, L., Zhang, X., Kirikkaleli, D., 2021. Modeling the dynamic links among natural resources, economic globalization, disaggregated energy consumption, and environmental quality: fresh evidence from GCC economies. *Resour. Pol.* 73, 102204.
- Markolf, S.A., Chester, M.V., Eisenberg, D.A., Iwaniec, D.M., Davidson, C.I., Zimmerman, R., Miller, T.R., Ruddell, B.L., Chang, H., 2018. Interdependent infrastructure as linked social, ecological, and technological systems (SETSs) to address lock-in and enhance resilience. *Earth's Future* 6 (12), 1638–1659.
- Martin, P.A., 2021. Commander–community ties after civil war. *J. Peace Res.* 58 (4), 778–793.
- Mitchell, T., 2010. The resources of economics: making the 1973 oil crisis. *Journal of Cultural Economy* 3 (2), 189–204.
- Moreland, W., 2019. The Purpose of Multilateralism: A Framework for Democracies in a Geopolitically Competitive World. *Foreign Policy at Brookings*.
- Morgan, J., 2016. Paris COP 21: power that speaks the truth? *Globalizations* 13 (6), 943–951.
- Mountford, H., Waskow, D., Gonzalez, L., Gajjar, C., Cogswell, N., Holt, M., Fransen, T., Bergen, M., Gerholdt, R., 2021. COP26: key outcomes from the UN climate talks in Glasgow. In: *Key Outcomes from the UN Climate Talks in Glasgow*. World Resources Institute (wri.org) [Online]. Available at: COP26: (Accessed 15 February 2023).
- Moyo, D., 2012. *Winner Take All: China's Race for Resources and what it Means for the World*. Basic Books, New York.
- Musavengane, R., Simatele, D.M., 2016. Community-based natural resource management: the role of social capital in collaborative environmental management of tribal resources in KwaZulu-Natal, South Africa. *Dev. South Afr.* 33 (6), 806–821.
- Ngongo, Y., Basuki, T., deRosari, B., Hosang, E., Nulik, J., daSilva, H., Hau, D., Sitorus, A., Kotta, N., Njurumana, G., 2022. Local wisdom of west timorese farmers in land management. *Sustainability* 2022 (14), 6023 s Note: MDPI stays neutral with regard to jurisdictional claims in published.
- Ni, Z., Yang, J., Razzaq, A., 2022. How do natural resources, digitalization, and institutional governance contribute to ecological sustainability through load capacity factors in highly resource-consuming economies? *Resour. Pol.* 79, 103068.
- Nielsen, K., 2019. World government, security, and global justice. In: *Problems of International Justice*. Routledge, pp. 263–282.
- Nitivattananon, V., Srinonil, S., 2019. Enhancing coastal areas governance for sustainable tourism in the context of urbanization and climate change in eastern Thailand. *Adv. Clim. Change Res.* 10 (1), 47–58.
- Oakley, J., Jenkins, R., Thomas, T., Williams, A., Phillips, M., 2016. Assessing harbour porpoise populations in south-west Wales, data issues and implications for conservation and management. *Ocean Coast Manag.* 119, 45–57.
- Olaniyi, E.O., Bakkar, Y., Prause, G., 2019. Entrepreneurial compliance opportunities for maritime fuel producers. *J. Entrepreneursh Sustain Issues* 6 (4), 1550–1565.
- Omeje, K., 2021. Natural Resources and Rentier Capitalism. *The Failure and Feasibility of Capitalism in Africa*, pp. 85–116.
- Peters, K., Dupar, M., Opitz-Stapleton, S., Lovell, E., Budimir, M., Brown, S., Cao, Y., 2020. *Climate Change, Conflict and Fragility: an Evidence Review and Recommendations for Research and Action*.
- Ramaano, A.I., 2022. Geographical Information Systems in Sustainable Rural Tourism and Local Community Empowerment: A Natural Resources Management Appraisal for Musina Municipality Society. *Local Development & Society*, pp. 1–32.
- Redmond, T., Nasir, M.A., 2020. Role of natural resource abundance, international trade and financial development in the economic development of selected countries. *Resour. Pol.* 66, 101591.
- Roberts, J., Florentine, S., van Etten, E., Turville, C., 2021. Germination biology, distribution and control of the invasive species *Eragrostis curvula* [Schard. Nees] (African Lovegrass): a global synthesis of current and future management challenges. *Weed Res.* 61 (3), 154–163.
- Robinson, C.J., Margerum, R.D., Koontz, T.M., Moseley, C., Lurie, S., 2011. Policy-level collaboratives for environmental management at the regional scale: lessons and challenges from Australia and the United States. *Soc. Nat. Resour.* 24 (8), 849–859.
- Ross, M., 2006. A closer look at oil, diamonds and civil war. *Annu. Rev. Polit. Sci.* 9 (1), 265–300.
- Sakib, N., Hossain, N.U.I., Nur, F., Talluri, S., Jaradat, R., Lawrence, J.M., 2021. An assessment of probabilistic disaster in the oil and gas supply chain leveraging Bayesian belief network. *Int. J. Prod. Econ.* 235, 108107.
- Saklani, U., Shrestha, P.P., Mukherji, A., Scott, C.A., 2020. Hydro-energy cooperation in South Asia: prospects for transboundary energy and water security. *Environ. Sci. Pol.* 114, 22–34.
- Smith, R.C., 2022. Revolution and oil shock. In: *The Real Oil Shock: How Oil Transformed Money, Debt, and Finance*. Springer, pp. 169–197.
- Soliman, A.M., Nasir, M.A., 2019. Association between the energy and emission prices: an analysis of EU emission trading system. *Resour. Pol.* 61, 369–374.
- Sone, J.S., Araujo, T.F., Gesualdo, G.C., Ballarin, A.S., Carvalho, G.A., Oliveira, P.T.S., Wendland, E.C., 2022. Water security in an uncertain future: Contrasting realities from an availability-demand perspective. *Water Resour. Manag.* 36 (8), 2571–2587.
- Song, M., Fisher, R., Kwoh, Y., 2019. Technological challenges of green innovation and sustainable resource management with large scale data. *Technol. Forecast. Soc. Change* 144, 361–368.
- Song, M., Ma, X., Shang, Y., Zhao, X., 2020. Influences of land resource assets on economic growth and fluctuation in China. *Resour. Pol.* 68, 101779.
- Specht, M.J., Santos, B.A., Marshall, N., Melo, F.P.L., Leal, I.R., Tabarelli, M., Baldauf, C., 2019. Socioeconomic differences among residents, users and neighbour populations of a protected area in the Brazilian dry forest. *J. Environ. Manag.* 232, 607–614.
- Stokke, K.B., Haukeland, J.V., 2018. Balancing tourism development and nature protection across national park borders—a case study of a coastal protected area in Norway. *J. Environ. Plann. Manag.* 61 (12), 2151–2165.
- Suškevičs, M., 2012. Legitimacy analysis of multi-level biodiversity governance: evidence from 11 case studies across the EU. *Environmental Policy and Governance* 22 (4), 217–237.
- Tang, C., Irfan, M., Razzaq, A., Dagar, V., 2022. Natural resources and financial development: role of business regulations in testing the resource-curse hypothesis in ASEAN countries. *Resour. Pol.* 76, 102612.
- Tsani, S., 2013. Natural resources, governance and institutional quality: the role of resource funds. *Resour. Pol.* 38 (2), 181–195.
- Tymstra, C., Stocks, B.J., Cai, X., Flannigan, M.D., 2020. Wildfire management in Canada: review, challenges and opportunities. *Progress in Disaster Science* 5, 100045.
- van Zanten, J.A., van Tulder, R., 2021. Analyzing companies' interactions with the Sustainable Development Goals through network analysis: four corporate sustainability imperatives. *Bus. Strat. Environ.* 30 (5), 2396–2420.
- Wang, J., Shahbaz, M., Song, M., 2021. Evaluating energy economic security and its influencing factors in China. *Energy* 229, 120638.
- Wang, S., Li, J., Razzaq, A., 2023. Do environmental governance, technology innovation and institutions lead to lower resource footprints: an imperative trajectory for sustainability. *Resour. Pol.* 80, 103142.
- Wheeler, S.A., Carmody, E., Grafton, R.Q., Kingsford, R.T., Zuo, A., 2020. The rebound effect on water extraction from subsidizing irrigation infrastructure in Australia. *Resour. Conserv. Recycl.* 159, 104755.
- Williams, M.J., 2021. Beyond state capacity: bureaucratic performance, policy implementation and reform. *J. Inst. Econ.* 17 (2), 339–357.
- Yates, D., 2022. Why does development fail in resource rich economies: the Catch 22 of mineral wealth. In: Elissaos, Papyrakis (Ed.), *Steinberg Jessica.—Mines, Communities, and States: the Local Politics of Natural Resource Extraction in Africa; Gillies Alexandra.—Crude Intentions: How Oil Corruption Contaminates the World*, vol. 247. Cahiers d'études africaines, pp. 659–664.