Journal of Mining and Environment (JME), Vol. 14, No. 3, 2023, 871-896

Shahrood University of Technology

Journal of Mining and Environment (JME)

Journal homepage: www.jme.shahroodut.ac.ir

Iranian Society of Mining Engineering (IRSME)

A Comprehensive Literature Review Approach for Assessing Probable Impact of Post-reclamation Strategies Applied to Abandoned Mines

Debasmita Basu*, and Smriti Mishra

Department of Architecture and Planning, Birla Institute of Technology, Mesra, Ranchi Jharkhand, India

Article Info

Received 27 April 2023

Received in Revised form 28 May 2023

Accepted 1 June 2023

Published online 1 June 2023

DOI:10.22044/jme.2023.13007.2356

Keywords

Abandoned mines

Economic impacts

Environmental impacts

Reclamation strategies

Socio-cultural impacts

Abstract

Although mine closure problems have been researched in the past, little to no research has been dedicated to the post-reclamation impacts of abandoned mine closure. Even though reclamation has been an age-old identified technique, stakeholders' perception has played an important role in defining the implementation procedure. Therefore, this study intends to identify the various implementation procedures through a rigorous literature assessment of 112 publications, identified from various sources. Theoretical and practical complications have been identified in the fields of environmental, socio-cultural and economic impacts of mine closure. The study unveiled that the most implemented reclamation strategy was intensive and non-intensive recreation/tourism-based reclamation techniques. Thus the study paves the way for the incorporation of an interdisciplinary strategy through cooperation between various stakeholders and research fields for the long-term viability of a mining site restoration.

1. Introduction

Minerals have become one of the basic human necessities throughout their lives as technology has advanced. As a result, the demand for minerals, particularly metals, has surged in recent years [1]. Although mining is recognized as a key economic activity for a nation, this industry invariably causes significant environmental harm. These sorts of operations significantly alter the landscape's potential from its initial state [2]. Such operations require the use of a significant amount of land, which may be useless if the mines are depleted [3]. When a mine operator has ceased operations without recovering the ground and is no longer there, the mine is said to be abandoned [4]. Environmental, economic, geological, geotechnical, regulatory, and community circumstances, lower pricing, higher expenses, changes in consumer needs, and people's loss of interest in mining are all causes that contribute to mine closure [5]. The most serious cases arise when the abandoned mine lands are classified as a "devastated landscape" where, according to *Mahr and Malgot* [6], the natural components have lost the capability to auto-regenerate promptly, and their rehabilitation is only possible through anthropogenic correction [7]. Furthermore, communities that depend on mining for their livelihoods are severely impacted by mine closure. As a result, worries are raised about how the mine will continue to be managed environmentally, about job loss, and about how social services like water, electricity, and health care will continue [8]. Given the foregoing, the mining process must guarantee the impacted land's restoration to production [9]. Concurrent post-mining rehabilitation of degraded land has become an essential component of the entire mining spectrum due to growing environmental concerns [10]. Reclamation of abandoned mines entails converting undesired elements (such as quarries

Corresponding author: debasmitabasu.123@gmail.com (D. Basu)

and pits) into pleasant and secure public places (such as woods, reservoirs, and recreation areas) [11].

Since there is no formal reclamation planning scheme for post-mining landscapes, it is a very difficult undertaking that heavily depends on site-specific factors. Several disciplines including landscape design, environmental and mining engineering, forestry, archaeology, and social sciences have advocated various strategies and methods for reclaiming opencast mine sites [2].

Many papers discuss the various ways in which reclamation strategies can be applied to an abandoned mine but little consideration has been given to their probable impact on land use. This review has been conducted which states the various impacts of these strategies when implemented in general land use (not specifically in any abandoned mine).

This study aims to identify the environmental, sociocultural, and economic effects of abandoned mines, as well as the reclamation procedures that may lessen those effects. It will also try to determine whether there is a specific procedure for choosing a specific reclamation plan for an abandoned mine and how the various stakeholders might participate in it.

A comprehensive literature review technique has been used for all three criteria to accomplish the stated objectives. The environmental, sociocultural, and economic effects of the mine closure have been recognized. It has been determined which reclamation techniques and their effects will help to lessen these effects. Although it was discovered during the reviews that only the strategies were being discussed and that no consideration was being given to the impact of these strategies after reclamation, such papers were also reviewed where these strategies have been considered elsewhere, not specifically related to abandoned mines but have been considered in other scenarios.

2. Methodology

Methodology refers to the systematic approach or set of principles used to conduct research, solve problems or achieve specific goals. It outlines the steps, procedures, and techniques employed to gather data, analyse information, and draw conclusions.

In various fields, such as scientific research, social sciences, business, and engineering, different methodologies are applied depending on the nature of the study or task. It's important to choose an appropriate methodology that aligns with the research objectives and provides reliable and valid results. Here for this research, a comprehensive literature review approach was utilised to first collect the plethora of articles to be studied for the current study for which first a search string was formulated, followed by literature search and screening. Then the selected articles are studied for the current study to accomplish the stated objectives.

2.1. Comprehensive literature review

In this study, a methodical examination of the literature is employed, and the two steps of the research process are covered. A reporting flowchart is advised for identifying the included and omitted research at various review stages. This flowchart also enhances reporting, traceability, and processing quality [12; 13; 14].

The impacts of mine closure have been identified in terms of environmental, socio-cultural and economic impacts. Various reclamation strategies along with their impacts have also been identified which will help in mitigating these repercussions. However, it was found that only the strategies were being discussed and no mention of the impact of these strategies post-reclamation was considered. Therefore, a comprehensive literature review (CLR) approach has been considered further.

A CLR is a critical analysis and synthesis of existing scholarly literature on a specific topic. It involves identifying, evaluating, and summarizing relevant research articles, books, dissertations, conference papers, and other sources of information related to the research area. A CLR is an iterative process, and it may require several iterations of searching, analysing, and refining to ensure a thorough and up-to-date synthesis of the existing literature.

By performing an extensive analysis of the relevant literature, the goal of this research work is achieved. Finding literature that meets certain study questions while avoiding bias is done scientifically using the CLR approach. A larger number of articles that enable the mapping of specific trends or theoretical directions, as well as the identification of gaps and areas of uncertainty, are more likely to be produced by comprehensive search and analysis of pertinent studies than by traditional narrative literature reviews [15; 16]. Bias cannot be avoided from a CLR since subjectivity is necessary for the selection of databases, the usage of inclusion/exclusion criteria, the screening of articles for analysis, and the critical evaluation of outcomes. On the other hand, a CLR clearly describes the methodology, enabling readers to assess the author's premises, methods, supporting data, and conclusions [15].

The review objectives and research questions are established in Step 1 of this study. Step 2 of this study's review procedure is created by defining search keywords and databases in addition to creating the selection criteria for the literature. The specified databases are then searched for pertinent material in Step 3 before being assessed against selection criteria. Step 4 involves extracting and tabulating all pertinent data, followed by Step 5's content analysis.

2.2. Problem definition

This CLR aims to identify

i. the environmental, sociocultural, and economic effects of mine closure;

ii. the different reclamation strategies that can be used to lessen these footprints, as well as the impacts of these strategies; and

iii. The effects of such strategies after the reclamation process is complete.

This search's parameters were established using a taxonomy for literature reviews. Due to the substantial amount of literature in this area that was discovered after a preliminary review of the available studies, only a representative sample of these studies was included in the coverage. These studies were chosen using the selection criteria outlined in the following section.

2.3. Formulation of search string

A search of existing literature on the effects of mine closure and various mine reclamation techniques and their effects was conducted. The studies that were produced were analysed to identify keywords and related phrases that are often used in the literature, and they were classified as indicated in Table 1.

Table 1. Keywords and the associated terms related to mine closure impacts, reclamation and its impacts and various land use strategies and their impact.

Keywords	Associated terms
Mine closure impacts	Abandoned mine impacts, abandoned mine land, mine closure, environmental impacts, social impacts, cultural impacts, socio-cultural impacts, economic impacts, mining impacts.
Reclamation, reclamation impact	Mine reclamation, reclamation strategy, restoration strategy, rehabilitation strategy, replacement strategy, remediation strategy, mitigation strategy, enhancement strategy, Revitalization, ecological restoration, mining tourism, geo-tourism, Post-mining development, mining heritage, mine lake, pit lake, Forest restoration, post-exploitation opencast pits, agricultural reclamation, agricultural reclamation impact, aquaculture reclamation, aquaculture reclamation impact, pit lake reclamation, pit lake reclamation impact, forest use reclamation, forest use reclamation impact, wildlife conservation reclamation, wildlife conservation reclamation impact, intensive recreation reclamation, intensive reclamation impact, non-intensive recreation reclamation, non-intensive recreation reclamation impact, tourism reclamation, tourism reclamation impact, urban reclamation, urban reclamation impact, industrial reclamation, industrial reclamation impact
Land use strategy, land use strategy impact	Contaminated land reclamation, landscape reclamation, mining site, landform reconstruction, agriculture land use impact, impact of agriculture, impact of aquaculture, impact of fishery, impact of pit lakes, impacts of dams, impacts of reservoirs, impact of aquaculture, impact of wildlife, impact of conservation, impact of forestry, impact of tree planting, ecological restoration, impact of tourism, impact of mining tourism, impact of geo-tourism, impact of parks, impact of new settlement, impact of urbanization, impact of open spaces, impact of outdoor recreation, electrical energy storage in abandoned mines

Keywords and string expressions were used to identify articles that were acceptable to include in the study. Peer-reviewed journal publications in electronic databases were the only sources that were searched. The findings did not include books, book sections, theses, reviews or grey literature. The likelihood of language and publication bias is acknowledged to increase when the search is restricted to English publications in peer-reviewed journals in electronic databases [15; 16; 17].

2.4. Literature search and screening

SCOPUS, ProQuest, ScienceDirect, SpringerLink, and Web of Science were selected for the CLR after the search phrase was developed and tested in several reputable databases.

The references were imported into Endnote and duplicates were removed. To find papers that contained the chosen keywords, titles and abstracts were searched. The resultant references were then exported to an Excel spreadsheet to allow for filtering and additional analysis. The references included the authors, year of publication, title, and abstract. Each study's abstract was analysed in Excel with a focus placed on those that were most closely related to the goals of the study.

A comprehensive review against the PRISMA checklist, according to *Kim et al.* [18], would help in understanding the execution, quality, and rigour of comprehensive reviews. Several publications [14; 19; 20; 21] have modified the PRISMA approach. It was chosen above alternative protocols because of its comprehensiveness and ability to improve uniformity between reviews [18; 22; 23; 24; 25].

The literature search method of article selection for the CLR is shown in the flow diagrams (Figures 1) based on the PRISMA 2009 Flow Diagram after formulation of the search string [25]. A total of 233 publications were selected for analysis in the first phase of this comprehensive literature review. Articles, reviews, news articles and conference proceedings were chosen to include both scientific and "grey" literature. Papers in other languages were not accepted because of the difficulties in translating them. The search for research articles was followed by the segregation of articles under 3 fragments for hassle-free handling – i. mining in general, ii. Reclamation in general, and iii. Mining and reclamation impacts individually and collectively. After segregation, correlation between identified articles was carried out to understand the interdependence between the fragments. Individual search yield 61 articles with mining in general context, 87 articles with reclamation in general context, and 121 articles with mining and reclamation impacts individually and collectively background. This was followed by screening for relevance and sort listing for final article selection (Refer to Appendix A for elaborated explanation of Figure 1).

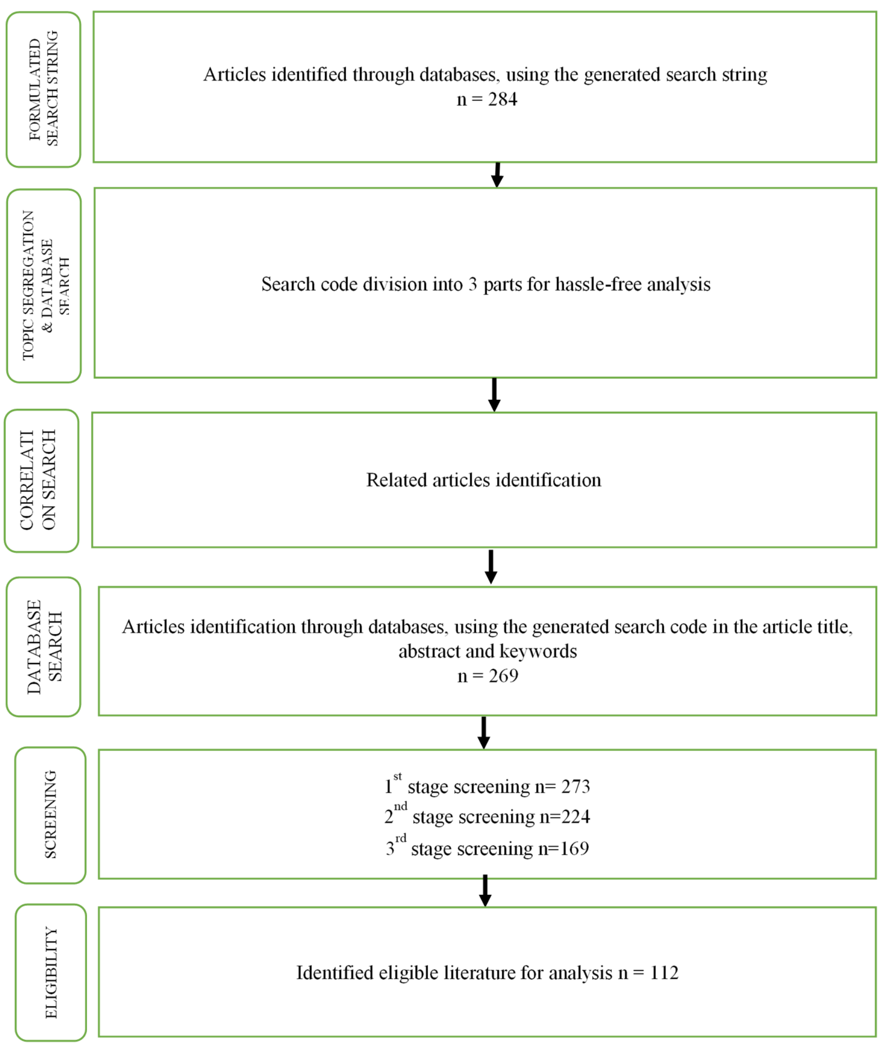


Figure 1. PRISMA flow diagram of the article selection process for identifying impacts of mine closure, identifying various reclamation strategies for abandoned mines, and identifying various impacts of the strategies not specifically related to abandoned mines.

This initial screening resulted in a 233 article sample selection. The screening resulted in the exclusion of 49 items. The 169 publications' abstracts and titles were manually reviewed to see whether each one was appropriate for inclusion in the study. The whole publication was examined when the title and abstract were inconclusive. The second part of this comprehensive literature evaluation, therefore, included the analysis of 112 studies in total. Few publications were discovered throughout the search that discussed the effects of the methods after the reclamation measures had been implemented. Therefore, publications that examined similar consequences elsewhere for land use goals, rather than only in abandoned mines, were found to assess the likely effects of such techniques.

2.5. Articles analysis

Two procedures were used to analyse the articles chosen in the earlier stage. First, the following aspects were the subject of a descriptive analysis:

i. The distribution is according to the geographical setting where the study was done.
ii. The distribution throughout time.
iii. The distribution by journals.

Following the discovery of both empirical and theoretical works, a second stage involved developing a content analysis of the empirical articles to determine the following:

i. Evaluation of the environmental, sociocultural, and economic effects of the closing of the mine.
ii. Evaluation of the effects of comparable tactics not explicitly employed in abandoned mines but for general land-use reasons.
iii. Identification of several reclamation procedures frequently utilised for abandoned mines and their effects.

3. Results and discussions

The selected 112 articles were analysed based on the geographical setting (as per the continents) and their time periods (1989-1999, 2000-2010, 2011-2014, 2015-2018, and 2019-2023) on grounds of ‘impacts on abandoned mines due to mine closure’, ‘Identification of various reclamation strategies widely used for abandoned mines along with their impacts’, and ‘assessment of impacts of similar strategies not specifically used in abandoned mines but for general land-use purposes’ in Figure 2 and 3 respectively. The classification of article number by year and location helped to understand the trend of the research and its probable course in the approaching years.

Figure 2 illustrates the number of peer-reviewed journal articles by year of publication in the CLR, showing a constant increase in the research trend throughout the history with ‘assessment of impacts of similar strategies not specifically used in abandoned mines but for general land-use purposes’ taking the lead.

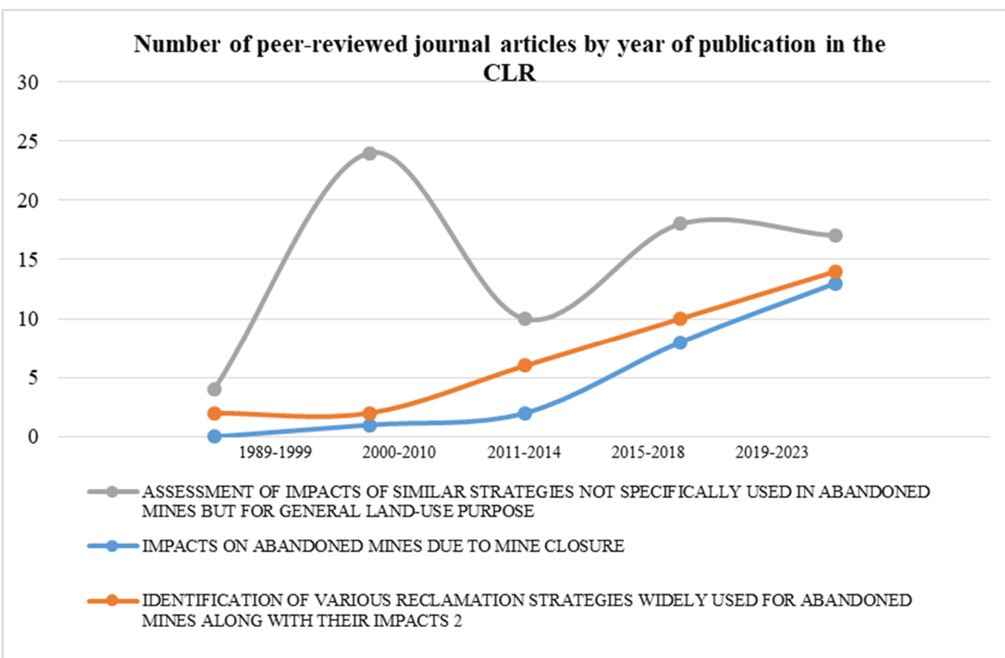


Figure 2. Number of peer-reviewed journal articles by year of publication in the CLR.

Figure 3 illustrates the number of peer-reviewed journal articles by geographical location of publication in the CLR, showing a constant increase in the research trend throughout the history with 'Identification of various reclamation strategies widely used for abandoned mines along with their impacts' taking the lead on all continents.

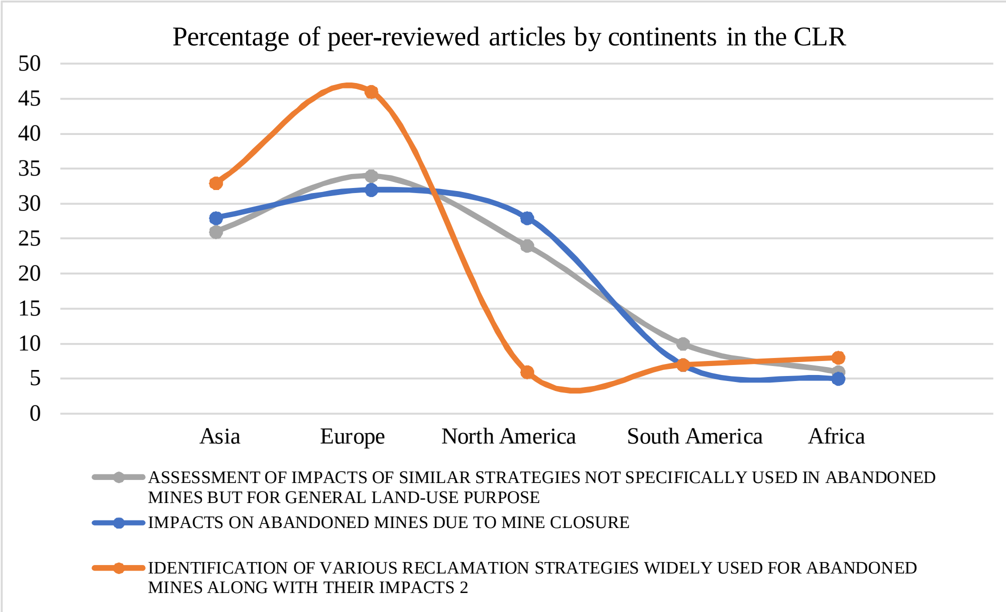


Figure 3. Number of peer-reviewed journal articles by continents in the CLR.

A further classification of the articles under 'impacts on abandoned mines due to mine closure', 'Identification of various reclamation strategies widely used for abandoned mines along with their impacts', and 'assessment of impacts of similar strategies not specifically used in abandoned mines but for general land-use purposes' as per journals and their overall contribution to the research extent has been explored in the succeeding sections.

3.1. Impacts on abandoned mines duo to mine closure

The majority (85.7%) of the literature analysed was written in the eight years prior, evenly split across the four-year panels of 2015–2018 and 2019–2022, highlighting the detrimental effects of abandoned mine reclamation and post-reclamation strategies. Figure 2 illustrates this.

The evaluated material, which was centred on the effects of abandoned mines on the economy, society, and environment, was drawn from 21 periodicals. A comprehensive list of journals and the quantity of articles published in each is provided in the table below. The majority of the publications were written by academics from Europe (25 papers), Asia (23 articles), North America (21), South America (13) and Africa (10 papers). Table 2 and Figure 3 have a complete list of the journals and the number of publications.

The following section discusses the impacts of abandoned mines as a result of mine closures. It has been divided into three sections: i) Environmental impacts ii) Socio-cultural impacts iii) Economic impacts (Refer to Table 3).

Table 2.Number of peer-reviewed articles by journal in the CLR.

JOURNAL TITLE	NO. OF ARTICLES
The Extractive Industries and Society	4
Results in Engineering	1
International Journal of Coal Science & Technology	2
GeoJournal	1
International Journal of Mining, Reclamation and Environment	3
International Journal of Environmental Studies	1
Minerals and Energy	174
Resources Policy	4
Reviews in Environmental Science and Bio/Technology	1
Journal of Mining and Environment	2
Environ Sci Pollut Res	1
Journal of Environmental Management	2
Journal of Computer Sciences and Applications	1
Journal of Cultural Heritage	1
Soc. Ecol. Restor.	1
Ecology and Society	1
Landscape Planning	2
Archives of Mining Science	1
Journal of Environmental Protection	1
Environmental Management	1
International Journal of Sustainable Development & World Ecology	1

Table 3. Impacts of mines due to mine closure

ENVIRONMENTAL IMPACT	SOCIO-CULTURAL IMPACT	ECONOMIC IMPACT
•Increase/decrease of air pollution [26; 27; 28]	•Increase in crime [29; 30; 31; 32; 33]	•Reduction of employment opportunity [30; 32; 34; 35]
•Increase/decrease of water pollution [26; 27; 33]	•Changes in standard of education [29; 30; 33]	•Foreign investment scale down [32; 33; 34; 36]
•Change in climatic condition [26; 27; 37]	•Increase in outward migration of people [29; 30; 32]	•Limited money circulating in the area [30; 36; 38]
•Landscape degradation (26;27; 37]	•Reduction of provision of infrastructure [29; 32; 37]	•Reduced buying capacity [30; 35; 36]
•Presence of natural and cultural heritage [26; 27; 37]	•Psychological diseases emerged [31; 36; 37)	•General decline of economic activities [34; 38]
•Degradation of flora and fauna [26; 27; 37; 38]	•Problems of behavioural nature [36; 30; 31; 32; 33]	•Lower standards of living [30; 32]
•Soil degradation [26; 27; 37]		•Reduced tax revenue [32; 30; 36]
•Degradation of soundscape [33; 35; 37]		
•Changes in human health and well-being [33; 35; 37]		
•Visual and aesthetic degradation [33; 35; 37]		

There are significant and widespread environmental, social, and economic issues related to abandoned mining sites. The issues posed by abandoned mines may be particularly difficult and complicated, and they can have detrimental effects on communities' economies as well as the safety and health of people and animals [39]. The structure of the terrestrial (soil, flora, fauna, landscape, historical and archaeological heritage), aquatic (hydrology, hydrogeology, water quality, aquatic biota), and atmospheric (climate, air quality) environments in the vicinity of active, inactive, or abandoned mines is now widely acknowledged to be significantly impacted [7; 27; 39; 40; 41; 42; 43].

Indigenous communities affected by the loss of ancestral lands and cultural ties may suffer particularly badly from forced resettlement [44]. There are insufficient programmes for rehabilitation and resettlement and migrants continue to lack access to appropriate means of meeting their fundamental needs [45; 46].

The economic effects of these areas, where mining operations have been stopped, are negative, resulting in a decline in the value of the land and a reduction in the productivity of the agricultural land through land degradation [47], which limits the possibilities for using the land for other uses (agricultural, forestry, recreational).

The final stage of mining is reclamation, which entails shutting down a mine and restoring the value of the land and water. Re-vegetation and area re-contouring are required. Reclamation has the following additional advantages:

i. The consequences on the environment include geodiversity, mitigation of aesthetic effects, and residues left over from mining,

ii. landscape improvements and the potential for many uses,

iii. Climate and land improvements, as well as the restoration of wildlife and plants [48; 49].

Benefits for the region include the development of cultural identity, the creation of direct and indirect jobs in numerous fields, leisure and entertainment opportunities, and the expansion of infrastructure. The economic implications include a variety of business options, alternative economic activity, revenue creation and a rise in the region's per capita income [50; 51].

3.2. Identification of various reclamation strategies widely used for abandoned mines along with their impacts

The majority (91.7 percent) of the papers under analysis were created in the recent two decades, highlighting the numerous reclamation techniques frequently employed in closed mines. Figure 2 illustrates this.

The material that was analysed was drawn from 24 publications and concentrated on the different reclamation techniques that are frequently utilised in closed mines, as well as the effects that go along with them. A comprehensive list of journals and the quantity of articles published in each is provided in the table below. The majority of the publications were written by academics from Europe (11 papers), Asia (8 articles), and Africa (2). Figure 3 and Table 4 contain a complete list of the journals and the number of articles.

Table 4. Number of peer-reviewed articles by journal in the CLR.

JOURNAL TITLE	NO. OF ARTICLES
Environmental Management	1
Journal of Environmental Protection	1
CZECH JOURNAL OF TOURISM	1
Annals of Tourism Research	1
Acta Montanistica Slovaca	1
International Journal of Coal Science & Technology	1
CIVIL AND ENVIRONMENTAL ENGINEERING	1
Sustainability	1
Landscape Planning	1
Advances in Hospitality and Tourism Research	1
International Journal of Mining, Reclamation and Environment	1
Journal of Civil Engineering and Architecture	1
Minerals	1
Journal of Resources and Ecology	1
Environmental & Socio-economic Studies	1
Coastal Management	1
New Forests	1
Journal of Urban Management	1
Journal of Ecological Engineering	1
Journal of Ecology and Environment	1
The Scientific World Journal	1
Reviews in Environmental Science and Bio/Technology	1
Energies	1
Environmental Science and Pollution Research	1

The articles dealing with the above topic calls for a separate research on reclamation and its strategies for better understanding of the overall research intent. The following sections talk about reclamation and the possible productive uses a reclaimed mine site can have apart from discussing the various possible strategies for positive reclamation.

3.2.1. Reclamation

Mining has a negative impact on the ecology around the removed region. As a result, it is critical to rehabilitate mines and return the territory to its natural state, or to optimise land usage [52]. The overall process of restoring disturbed, damaged, degraded, or destroyed land to its prior or potential productive use is known as reclamation. There are several terms used to describe actions taken to repair damaged ecosystems including "reclamation," "restoration," "rehabilitation," "remediation," "mitigation," etc. [e.g. 27; 53; 54; 55]. These phrases are frequently used interchangeably in real life. However, their meanings differ depending on the authors (for example, scientific literature, R&D initiatives) or the implementing authorities (for example, laws, rules, and technical reports) [7].

A rational reclamation objective should take into account aesthetics, intended use, and versatility in addition to aiming to create a permanently stable landscape. Reclamation rules normally call for the approximate original contour as a minimum requirement. There may be circumstances when deviating from that is permitted as long as desired outcomes are ensured [2; 56; 57].

Such efforts aim to improve the environment in and around mined areas. It is crucial to note that it is not practical to restore all mine sites owing to economic and operational factors, as well as the fact that not every mine has the same goals and techniques for site rehabilitation [58; 59; 60; 61; 62; 63; 64]. Thus reclamation plans are required. The mined land reclamation plan includes the control and treatment of all environmental impacts caused during the operation in each area of mined land. It also covers the mine closing phase and the subsequent implementation of a permanent Post Mining Land Use (PMLU) for various areas of mined land. As a result, it is evident that the quality and description of the reclamation plan, as well as its costs, are dependent on the type of PMLU chosen to apply on my land following mine closure [65].

All post-mining lands ultimately gain some economic, recreational, and aesthetic potential, even when mining activities damage them. The effective conversion of this potential into a sustained capability requires identifying the special potential of mined land and selecting appropriate procedures and measures. Special attention must be given to the use of the land and its potential functions (such as pasture, hay land, recreational areas, wildlife habitat, wetlands, and fishing ponds) [66; 67; 68]. Mining activities often have an impact on the surrounding areas and ecosystems. This ecosystem includes the ecological, social, and economic surroundings that are directly involved in these activities. Some key actions must be done to minimise the negative effects of mining and related businesses on ecosystems in order to limit the ecologically harmful consequences of mining on ecosystems [69]. The following section illustrates the reclamation possibilities being circulated these days.

3.2.2. Productive uses of the reclaimed mine sites: Possibilities

The following section presents a brief description of a set of possible options for the productive uses of reclaimed mine lands (Refer to Table 5).

3.2.3. Agricultural use

Mining, industry, and agriculture are the major sources of soil pollution with heavy metals caused by human activities [91]. In rural locations, agricultural usage as reclamation is a sensible and practical answer. In some instances, the establishment of crops can be accomplished at fewer costs and with more immediate economic viability than other potential applications, such as forestry. The literature has several instances of agriculturally recovered mine sites [e.g. 92, 93, 94]. Deep mines can be used to store agricultural goods, albeit this is not primarily an agricultural application. Wine cellars can be installed in the galleries of underground mines, taking advantage of the consistent temperature and high humidity levels [7].

3.2.4. Forestry use

Estimating mine reclamation costs is an important aspect of mine closure initiatives. Planting mine sites is one method of mine reclamation [95]. The greatest option for places with weak and/or stony soils, steep terrain, and rural areas is the post-mining forest land use aim. As a result, abandoned mine sites are frequently converted into new forests [for example, 79; 96; 97]. An ideal end state for land management would be forest land usage after mining. An attractive environment, a natural habitat, and the financial advantage of wood products, resin, etc. are all benefits of converting abandoned mine areas to a forest land use end state [98]. Other advantages of using post-mining forest land include providing food and shelter for wildlife, preventing erosion, and establishing recreational places [7].

Table 5. Identified reclamation strategies along with the impacts associated with them.

RECLAMATION MODE	APPLICATION	ASSOCIATED IMPACTS CONSIDERED	REFERENCE
AGRICULTURE	• PLANTATION • GARDEN • PASTURE • NURSERY	Stabilizes erodible slopes of minimize pollution Restoration of the vegetation cover on tailing dumps contributes to soil quality Improvement through stabilization, pollution control, aesthetic improvement, and soil fertility	[27; 70; 71; 72; 73; 74; 75; 76; 77; 78]
FORESTRY	• PLANTING TREES • ORCHARD • LUMBER PRODUCTION • WOODLAND • SHRUBS • HERBS • NATIVE FORESTATION	Serves as wildlife habitat Holds soil and prevents soil erosion Maintains clean water quality Protects the watershed by enhancing groundwater recharge and reducing peak stormflows to help prevent flooding Stores carbon so as to aid in mitigating climate change Maintains landscape aesthetics	[27; 72; 73; 74; 75; 76; 78; 79]
PIT LAKES	• RESERVOIR/ RECREATIONAL- swimming, boating, diving, hunting, fisheries, aesthetics, passive recreation • WILDLIFE-Aquatic ecosystems, amphibious fauna and flora, terrestrial wildlife, migratory species, • PRIMARY PRODUCTION- irrigated crops, agriculture, livestock watering, aquaculture • DRINKING	Pit lakes limits the mine waste's contact with oxygen and thereby restricts the potential for generation of sulfuric acid from residual sulphides Provide good habitat conditions for the conservation of significant bird life and plant species Increase in livelihood Improves the climatic condition Source of revenue, employment and, in some cases, food to communities impacted by mine closure	[3; 27; 71; 72; 73; 76; 78; 80; 81; 82; 83; 84; 85]
CONSERVATION	• HABITATION FOR WILDLIFE • WATER SUPPLY (SURFACE AND UNDERGROUND)	Protects the watershed by enhancing groundwater recharge and reducing peak stormflows to help prevent flooding Improves the climatic condition Holds soil and prevents soil erosion Maintains clean water quality	[27; 54; 71; 72; 75; 78; 79; 82; 86]
CONSTRUCTION	• RESIDENTIAL • COMMERCIAL (SHOPPING CENTER) • INDUSTRIAL (FACTORY) • EDUCATIONAL (CONSTRUCTION OF SCHOOLS OF ANY KIND) • SUSTAINABLE COMMUNITY	Source of revenue and employment Increase in livelihood Increases in property value Attract investment and revitalize cities Tangible and intangible benefits to communities Better use of natural resources	[3; 70; 72; 74; 78; 87; 88; 89]
INTENSIVE RECREATION	• SPORTS FIELD • SAILING, SWIMMING • FISH POND AND GAMING	Protection of life, health, and safety Improved environmental and social conditions Better use of natural resources. Tangible and intangible benefits to communities	[3; 70; 71; 72; 73; 78; 81; 82; 83; 84; 87; 88]
NON-INTENSIVE RECREATION/ TOURISM	• PARK AND OPEN GREEN SPACE • MUSEUM OR EXHIBITION OF MINING INNOVATIONS	Promote healthier communities Aesthetic benefits Increases in property value Attract investment, revitalize cities, boost tourism	[3; 27; 70; 71; 72; 73; 78; 80; 81; 83; 84; 87; 88; 90]

3.2.5. Pit lakes

According to *Gilewska and Otremba* [85] and Szczepiński *et al.* [99], underground mine galleries and open-pit mines are often flooded by natural groundwater and surface water input or by human intervention using pumped groundwater and water from dewatering systems. Depending on the quality of the water, flooded mines can serve as strategic water storage reservoirs for a variety of uses, including irrigation, household or industrial supplies, hydraulic fracturing, aquifer recharge, firefighting, etc. In another setting, flooded open pits can be used for a variety of recreational and leisure activities, including the preservation of natural ecosystems, and animal habitats, and recreational, sporting, and educational uses. James Besha and Steve Burke (Albany Engineering Corporation) suggest using these "water reservoirs" to generate power in a new and creative way [100]. The flooded mines would be used to operate a hydroelectric generating plant, which would provide power, through the building of a pumping station [7].

3.2.6. Wildlife habits and nature conservation

Open-cast mines are artificial, yet the topographic relief they produce might contain aspects that are identical to the various topographic features of a natural environment. Manmade surface impoundments may lead to "spontaneous" colonization by several species, giving these regions significant ecological potential. Flooded open pits may be crucial for the survival of animal and plant species in locations where water is limited. This can result in interesting ecological rehabilitation cases, like those seen in some quarries [e.g. 101; 102; 103].

3.2.7. Recreational, sporting, and educational use

Old mines and quarries have a unique chance to create areas for leisure, sports, and educational pursuits. If the land has to be recovered, it is feasible to transform it into other uses. Some open pits have amphitheatre shapes that may be modified and utilized as outdoor activity auditoriums. Other doable uses include modifications to recreational fisheries, woodlands, and horseback riding trails [7; 83; 104; 105].

3.2.8. Urban and industrial use

Demolition activities produce bench formations, uneven surfaces, and excavations that can help with building development. Well-maintained structures having historical or architectural significance might be used for residential, commercial or industrial purposes [7; 74; 106].

3.3. Assessment of impacts of similar strategies not specifically used in abandoned mines but for general land-use purposes

The majority (38 per cent) of the papers under analysis were produced between 2000 and 2010, illustrating the examination of the effects of comparable tactics applied more generally for land-use planning than for abandoned mines. Figure 2 illustrates this.

The evaluated literature, which is concentrated on the economic, socio-cultural, and environmental effects of comparable reclamation procedures but especially connected to abandoned mines, is drawn from 56 periodicals and 7 additional e-resources. A comprehensive list of journals and the quantity of articles published in each is provided in the table below. The majority of the articles were written by academics from Europe (14 papers), Asia (12 papers), Australia (4 papers), North America (12 papers), South America (3 papers), and Africa (2 papers). Table 6 and Figure 3 have a complete list of the journals and the number of articles.

Table 6. Number of peer-reviewed articles by journal in the CLR.

JOURNAL TITLE	NO. OF ARTICLES	JOURNAL TITLE	NO. OF ARTICLES
Ecological Indicators	1	Journal of Community Health	1
Journal of the Saudi Society of Agricultural Sciences	1	Renewable Agriculture and Food Systems	1
Procedia Earth and Planetary Science	1	Land Use Policy	2
International Journal of Geoheritage and Parks	1	Soil & Tillage Research	1
Biological Conservation	1	Tourism Management Perspectives	2
Indian Journal of Landscape Systems and Ecological Studies	1	Tourism Management	1
International Journal of Tourism Sciences	1	Journal of Travel Research	2
Asia Pacific Journal of Tourism Research	1	Sustainable Rural Development	1
Tourism Management	1	Research Journal of Agricultural Science	1
The International Journal of Justice and Sustainability	1	International Journal of Mine Water	1
Journal of Travel Research	1	The Scientific World Journal	1
International Federation of Automatic Control	1	Frontiers in Sustainable Food Systems	1
Annual Review of Ecology, Evolution, and Systematics	1	Journal of Rural Social Sciences	1
Minerals	1	Sustainability	3
Community Development Journal	1	Annals of Tourism Research	1
Ecological Research	1	Landscape and Urban Planning	3
Journal of Sustainable Tourism	3	Environmental Impact Assessment	1
Journal of Environmental Management	1	Mine Water Environment	1
Environmental & Socio-economic Studies	1	Hydrobiologia	1
Environmental Reviews	1	International Journal of Sustainable Development	1
Tourismos	1	Journal of Tourism, Heritage & Services Marketing	1
Journal of the American Society of Mining and Reclamation	1	Procedia Environmental Sciences	1
International Journal of Scientific and Research Publications	1	Natural Resources	1
Environmental Science and Pollution Research	1		

The section discusses the impacts of reclamation strategies not related to mining but to other land use purposes. It has been divided into three sections: i) Environmental impacts ii) Socio-cultural impacts iii) Economic impacts.

Land use is the control and transformation of the wild or natural environment into constructed environments like towns and semi-natural ecosystems like arable fields, pastures, and managed forests. Controlling the allocation of land for certain uses is a function of land use management. It is possible to make the most use of the resources at hand through coordinated utilization [107; 108; 109].

The articles dealing with the above topic calls for a separate research on impacts of the specific reclamation strategies for better understanding of the overall research intent. The following sections talk about impacts of various reclamation strategies as per the environmental impact, socio-cultural impact and economic impact.

3.3.1. Impacts of agricultural land-use

Present-day unfavourable mining circumstances across the world, as well as the decreasing grade of geological resources and remaining extractable reserves, as well as a rise in mining depth and tailings volumes, reveal a significant increase in damaged lands as a result of mining operations [110]. Future land use, the environment, natural resources, and ecosystem services will be under a lot of strain due to the population's rapid rise. Agricultural land is essential to supplying food and fibre to expanding people, as well as serving as a significant employer. Climate change, deforestation, biodiversity loss, dead zones, genetic engineering, irrigation issues, pollutants, soil degradation, and waste are just a few of the larger environmental issues that agriculture contributes *to* [111; 112; 113; 114]. As seen in Table 7 below, the CLR technique helped analyse a few variables that showed cause-and-effect connections between the environmental, sociocultural, and economic sectors.

Table 7. Identified impacts associated with agricultural land-use strategy.

RECLAMATION MODE- AGRICULTURE					
APPLICATIONS- • PLANTATION • GARDEN • PASTURE • NURSERY					
ENVIRONMENTAL IMPACT		SOCIO-CULTURAL IMPACT		ECONOMIC IMPACT	
ASPECT	REFERENCE	ASPECT	REFERENCE	ASPECT	REFERENCE
Increase in global warming	[2; 115; 116]	Lifestyle changes	[77; 117]	Increased indirect costs	[118; 119]
Heavy rainfalls	[7; 120]	Career expectations	[7; 77]	Increase in per capita income	[77; 78; 121; 122]
Flood control	[123]	Consumer activism	[7]	Balance of payment positions	[124; 125]
Decrease in acidic rains	[126; 127]	Rate of family formation	[2; 77]	Extension in market size	[7; 128]
Wind erosions	[127; 129]	Growth rate of population	[2; 115]	Capital formation	[77; 125]
Decrease in chances of land sliding	[2; 130]	Age distribution of population	[77; 115]	Increase in investment	[2; 125]
Preserve and restore critical habitats	[2; 66; 115; 131]	Regional shifts in population	[2; 115]	Direct foreign investment	[77; 125]
Protect watersheds	[92]	Life expectancies birth rates	[7]	Controlling inflation	[125; 77]
Improve soil health and water quality	[2; 7]	Food security	[2; 125]	Demand of industrial goods	[77; 125]
Land conservation and habitat loss	[2; 7]	Employment opportunities	[2; 115]		
Wasteful water consumption	[2; 7]	Waste management issues	[7]		
Soil erosion and degradation	[2; 125]	Health problems for animals and human	[7; 125]		
Pollution control/ increase	[2; 77]	Reduction in poverty	[125]		
Climate change	[2; 115]	Improvement in standard of living	[7; 125]		
Genetic erosion	[77; 115]	Self-reliance policy	[7]		

3.3.2. Impacts of aquaculture or pit lakes as land-use strategy

Sustainability will be aided if mine reclamation sites, or sections of them, could be utilized for other revenue-generating activities such as commercial fish farming and recreational (sport) fishing. Establishing aquaculture might enhance the connection between the community and the mine, which could help the community's engagement in long-term monitoring programmes. Common characteristics and factors that helped abandoned pit lakes be successfully converted into useful end uses are highlighted [109; 132; 133; 134]. As shown in Table 8 below, the CLR technique helped analyse a few variables that showed cause-and-effect connections between the environmental, sociocultural, and economic sectors.

Table 8. Identified impacts associated with aquaculture or pit-lake land-use strategy.

RECLAMATION MODE- AQUACULTURE/ PIT LAKES					
APPLICATIONS- • RESERVOIR • FISH-FARMING • IRRIGATION • DRINKING • HABITATION FOR WILDLIFE • WATER SUPPLY (SURFACE AND UNDERGROUND)					
ENVIRONMENTAL IMPACT		**SOCIO-CULTURAL IMPACT**		**ECONOMIC IMPACT**	
ASPECT	**REFERENCE**	**ASPECT**	**REFERENCE**	**ASPECT**	**REFERENCE**
Increase in suspended substances and nutritional salts in water	[8; 115; 135; 136; 137; 138]	Food security	[2; 7; 77; 78; 125; 128; 139]	Local income source	[82; 136; 140; 141]
Cages used in aquaculture can reduce dissolved oxygen in the water	[8; 122; 137; 138; 142; 143]	Employment opportunities	[2; 77; 78; 115; 135; 136; 139]	Increased indirect costs	[82; 136; 140; 141]
The waste of cages can increase the total concentration of water nutrients and increase the water's turbidity	[8; 122 ; 138; 142; 143; 144]	Aesthetic value of the surroundings	[2; 7; 78; 125; 128 135; 136; 139]	Increase in per capita income	[140; 141; 145]
Water pollution	[8; 115; 122; 135; 136; 138]	Recreational services	[2; 7; 78; 115 125; 128; 135; 136]	Increase in investment	[140; 141; 145]
Wildlife habitat	[115; 135; 136]	Human health and well being	[2; 77; 78; 139; 144]	Direct foreign investment	[82; 83]
Rainfall reservoir	[8; 137; 138; 146]	Wildlife and stock watering	[2; 77; 78; 142; 143]	Controlling inflation	[83; 140; 141]
Polishing surface water	[8; 122; 144; 146]	Recreational fisheries	[2; 78; 139; 144]	Demand of industrial goods	[82; 83]
Boosting groundwater levels	[137; 146]	Constructed wetlands for waterfowl	[2; 7; 78; 128; 125; 144]	Opportunities in revenue generation from livestock watering and aquaculture	[82; 83]
Groundwater mixing	[137; 146]	Source and storage of water	[77; 139]		
Amphibious flora and fauna	[146]	Waste storage and treatment	[77; 139]		

3.3.3. Impacts of forestry as land use stategy

One of the green economy's sector success stories is forest management. Forests serve as vital wildlife habitats and a source of raw materials for the construction and timber industries. Studies have shown that community forestry significantly improves forest conditions. By generating rural jobs, it also addresses social marginalization and reduces poverty [111; 147; 148; 149]. As seen in Table 9 below, the CLR technique helped analyse a few variables that showed cause-and-effect connections between the environmental, sociocultural, and economic sectors.

3.3.4. Impacts of intensive and non-intensive recreation/tourism based land-use strategy

Recreational land use should be developed while taking into consideration the cadastral valuation of the potential use of recreational land. When mining tourism is used, several environmental, sociocultural, and economic benefits are realized. Construction of mining parks, geo-parks, or theme parks materializes the reuse of mining regions encircled by geo-tourism and mining tourism activities [153; 154; 155; 156]. As shown in Table 10 below, the CLR technique helped analyse a few variables that showed cause-and-effect connections between the environmental, sociocultural, and economic sectors.

Table 9. Identified impacts associated with forestry land-use strategy.

RECLAMATION MODE- FORESTRY					
APPLICATIONS- •PLANTING TREES •ORCHARD •LUMBER PRODUCTION •WOODLAND •SHRUBS •HERBS •NATIVE FORESTATION					
ENVIRONMENTAL IMPACT		**SOCIO-CULTURAL IMPACT**		**ECONOMIC IMPACT**	
ASPECT	**REFERENCE**	**ASPECT**	**REFERENCE**	**ASPECT**	**REFERENCE**
Biotopes for flora and fauna in urban environment	[2; 7; 125; 128; 147]	Recreational opportunities	[7; 125; 147; 140; 150]	Value of market-priced benefits	[66; 127; 137; 151]
Cooling of climate	[2; 7; 125; 128; 147]	Improvement of home and work environments	[77; 119]	Increased property values	[66; 127; 137; 151]
Wind control	[7; 125; 147]	Impacts on physical and mental health	[77; 119]	Generation of revenues	[66; 127; 137; 151]
Impacts on urban climate through temperature and humidity control	[2; 115; 120; 128; 142]	Cultural and historical values of green areas	[7; 125; 147]	Demand of industries	[78; 122; 124]
Air pollution reduction	[2; 7; 125; 128; 147]	Promotion of tourism	[7; 125; 147]	Sustaining livelihoods and economic opportunities	[7; 122; 125; 147; 140; 150; 152]
Sound control	[2; 115; 120; 128; 142]	Growth of trees, seasonal dynamics and experiencing nature	[77; 119]		
Glare and reflection control	[2; 128]	Defining open space, framing and screening views	[77; 119]		
Flood prevention and erosion control	[7; 125; 147]	Food security and livelihood	[140; 150]		
Landscape variation through different colours, textures, forms and densities of plants	[7; 125; 147]				

Table 10. Identified impacts associated with intensive and non-intensive recreation/tourism based land-use strategy.

RECLAMATION MODE-INTENSIVE AND NON-INTENSIVE RECREATION/ TOURISM					
APPLICATIONS- • RESIDENTIAL • COMMERCIAL (SHOPPING CENTER) • INDUSTRIAL (FACTORY) • EDUCATIONAL (CONSTRUCTION OF SCHOOLS OF ANY KIND) • SUSTAINABLE COMMUNITY • SPORTS FIELD • SAILING, SWIMMING • FISH POND AND GAMING • PARK AND OPEN GREEN SPACE • MUSEUM OR EXHIBITION OF MINING INNOVATIONS					
ENVIRONMENTAL IMPACT		**SOCIO-CULTURAL IMPACT**		**ECONOMIC IMPACT**	
ASPECT	**REFERENCE**	**ASPECT**	**REFERENCE**	**ASPECT**	**REFERENCE**
Environmental awareness	[2; 7; 83; 128; 135; 157]	Improves the quality of life	[135; 158; 159; 160; 161]	Foreign exchange earning	[135; 140; 162; 163; 164]
Enhancement of local environment	[83; 120; 128; 157]	Increases availability of recreation facilities/ opportunities	[83; 136; 157]	Contribution to government revenues	[145; 165]
Protection and conservation of wildlife	[83; 120; 128; 157]	Improves quality of fire protection	[83; 136; 157]	Generation of employment	[145; 165]
Increases public appreciation to spread awareness	[128; 135; 166; 167]	Improves quality of police protection	[83; 136; 157]	Balance of payment/ trade account balance	[145; 165]
Retain and increase visitor numbers by improving the general amenity value of local environment	[135; 142; 166; 167]	Improves understanding and image of different communities or cultures	[136; 158; 159; 160; 161]	Stimulation of infrastructure investment	[126; 124; 162; 163; 164]
More attention to cultural heritage	[136; 168; 169]	Promotes cultural exchange	[168; 169]	Contribution to local economies	[126]
Protection of selected natural environments or prevention of further ecological decline	[120; 168; 169]	Facilitates meeting visitors (educational experience)	[168; 169]	Alternative economy	[135]
Preservation of historic buildings and monuments	[136; 168; 169]	Preserves cultural identity of host population	[168; 169]	Increase in job opportunities	[126; 162]
Improvement of the area's appearance (visual and aesthetic)	[2; 7; 126; 136]	Increases demands of historical and cultural exhibits	[83; 157; 158; 159; 160; 161]	Higher income	[145; 165]
Inappropriate development	[2; 7; 126; 136]	Loss of spirit	[83; 128; 157]	More varying occupations	[145; 165]
Loss of natural habitat and effects of wildlife	[126; 136]	Increase in public transport	[83; 128; 157]	Broader economic base	[2; 7; 162]

RECLAMATION MODE-INTENSIVE AND NON-INTENSIVE RECREATION/ TOURISM					
APPLICATIONS- • RESIDENTIAL • COMMERCIAL (SHOPPING CENTER) • INDUSTRIAL (FACTORY) • EDUCATIONAL (CONSTRUCTION OF SCHOOLS OF ANY KIND) • SUSTAINABLE COMMUNITY • SPORTS FIELD • SAILING, SWIMMING • FISH POND AND GAMING • PARK AND OPEN GREEN SPACE • MUSEUM OR EXHIBITION OF MINING INNOVATIONS					
ENVIRONMENTAL IMPACT		**SOCIO-CULTURAL IMPACT**		**ECONOMIC IMPACT**	
ASPECT	**REFERENCE**	**ASPECT**	**REFERENCE**	**ASPECT**	**REFERENCE**
Increase in pollution (air, water, noise, solid waste and visual)	[128; 166; 167]	Shopping opportunities	[83; 157]	Inclusion of new activities	[145; 165]
Increase in chances of erosion	[142; 166; 167]	Entertainment and recreational opportunities	[83; 157]	Increase in tax revenues	[140; 163; 164]
Localized pollution	[128; 142; 166; 167]	Opportunities to socialize	[158; 159; 160; 161]	Inflation	[2; 7; 140; 163; 164]
Activities affecting the natural environment	[128; 166; 167]	Intercultural interactions	[122; 170; 171]	Opportunity costs	[140; 163; 164]
		Change in the physical appearance of the region	[128; 172; 173]	Dependency	[140; 163; 164]
		Change in style of architecture on the region	[128; 172; 173]	More seasonal jobs	[140; 163; 164]
		Change in character of the region	[158; 159; 160; 161]	Enclave tourism	[2; 7]
		Population growth	[158; 159; 160; 161]	Seasonal character of jobs	[172; 173]
		Positive changes in values and customs	[122; 170; 171]	Funding for public services(e.g. Health, police, fire services)	[172; 173]
		Increased gambling	[122; 170; 171]	Increase in cost of living	[172; 173]
		Increased alcoholism	[122; 170; 171]	Increase in property value	[172; 173]
		Increased smuggling	[78; 128]	Increase in rent rates	[172; 173]
		Heightened tension	[158; 159; 160; 161]	Costs of developments	[77; 146; 158]
		Increasingly hectic community and personal life	[77; 146; 158]	Increase in price of goods and services	[2; 7; 78]
		Creation of phony folk culture	[2; 7; 78]	Increase in potential of imported labours	[172; 173]
		Agglomeration in public facilities and resources	[2; 7; 78]	Strengthens local economy	[2; 7; 78]
		Lesser availability of parking spaces	[77; 146; 158]	Generates revenue for local government	[77; 146; 158]
		Increase in noise levels	[138; 171; 174]		
		Increase in traffic congestion	[138; 171; 174]		
		Behavioural changes	[138; 171; 174]		
		Language and cultural effects	[138; 171; 174]		
		Unwanted lifestyle changes	[138; 171; 174]		
		Negative changes in values and customs	[138; 171; 174]		
		Exclusion of local and natural resources	[77; 146; 158]		
		Increase in littering of spaces	[77; 146; 158]		
		Overcrowding and traffic congestion	[77; 146; 158]		

4. Conclusions

Mining operations harm the vegetation, soil, wildlife habitats, and water supplies in the mining region. They also significantly modify the terrain and the physical characteristics of the atmosphere. Post-mining landscapes lose their earlier aesthetic, ecological, sociocultural, and economic worth. Environmental deterioration brought on by mining activities may become irreversible if adequate mitigation measures are not implemented.

Degraded mine recovery can range from not overly challenging to quite complicated when approached holistically. Reclamation of abandoned mine land should be done gradually and according to the specifics of each site. A truly interdisciplinary strategy involving cooperation between geologists, hydrologists, chemists, biologists, soil scientists, landscape architects, engineers, and economics is necessary for the long-term viability of a mining site restoration.

As discussed in the paper, the ultimate goal of reclamation is two-fold:

i. to sustainably establish the aesthetic and ecological conditions of the post-mining landscape so that it become as compatible with nearby undisturbed lands; and

ii. To regain or enhance the productive capacity and stability of the land so that it contributes to the community's economic and social welfare more efficiently.

Naturally, there isn't a "special" or "magical" reclamation strategy that can be instantly implemented in all post-mining regions, as the key factors in each reclamation study are quite different and depend on the particular features of the location.

The selection of post-mining land use in mining is important for determining mine closure and reclamation costs. As a result, it influences the final limit and, as a result, production planning. Since several studies have been conducted to explore the reclamation strategies, mining effects on the environment and people, reclamation benefits, it is difficult to decide on a particular reclamation strategy. Multi attribute decision making approaches are necessary in this respect since there are multiple appropriate choices, criteria, characteristics, and sub-attributes to identify post mining land use for abandoned mine area. Furthermore, the nature of the effective parameters for defining optimal post-mining land use includes gradual modifications with no specific limitations, similar to the changes in Fuzzy numbers as suggested in recent studies.

What we do now and how we engage with nature will determine our future. It is critical to adopt new policies to safeguard local residents and to fairly divide the revenue generated by this development in order to repair the infrastructure of the recovered mining region. Further study is required to investigate and devise a comprehensive strategy selection tool to easily select reclamation strategies based on the type of abandoned mine and its communities' priorities. It is imperative to carefully and collaboratively plan the sustainable reclamation of mine-affected areas. The development of long-term stable landscape use and reclamation plans also requires the cooperative and innovative participation of all parties involved. Moreover, abandoned mine reclamation plan should be designed with collaboration of the urban planners, ecologists, environmentalist, financial officials, political and administrative officials, mining experts, and community members.

References

[1]. Pouresmaieli, M. and Osanloo, M. (2019). Establishing a Model to Reduce the Risk of Premature Mine Closure. In IOP Conference Series: Earth and Environmental Science, 362, 1, 012005. IOP Publishing.

[2]. Kuter, N. (2013). Reclamation of Degraded Landscapes due to Opencast Mining. Advances in Landscape Architecture, Rijeka, Croatia, InTech, 823–858.

[3]. Ghosh, P. (2021). Mining Tourism Potential Assessment of Raniganj Coalfield, India. Advances in Hospitality and Tourism Research, 9, 2, 341-367.

[4]. Kim, A. (2011). Chapter 16 - United States Bureau of Mines-Study and Control of Fires in Abandoned Mines and Waste Banks. Coal and Peat Fires: A Global Perspective, 1, 267-305.

[5]. Pouresmaieli, M. and Osanloo, M. (2020). A Valuation Approach to Investigate the Sustainability of Sorkhe-Dizaj Iron Ore Mine of Iran. In: Topal, E. (Eds) Proceedings of the 28th International Symposium on Mine Planning and Equipment Selection - MPES 2019. MPES 2019, 431-446. Springer Series in Geomechanics and Geoengineering. Springer, Cham.

[6]. Mahr T. and Malgot J. (1985). Devastation of the environment by landslides activated by construction. Bulletin of the International Association of Engineering Geology, 31, 81–88.

[7]. Favas, P.J.C., Martino, L.E. and Prasad, M.N.V. (2018). Chapter 1 - Abandoned Mine Land Reclamation—Challenges and Opportunities (Holistic Approach). Bio-Geotechnologies for Mine Site Rehabilitation, 3-31.

[8]. Otchere, F.A. et al. (2004). Transforming open mining pits into fish farms: Moving towards sustainability. Natural Resources Forum, 28, 216-223.

[9]. Sheoran, V., Sheoran, A.S. and Poonia, P. (2010). Soil Reclamation of Abandoned Mine Land by Revegetation: A Review. International Journal of Soil, Sediment and Water, 3, 2. Retrieved from: https://scholarworks.umass.edu/intljssw/vol3/iss2/13.

[10]. Ghose, M.K. (1989). Land reclamation and protection of environment from the effect of coal mining operation. Mine technology, 10, 5, 35-39.

[11]. Kimball, B.A., Church, S.E. and Besser, J.M. (2006). Lessons Learned From The U.S. Geological Survey Abandoned Mine Lands Initiative – 1997-2002. 7th International Conference on Acid Rock Drainage

(ICARD), March 26-30, 2006, St. Louis MO. R.I. Barnhisel (ed.) Published by the American Society of Mining and Reclamation (ASMR), 3134. Montavesta Road, Lexington, KY 40502, 944-963.

[12]. Centobelli, P. and Ndou, V. (2019). Managing customer knowledge through the use of big data analytics in tourism research. Current Issues in Tourism, 1, 15, 1862-1882.

[13]. Comerio, N. and Strozzi, F. (2019). Tourism and its economic impact: a literature review using bibliometric tools. Tourism Economics, 25, 1, 109-131.

[14]. Yang, E.C.L., Khoo-Lattimore, C. and Arcodia, C. (2017). A systematic literature review of risk and gender research in tourism. Tourism Management, 58, 89-100.

[15]. O'Brien, A.M. and Guckin, C.M. (2016). The Systematic Literature Review Method: Trials and Tribulations of Electronic Database Searching at Doctoral Level. In SAGE Research Methods Cases Part 1. SAGE Publications, Ltd. London, UK.

[16]. Siddaway, A.P., Wood, A.M. and Hedges, L.V. (2019). How to Do a Systematic Review: A Best Practice Guide for Conducting and Reporting Narrative Reviews, Meta-Analyses, and Meta-Syntheses. Annual Review of Psychology, 70, 747-770.

[17]. Eusébio, C. et al. (2021). The impact of air quality on tourism: a systematic literature review. Journal of Tourism Futures, 7, 1, 111-130.

[18]. Kim, C. S. et al. (2018). Review of reviews: A systematic analysis of review papers in the hospitality and tourism literature. International Journal of Hospitality Management, 70, 49–58.

[19]. Janjua, Z.A., Krishnapillai, G. and Rahman, M. (2021). A Systematic Literature Review of Rural Homestays and Sustainability in Tourism. SAGE Open, 11, 2.

[20]. Garcês, S., Pocinho, M. and Jesus, S.N.D. (2018). Review of optimism, creativity and spirituality in tourism research. Tourism and Hospitality Management, 24, 1, 107–117. DOI:10.20867/thm.24.L6.

[21]. Wijesinghe, S.N.R., Mura, P. and Bouchon, F. (2017). Tourism knowledge and neo-colonialism: A systematic critical review of the literature. Current Issues in Tourism, 22, 11, pp. 1263–1279.

[22]. Pahlevan-Sharif, S., Mura, P. and Wijesinghe, S.N.R. (2019). A systematic review of systematic reviews in tourism. Journal of Hospitality and Tourism Management, 39, 158–165.

[23]. PRISMA. (2019a). PRISMA statement. Retrieved from: http://www.prisma-statement.org/PRISMAStatement/Checklist.aspx.

[24]. PRISMA. (2019b). PRISMA statement. Retrieved from: http://www.prisma-statement.org/PRISMAStatement/.

[25]. Moher, D. et al. (2009). Reprint—Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Physical Therapy & Rehabilitation Journal, 89, 9, 873-880.

[26]. Chabukdhara, M. and Singh, O.P. (2016). Coal mining in northeast India: an overview of environmental issues and treatment approaches. International Journal of Coal Science & Technology, 3, 87–96.

[27]. Venkateswarlu, K. et al. (2016). Abandoned metalliferous mines: ecological impacts and potential approaches for reclamation, Rev Environ Sci Biotechnol, 15, 2, 327–354.

[28]. Agboola, O. et al. (2020). A review on the impact of mining operation: Monitoring, assessment and management. Results in Engineering, 8, 100181.

[29]. Mwakesi, I., Wahome, R. and Ichang, D. (2020). Mining impact on communities' livelihoods: A case study of Taita Taveta County, Kenya. AIMS Environmental Science, 7, 3, 286-301. DOI: 10.3934/environsci.2020018.

[30]. Rao, P.M. and Pathak, K. (2007). Socio-economic impacts of mine closure: a case study using satellite imagery. International Journal of Environmental Studies, 62, 5, 555-570.

[31]. Bainton, N. and Holcombe, S. (2018). A critical review of the social aspects of mine closure. Resources Policy, 59, 468-478.

[32]. Sesele, K., Marais, L. and Rooyen, D.V. (2021). Women and mine closure: A case study of policy in South Africa. Resources Policy, 72, 102059.

[33]. Larsen, R.K. et al. (2022). The impacts of mining on Sámi lands: A knowledge synthesis from three reindeer herding districts. The Extractive Industries and Society, 9, 101051.

[34]. Fernández-Vázquez, E. (2022). Mine closures and local diversification: Job diversity for coal-mining areas in a post-coal economy. The Extractive Industries and Society, 101086.

[35]. Acquah, P.C. and Boateng, A. (2008). Planning for mine closure: Some case studies in Ghana. Minerals & Energy - Raw Materials Report, 15, 1, 23-30.

[36]. Siyongwana, P.Q. and Shabalala, A. (2018). The socio-economic impacts of mine closure on local communities: evidence from Mpumalanga Province in South Africa. GeoJournal, 84, 367-380.

[37]. Brueckner, M. et al. (2021). Mining legacies—Broadening understandings of mining impacts. The Extractive Industries and Society, 8, 3:100950.

[38]. Mhlongo, S.E. and Amponsah-Dacosta, F. (2015). A review of problems and solutions of

abandoned mines in South Africa. International Journal of Mining, Reclamation and Environment, 30, 4, 279-294.

[39]. Bennett, K. (2016). Abandoned mines — environmental, social and economic challenges. In AB Fourie & M Tibbett (Eds), Mine Closure 2016: Proceedings of the 11th International Conference on Mine Closure, Australian Centre for Geomechanics, Perth, 241-252.

[40]. Macías, F. et al. (2017). A geochemical approach to the restoration plans for the Odiel River basin (SW Spain), a watershed deeply polluted by acid mine drainage. Environ Sci Pollut Res, 24, 4506–4516.

[41]. Anawar, H.M. (2015). Sustainable rehabilitation of mining waste and acid mine drainage using geochemistry, mine type, mineralogy, texture, ore extraction and climate knowledge. Journal of Environmental Management, 158, 111–121.

[42]. Johnston, D. et al. (2008). Abandoned mines and the Water Environment: Science project SC030136-41, Environment Agency, the Scottish Environment Protection Agency (SEPA), the Coal Authority (The Environment Agency et al.), Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol.

[43]. UNEP and Cochilco, (2001). Abandoned Mines - Problems, Issues and Policy Challenges for Decision Makers: Summary Workshop Report. UNEP & Cochilco, Chile, United Nations Environment Programme & Chilean Copper Commission.

[44]. Singh, A.N., Srinivas, M. and Naik, B.N. (2015). Forecasting the impact of surface mining on surrounding cloud computing. Journal of Computer Sciences and Applications, 3, 6, 118-122.

[45]. Singh, P.K. and Singh, R.S. (2016). Environmental And Social Impacts Of Mining And Their Mitigation. National Seminar ESIMM-2016, Carbon sequestration through revegetated mine wasteland. Retrieved from: https://www.researchgate.net/publication/308937912.

[46]. UNEP. (2002). EIA Training Resource Manual. Topic 13 Social Impact Assessment.

[47]. Benckert, A.G. (2000). Remediation of tailings dams In: Rofer, C.K., Kaasik, T. (Eds) Turning a problem into a resource: remediation and waste management at the Sillamäe Site, Estonia. Dordrecht: Kluwer Academic Publishers in cooperation with NATO Scientific Affairs Division, 75-80.

[48]. Skousen, J.G., Ziemkiewicz, P.F. and McDonald, L.M. (2019). Acid mine drainage formation, control and treatment: Approaches and strategies. The Extractive Industries and Society, 6, 1, 241-249.

[49]. Howard, A.J. et al. (2016). Assessing riverine threats to heritage assets posed by future climate change through a geomorphological approach and predictive modelling in the Derwent Valley Mills WHS, UK. Journal of Cultural Heritage, 19, 387-394.

[50]. Das, S.K., Mahamaya, M. and Reddy, K. R. (2020). Coal mine overburden soft shale as a controlled low strength material. International Journal of Mining, Reclamation and Environment, 34, 10, 725-747.

[51]. Singh, G. et al. (2020). Soil pollution by fluoride in India: distribution, chemistry and analytical methods. Environmental Concerns and Sustainable Development, 307-324.

[52]. Ebrahimabadi, A. et al. (2018). Comparing two methods of PROMETHEE and Fuzzy TOPSIS in selecting the best plant species for the reclamation of Sarcheshmeh copper mine. Asian journal of water, Environment and Pollution, 15, 2, 141-152. DOI: 10.3233/AJW-180026.

[53]. Cooke, S.J. and Suski, C.D. (2008). Ecological Restoration and Physiology: An Overdue Integration. BioScience, 58, 10, 957–968.

[54]. Bradshaw, A.D. (1984). Ecological principles and land reclamation practice. Landscape Planning, 11, 1, 35-48.

[55]. Bradshaw, A.D. (1996). Underlying principles of restoration. Can. J. Fish. Aquat. Sci., 53, 1, 3–9. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.548.4717&rep=rep1&type=pdf.

[56]. Jansen, I.J. and Melsted, S.W. (1988). Land Shaping and Soil Construction. In: Hossner L.R. (ed.) Reclamation of Surface-Mined Lands. Florida: CRC Press, Inc, 1, 125-136. Retrieved from: https://eurekamag.com/research/001/874/001874495.php.

[57]. Sengupta, M. (1993). Environmental Impacts of Mining Monitoring, Restoration, and Control. USA: CRC Press. Retrieved from: https://www.routledge.com/Environmental-Impacts-of-Mining-Monitoring-Restoration-and-Control/Sengupta/p/book/9780367579890.

[58]. Dudley, N. et al. (2018). Measuring progress in status of land under forest landscape restoration using abiotic and biotic indicators. Soc. Ecol. Restor, 26, 1, 5–12.

[59]. Nilsson, C. et al. (2016). Evaluating the process of ecological restoration. Ecology and Society, 21, 1, 1–18. DOI: 10.5751/ES-08289-210141.

[60]. Maiti, S.K. (2013). Ecorestoration of the coalmine degraded lands. Springer Science & Business Media.

[61]. Tischew, S. et al. (2010). Evaluating restoration success of frequently implemented sompensation measures: Results and demands for control procedures. Restoration Ecology, 18, 4, 467–480.

[62]. Michaud, L.H. and Bjork, D. (1995). The feasibility of constructing solid waste landfills as a reclamation method for abandoned mine lands. In Hynes TP, Blanchette MC, editors: Proceedings of the conference on mining and the environ¬ment (Sudbury '95), Sudbury, Canada Communication Group – Publishing, 227–237.

[63]. Hunsberger, E.L. and Michaud, L.H. (1994). The development of a field method for evaluating the success of reclamation efforts on abandoned mine lands. International Land Reclamation and Mine Drainage Conference and Third, 304–313.

[64]. Chambers, J.C. and Wade, G.L. (1992). Evaluating Reclamation Success: The Ecological Consideration-Proceedings of a Symposium. General Technical Report NE-164, United States Department of Agriculture, Forest Service: Charleston, WV, USA, 1992. Available online: https://www.nrs.fs.fed.us/pubs/gtr/gtr164.pdf (accessed on 15 May 2019).

[65]. Bangian, A.H., et al. (2011a). The Application of Fuzzy MADM Modeling to Define Optimum Post Mining Land Use for Pit Area to Recognize Reclamation Costs in Open Pit Mining. Archives of Mining Science, 56, 1, 91–116.

[66]. Cao, X. (2007). Regulating Mine Land Reclamation in Developing Countries: The Case of China. Land Use Policy, 24, 2, 472-483.

[67]. Kavourides, C., Pavloudakis, F. and Filios, P. (2002). Environmental protection and land reclamation works in West Macedonia Lignite Centre in North Greece current practice and future perspectives. In: Ciccu R. (Ed.) SWEMP 2002: Proceedings of the 7th International Symposium on Environmental Issues and Waste Management in Energy and Mineral Production, SWEMP 2002, Cagliari, Italy. University of Cagliari.

[68]. Saperstein, L.W. (1990). Reclamation (Introduction). In: Kennedy B.A. (Ed.) Surface Mining. 2nd Edition. Littleton, Colorado: Society for Mining, Metallurgy, and Exploration, Inc., 749.

[69]. Hajkazemiha, N. et al. (2021). Evaluation of Mine Reclamation Criteria Using Delphi-Fuzzy Approach. Journal of Mining and Environment, 12, 2, 367-384. DOI: 10.22044/JME.2020.9674.1880.

[70]. Wirth, P. et al. (2018). Green infrastructure: a planning concept for the urban transformation of former coal-mining cities. International Journal of Coal Science & Technology, 5, pp. 78–91.

[71]. Zhang, J. et al. (2011). Land Use-Based Landscape Planning and Restoration in Mine Closure Areas. Environmental Management, 47, 739–750.

[72]. Vrablikova, J., Wildova, E. and Vrablik, P. (2016). Sustainable Development and Restoring the Landscape after Coal Mining in the Northern Part of the Czech Republic. Journal of Environmental Protection, 7, 11.

[73]. Kasztelewicz, Z. (2014). Approaches to Post-Mining Land Reclamation in Polish Open-Cast Lignite Mining. Civil and Environmental Engineering Reports, 12, 1, 55-67.

[74]. Wapwera, S.D., Ayanbimpe, G.M. and Odita, C.E. (2015). Abandoned mine, potential home for the people: a case study of Jos Plateau Tin-Mining Region, Journal of Civil Engineering and Architecture, 9, 429–445. DOI: 10.17265/1934-7359/2015.04.007

[75]. Hu, Z., Wang, P. and Li, J. (2012). Ecological Restoration of Abandoned Mine Land in China. Journal of Resources and Ecology, 3, 4, 289-296.

[76]. Kim, A.R. et al. (2021). Principle of restoration ecology reflected in the process creating the National Institute of Ecology. Journal of Ecology and Environment, 45, 12.

[77]. Bing-yuan, H. and Li-xun, K. (2014). Mine Land Reclamation and Eco-Reconstruction in Shanxi Province I: Mine Land Reclamation Model. The Scientific World Journal, 2014, 483862.

[78]. Zobrist, J. et al. (2009). Environmental and socioeconomic assessment of impacts by mining activities—a case study in the Certej River catchment, Western Carpathians, Romania. Environmental Science and Pollution Research, 16, 14–26.

[79]. Macdonald, S.E. et al. (2015). Forest restoration following surface mining disturbance: challenges and solutions, New Forests, 46, 703–732.

[80]. Edwards, J.A. and Coit, J.C.L. (1996). Mines and quarries: Industrial heritage tourism. Annals of Tourism Research, 23, 2, 341-363.

[81]. Różycki, P. and Dryglas, D. (2017). Mining tourism, sacral and other forms of tourism practiced in antique mines - analysis of the results. Acta Montanistica Slovaca, 22, 1, 58-66.

[82]. McCullough, C.D., Schultze, M. and Vandenberg, J. (2020). Realizing Beneficial End Uses from Abandoned Pit Lakes. Minerals, 10, 2:133.

[83]. Havrlant, J. and Krtička, L. (2014). Reclamation of devastated landscape in the Karviná region (Czech Republic). Environmental & Socio-economic Studies, 2, 4, 1–12.

[84]. Orewere, E., Owonubi, A. and Zainab, S. (2020). Landscape Reclamation for Abandoned Mining Site for Outdoor Recreation on the Jos Plateau. Journal of Environmental Sciences and Resources Management, 12, 2, 26-50.

[85]. Gilewska, M. and Otremba, K. (2015). Water reservoirs under construction as a result of the activities of "Konin" and "Adamów" brown coal mines. Journal of Ecological Engineering, 16, 5, 138–143.

[86]. Xiao, W. et al. (2011). A study of land reclamation and ecological restoration in a resource-exhausted city – a case study of Huaibei in China. International Journal of Mining, Reclamation and Environment, 25, 4, 332-341.

[87]. Yu, X., Mu, C. and Zhang, D. (2020). Assessment of Land Reclamation Benefits in Mining Areas Using Fuzzy Comprehensive Evaluation. Sustainability, 12, 5.

[88]. Luo, P., Miao, Y. and Chang, J. (2020). The “Classification - Strategies” method for the eco-transition of “mine-city” system-taking Xuzhou city as an example. Journal of Urban Management, 9, 3, 360-371.

[89]. Saigustia, C. and Robak, S. (2021). Review of Potential Energy Storage in Abandoned Mines in Poland. Energies, 14, 19:6272.

[90]. Jelen, J. (2018). Mining Heritage and Mining Tourism. Czech Journal of Tourism, 7, 1, 93-105.

[91]. Pouresmaieli, M. et al. (2022). Recent progress on sustainable phytoremediation of heavy metals from soil. Journal of Environmental Chemical Engineering, 10, 5:108482.

[92]. Kołodziej, B. et al. (2016). Soil physical properties of agriculturally reclaimed area after lignite mine: a case study from central Poland, Soil and Tillage Research, 163, 54–63.

[93]. Li, Y., Chen, L. and Wen, H. (2015). Changes in the composition and diversity of bacterial communities 13 years after soil reclamation of abandoned mine land in eastern China, Ecological Research, 30, 357–366.

[94]. Mastrogianni, A. et al. (2014). Reclamation of lignite mine areas with Triticum aestivum: the dynamics of soil functions and microbial communities, Applied Soil Ecology, 80, 51–59.

[95]. Alavi, I., Ebrahimabadi, A. and Hamidian, H. (2022). A New Technical and Economic Approach to Aptimal Plant Species Selection for Open-pit Mine Reclamation Process. Journal of Mining and Environment, 13, 4, 1091-1105.

[96]. Chodak, M., Pietrzykowski, M. and Niklińska, M. (2009). Development of microbial properties in a chronosequence of sandy mine soils, Applied Soil Ecology, 41, 259–268.

[97]. Curran, M. and Bulmer, C. (1999). Forestry as an end use for reclaimed mines: some considerations. In Proceedings of the 23rd Annual British Columbia mine reclamation symposium: mine decommissioning, Kamloops, 1999, The British Columbia Technical and Research Committee on Reclamation, 84–95.

[98]. UAK. (2017). University of Agriculture in Krakow: Current challenges in reclamation to forest. Retrieved from: http://reclamation 2016.ur.krakow.pl/.

[99]. Szczepiński, J. et al. (2010). Reclamation of polish lignite open pits by flooding. Biuletyn Państwowego Instytutu Geologicznego, 441, 441, 167–174. Retrieved from: https://geojournals.pgi.gov.pl/bp/article/view/28887.

[100]. Esch, M. (2016). Hydroelectric engineers find potential in centuries-old mine. Energy & Green Tech. Retrieved from: https://phys.org/news/2016-12-hydroelectric-potential-centuries-old.html.

[101]. Life in Quarries Project. (2017). Retrieved from: http://www.lifeinquarries.eu/en/

[102]. Šebelíková, L., Řehounková, K. and Prach, K. (2016). Spontaneous revegetation vs. forestry reclamation in post-mining sand pits. Environmental Science and Pollution Research, 23, 13598–13605.

[103]. Jurek, V. (2014). Wildlife return at the quarry “Břidla”: possibilities of natural habitat restoration. Czech Republic, Brno, Quarry Life Award Project.

[104]. Lopes, M.E. et al. (2015). Recovery of ancient groundwater supply systems and old abandoned mines: coupling engineering geosciences and geoheritage management. In: Lollino, G., Giordan, D., Marunteanu, C., Christaras, B., Yoshinori, I., and Margottini, C. (Eds.) Engineering geology for society and territory, 8, 227–230.

[105]. Brandão, J.M. (1998). Património mineiro português: um filão a explorar. Bio-Geotechnologies for Mine Site Rehabilitation, In Proceedings of Seminário Arqueologia e Museologia Mineiras, Lisbon, Museu do IGM, 5–9.

[106]. Ping, L. (2012). The activation, transformation, and updates of the abandoned mining area: take the Quantai, Xuzhou mining area’s concept design of landscape for example. In Proceedings of the 2nd international conference on consumer electronics, communications and networks (CECNet), Yichang, 3547–3550. DOI: 10.1109/CECNet.2012.6201391.

[107]. Ellis, E.C. (2021). Land Use and Ecological Change: A 12,000-Year History. Annual Review of Environment and Resources, 46, 1-33.

[108]. Ellis, E.C. et al. (2020). People have shaped most of terrestrial nature for at least 12,000 years. PNAS, 118, 17.

[109]. Meyfroidt, P. et al. (2018). Middle-range theories of land system change. Global Environmental Change, 53, 52-67.

[110]. Pouresmaieli, M., Ataei, M. and Taran, A. (2023). Future mining based on internet of things (IoT) and sustainability challenges. International Journal of Sustainable Development & World Ecology, 30, 2, 211-228.

[111]. K.C., A. (2017). Community Forestry Management and its Role in Biodiversity Conservation

in Nepal. In (Ed.), Global Exposition of Wildlife Management. IntechOpen.

[112]. Kanianska, R. (2016). Agriculture and Its Impact on Land-Use, Environment, and Ecosystem Services. In (Ed.), Landscape Ecology - The Influences of Land Use and Anthropogenic Impacts of Landscape Creation. IntechOpen.

[113]. Dobrovodská, M. et al. (2010). Research and maintenance of biodiversity in historical structures in the agricultural landscape of Slovakia. In: Barančoková M, Krajčí J, Kollár J, Belčáková I, editors. Landscape Ecology – Methods, Applications and Interdisciplinary Approach. Bratislava: ILE SAS, 131–140.

[114]. Burkhard, B. and Müller, F. (2008). Driver–pressure–state–impact–response. In: Jorgensen SE, Fath BD, editors. Ecological indicators. Encyclopedia of ecology. Oxford: Elsevier, 2, 967–970.

[115]. Tian, P. et al. (2021). Impacts of reclamation derived land use changes on ecosystem services in a typical gulf of eastern China: A case study of Hangzhou bay. Ecological Indicators, 132, 108259.

[116]. Sihem, E. (2019). Economic and socio-cultural determinants of agricultural insurance demand across countries. Journal of the Saudi Society of Agricultural Sciences, 18, 2, 177-187. http://dx.doi.org/10.1016/j.jssas.2017.04.004.

[117]. Diekmann, L.O., Gray, L.C. and Thai, C.L. (2020). More Than Food: The Social Benefits of Localized Urban Food Systems. Front. Sustain. Food Syst., 4, 534219.

[118]. Brehm, J.M. and Eisenhauer, B.W. (2008). Motivations for Participating in Community-Supported Agriculture and Their Relationship with Community Attachment and Social Capital. Journal of Rural Social Sciences, 23, 1.

[119]. Adesipo, A.A. et al. (2021). An Approach to Thresholds for Evaluating Post-Mining Site Reclamation. Sustainability, 13, 10:5618.

[120]. Shan-Shan, F. et al. (2009). Re-use strategy of subsided land based on urban space ecological compensation: case study for Xuzhou mining area for example. Procedia Earth and Planetary Science, 1, 1, 982-988.

[121]. Miller, D. (2008). Using Aquaculture as a Post-mining Land Use in West Virginia. Mine Water and the Environment, 27, 122.

[122]. Narrei, S. and Osanloo, M. (2011). Post-Mining Land-Use Methods Optimum Ranking, Using Multi Attribute Decision Techniques with Regard to Sustainable Resources Management. OIDA International Journal of Sustainable Development, 2, 11, 65-76.

[123]. Poulsen, M.N., Neff, R.A. and Winch, P.J. (2017). The multi-functionality of urban farming: perceived benefits for neighbourhood improvement. The International Journal of Justice and Sustainability, 22, 11, 1411-1427.

[124]. Tyrväinen, L. et al. (2005). Benefits and Uses of Urban Forests and Trees. In: Konijnendijk, C., Nilsson, K., Randrup, T., Schipperijn, J. (Eds.) Urban Forests and Trees. Springer, Berlin, Heidelberg, 81-114.

[125]. Velan, M. and Prasad, M.N.V. (2018). Chapter 20 - Neyveli Lignite Mine Waste Rehabilitation for Sustainable Development. Bio-Geotechnologies for Mine Site Rehabilitation, 347-370.

[126]. Beer, F. and Marais, M. (2005). Rural communities, the natural environment and development – some challenges, some successes. Community Development Journal, 40, 1, 50–61.

[127]. Miao, Z. and Marrs, R. (2000). Ecological restoration and land reclamation in open-cast mines in Shanxi Province, China. Journal of Environmental Management, 59, 3, 205-215.

[128]. Ashby, A.D. and Van-Etten, E.J.B. (2021). Exploring abandoned mines through a public lens. In AB Fourie, M Tibbett & A Sharkuu (Eds.), Mine Closure 2021: Proceedings of the 14th International Conference on Mine Closure, QMC Group.

[129]. Carney, P.A. et al. (2012). Impact of a community gardening project on vegetable intake, food security and family relationships: a community-based participatory research study. Journal of Community Health, 37, 874–881.

[130]. Archer, D.W. et al. (2008). Social and political influences on agricultural systems. Renewable Agriculture and Food Systems, 23, 272-284.

[131]. Zasada, I. (2011). Multifunctional peri-urban agriculture—A review of societal demands and the provision of goods and services by farming. Land Use Policy, 28, 4, 639-648.

[132]. Blanchette, M.L. and Lund, M.A. (2016). Pit lakes are a global legacy of mining: an integrated approach to achieving sustainable ecosystems and value for communities. Current Opinion in Environmental Sustainability, 23, 28-34.

[133]. Kean, S. (2009). Eco-Alchemy in Alberta. Science, 326, 5956, 1052-1055.

[134]. Otcherea, F.A. et al. (2002). Mining and Aquaculture: A Sustainable Venture. British Columbia Mine Reclamation Symposium.

[135]. Singh, R.S. and Ghosh, P. (2021). Geotourism potential of coal mines: An appraisal of Sonepur-Bazari open cast project, India. International Journal of Geoheritage and Parks, 9, 2, 172-181.

[136]. Singh, R.S. and Ghosh, P. (2019). Potential of Mining Tourism: A Study of Select Coal Mines of Paschim Bardhaman District, West Bengal. Indian

Journal of Landscape Systems and Ecological Studies, 42, 101-114.

[137]. Li, Y., Chen, L. and Wen, H. (2014). Changes in the composition and diversity of bacterial communities 13 years after soil reclamation of abandoned mine land in eastern China. Ecological Research, 30, 357–366.

[138]. George-Laurentiu, M., Florentina-Cristina, M. and Andreea-Loreta, C. (2016). The Assessment of Social and Economic Impacts Associated to an Abandoned Mining Site Case study: Ciudanovita (Romania). Procedia Environmental Sciences, 32, 420-430.

[139]. Lynch, A.J. et al. (2016). The social, economic, and environmental importance of inland fish and fisheries. Environmental Reviews, 24, 2, 115-121.

[140]. Luttik, J. (2000). The value of trees, water and open space as reflected by house prices in the Netherlands. Landscape and Urban Planning, 48, 3–4, 161-167.

[141]. Breber, P., Povilanskas, R. and Armaitienė, A. (2008). Recent evolution of fishery and land reclamation in Curonian and Lesina Jagoons. Hydrobiologia, 611, 105.

[142]. Zande, A.N. et al. (1984). Impact of outdoor recreation on the density of a number of breeding bird species in woods adjacent to urban residential areas. Biological Conservation, 30, 1, 1-39.

[143]. Allan, J.D. (2004). Landscapes and Riverscapes: The Influence of Land Use on Stream Ecosystems. Annual Review of Ecology, Evolution, and Systematics, 35, 257-284.

[144]. McCullough, C.D. and Lund, M.A. (2006). Opportunities for Sustainable Mining Pit Lakes in Australia. Mine Water and the Environment, 25, 220–226.

[145]. Lagarense, B.E.S. and Walansendow, A. (2014). Exploring Residents' Perceptions and Participation on Tourism and Waterfront Development: The Case of Manado Waterfront Development in Indonesia. Asia Pacific Journal of Tourism Research, 20, 2, 223-237.

[146]. Vaugeois, N. et al. (2009). "Made in BC" Innovation in Sustainable Tourism. Fostering Innovation in Sustainable Tourism.

[147]. Angel, P.N. et al. (2009). Angel, P.N., Burger, J.A., Davis, V., Barton, C.D., Bower, M., Eggerud, S., and Rothman, P.S. (2009). The Forestry Reclamation Approach and the Measure of Its Success in Appalachia 1. Journal of the American Society of Mining and Reclamation, 18-36.

[148]. Acharya, K.P. (2004). Does Community Forests Management Supports Biodiversity Conservation? Evidences from Two Community Forests from the Mid Hills of Nepal. Journal of Forest and Livelihood, 4, 1, 44–54.

[149]. Pokharal, B.K. (2001). Livelihoods, Economic Opportunities and Equity: Community Forestry and People's Livelihoods. Journal of Forestry and Livelihood, 1, 1, 16–18.

[150]. Karjalainen, E. and Tyrväinen, L. (2002). Visualization in forest landscape preference research: a Finnish perspective. Landscape and Urban Planning, 59, 1, 13-28.

[151]. Burger, J.A. et al. (2003). White Pine Growth and Yield on a Mined Site in Virginia: Response to Thinning and Pruning. Journal of the American Society of Mining and Reclamation, 96-102..

[152]. Tyrväinen, L. and Väänänen, H. (1998). The economic value of urban forest amenities: an application of the contingent valuation method. Landscape and Urban Planning, 43, 1–3, 105-118.

[153]. Tretiak, V.M. and Marchenkova, T.P. (2020). Recreational land use: issues of development and assessment of potential. Land management, cadastre and land monitoring, 26, 1.

[154]. Costa, S.S.S. and Santos, E.N. (2016). Mining Tourism and Geotourism: Alternatives Solutions to Mine Closure and Completion. In book: 24th World Mining Congress Proceedings: Sustainability in mining Edition: 1Publisher: IBRAM, 301-309.

[155]. Bangian, A.H. et al. (2011b). Fuzzy analytical hierarchy processing to define optimum post mining land use for pit area to clarify reclamation costs. Mineral resources management (Gospodarka surowcami mineralnymi), 56, 2, 145-168.

[156]. Pouresmaieli, M., Ataei, M. and Qarahasanlou, A. N. (2023). A scientometrics view on sustainable development in surface mining: Everything from the beginning. Resources Policy, 82, 103410.

[157]. Dickinson, J.E. (2015). Travel, tourism, climate change, and behavioral change: travelers' perspectives from a developing country, Nigeria. Journal of Sustainable Tourism, 23, 3, 437-454.

[158]. García, F.A., Vázquez, A.B. and Macías, R.C. (2015). Resident's attitudes towards the impacts of tourism. Tourism Management Perspectives, 13, 33-40.

[159]. Deery, M., Jago, L. and Fredline, L. (2012). Rethinking social impacts of tourism research: A new research agenda. Tourism Management, 33, 1, 64-73.

[160]. McKercher, B. and Ho, P.S.Y. (2011). Assessing the Tourism Potential of Smaller Cultural and Heritage Attractions. Journal of Sustainable Tourism, 14, 5, 473-488.

[161]. Choi, H.S.C. and Sirakaya, E. (2005). Measuring Residents' Attitude toward Sustainable Tourism: Development of Sustainable Tourism Attitude Scale. Journal of Travel Research, 43, 4, 380-394.

[162]. Seifullina, A. et al. (2018). A Lean Implementation Framework for the Mining Industry. IFAC-PapersOnLine, 51, 11, 1149-1154.

[163]. Roberts, S. and Tribe, J. (2008). Sustainability Indicators for Small Tourism Enterprises – An Exploratory Perspective. Journal of Sustainable Tourism, 16, 5, 575-594.

[164]. Mason, P. and Cheyne, J. (2000). Residents' attitudes to proposed tourism development. Annals of Tourism Research, 27, 2, 391-411.

[165]. Rayel, J.J., Manoka, B. and Boin, C. (2012). Residents' Perception on the Implications of Tourism and the Proposed Mining Operations along Kokoda Track in Papua New Guinea. International Journal of Tourism Sciences, 12, 1, 69-92.

[166]. Spyridou, L.P. (2019). Analyzing the active audience: Reluctant, reactive, fearful, or lazy? Forms and motives of participation in mainstream journalism. Journalism, 20, 6, 827-847.

[167]. Shafaei, F. and Mohamed, B. (2015). A Stage-based Model Development Study on Tourism Social Impact Assessment. International Journal of Scientific and Research Publications, 5, 3, 1-6.

[168]. Riley, R.W. and Doren, C.S.V. (1992). Movies as tourism promotion: A 'pull' factor in a 'push' location. Tourism Management, 13, 3, 267-274.

[169]. Ap, J. and Crompton, J.L. (1993). Residents' Strategies for Responding to Tourism Impacts. Journal of Travel Research, 32, 1, 47-50.

[170]. Zhuang, X., Yao, Y. and Li, J. (2019). Sociocultural Impacts of Tourism on Residents of World Cultural Heritage Sites in China. Sustainability, 11, 3:840.

[171]. Almeyda-Ibáñez, M. and George, B.P. (2017). The evolution of destination branding: A review of branding literature in tourism. Journal of Tourism, Heritage & Services Marketing, 3, 1, 9-17.

[172]. Becker, D.R. et al. (2003). A participatory approach to social impact assessment: the interactive community forum. Environmental Impact Assessment Review, 23, 3, 367-382. https://doi.org/10.1016/S0195-9255(02)00098-7.

[173]. Pettersson, R. (2004). Sami tourism in Northern Sweden: Supply, demand and interaction. Retrieved from:.

[174]. Ibănescu, B.C. et al. (2018). The Impact of Tourism on Sustainable Development of Rural Areas: Evidence from Romania. Sustainability, 10, 10:3529.

Appendix A

FORMULATED SEARCH STRING

Articles identified through databases, using the following search string:
(“mining impacts” OR “mine closure impacts” OR “abandoned mines” AND “mine reclamation” OR “reclamation strategy” OR “reclaimed mines” OR “land reclamation” AND “agriculture land use impact” OR “impact of agriculture” AND “impact of aquaculture” OR “impact of fishery” OR “impact of pit lakes” OR “impacts of dams” OR “impacts of reservoirs” AND “impact of wildlife” AND “impact of forestry” AND “impact of tourism” OR “impact of mining tourism” OR “impact of geo-tourism” OR “ impact of parks” OR “impact of new settlement” OR “impact of urbanization” OR “impact of open spaces”)
n = 284

TOPIC SEGREGATION AND DATABASE SEARCH

Search code divided into 3 parts for hassle-free analysis:

1. **Mining in general**: (“mining impacts” OR “mine closure impacts” OR “abandoned mines”)
2. **Reclamation in general**: (“mine reclamation” OR “reclamation strategy” OR “reclaimed mines” OR “land reclamation”)
3. **Mining and reclamation impacts individually and collectively**: (“agriculture land use impact” OR “impact of agriculture” AND “impact of aquaculture” OR “impact of fishery” OR “impact of pit lakes” OR “impacts of dams” OR “impacts of reservoirs” AND “impact of wildlife” AND “impact of forestry” AND “impact of tourism” OR “impact of mining tourism” OR “impact of geo-tourism” OR “impact of parks” OR “impact of new settlement” OR “impact of urbanization” OR “impact of open spaces”)

CORRELATION SEARCH

Related articles were identified:

1. Mining in general and **Reclamation in general**
n = 24

2. Reclamation in general and **Mining and reclamation impacts individually and collectively**
n = 31

3. Mining and reclamation impacts individually and collectively and **Mining in general**
n = 30

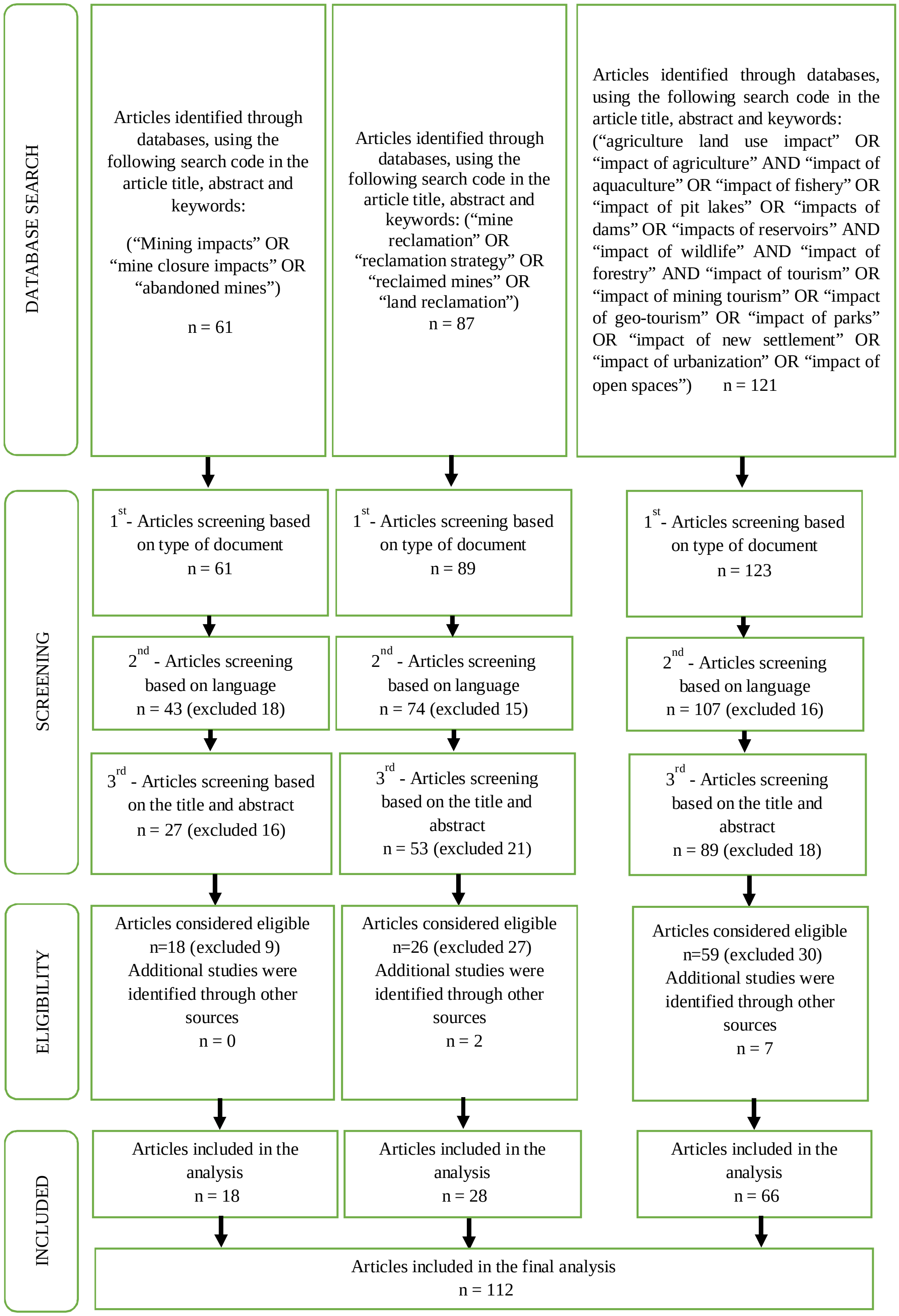
4. Mining in general and **Reclamation in general** and **Mining and reclamation impacts individually and collectively**
n=15

DATABASE SEARCH

Articles identified through databases, using the following search code in the article title, abstract and keywords: (“Mining impacts” OR “mine closure impacts” OR “abandoned mines”)
n = 61

Articles identified through databases, using the following search code in the article title, abstract and keywords: (“mine reclamation” OR “reclamation strategy” OR “reclaimed mines” OR “land reclamation”)
n = 87

Articles identified through databases, using the following search code in the article title, abstract and keywords: (“agriculture land use impact” OR “impact of agriculture” AND “impact of aquaculture” OR “impact of fishery” OR “impact of pit lakes” OR “impacts of dams” OR “impacts of reservoirs” AND “impact of wildlife” AND “impact of forestry” AND “impact of tourism” OR “impact of mining tourism” OR “impact of geo-tourism” OR “impact of parks” OR “impact of new settlement” OR “impact of urbanization” OR “impact of open spaces”)
n = 121


DATABASE SEARCH
Articles identified through databases, using the following search code in the article title, abstract and keywords:
("Mining impacts" OR "mine closure impacts" OR "abandoned mines")
n = 61
Articles identified through databases, using the following search code in the article title, abstract and keywords: ("mine reclamation" OR "reclamation strategy" OR "reclaimed mines" OR "land reclamation")
n = 87
Articles identified through databases, using the following search code in the article title, abstract and keywords: ("agriculture land use impact" OR "impact of agriculture" AND "impact of aquaculture" OR "impact of fishery" OR "impact of pit lakes" OR "impacts of dams" OR "impacts of reservoirs" AND "impact of wildlife" AND "impact of forestry" AND "impact of tourism" OR "impact of mining tourism" OR "impact of geo-tourism" OR "impact of parks" OR "impact of new settlement" OR "impact of urbanization" OR "impact of open spaces") n = 121
SCREENING
1st - Articles screening based on type of document n = 61
1st - Articles screening based on type of document n = 89
1st - Articles screening based on type of document n = 123
2nd - Articles screening based on language n = 43 (excluded 18)
2nd - Articles screening based on language n = 74 (excluded 15)
2nd - Articles screening based on language n = 107 (excluded 16)
3rd - Articles screening based on the title and abstract n = 27 (excluded 16)
3rd - Articles screening based on the title and abstract n = 53 (excluded 21)
3rd - Articles screening based on the title and abstract n = 89 (excluded 18)
ELIGIBILITY
Articles considered eligible n=18 (excluded 9) Additional studies were identified through other sources n = 0
Articles considered eligible n=26 (excluded 27) Additional studies were identified through other sources n = 2
Articles considered eligible n=59 (excluded 30) Additional studies were identified through other sources n = 7
INCLUDED
Articles included in the analysis n = 18
Articles included in the analysis n = 28
Articles included in the analysis n = 66
Articles included in the final analysis n = 112

یک رویکرد جامع مرور ادبیات برای ارزیابی تأثیر احتمالی استراتژی‌های پس از بازسازی به‌کار رفته در معادن متروکه

دباسمیتا باسو* و اسمریتی میشرا

گروه معماری و برنامه ریزی، موسسه فناوری بیرلا، مسرا، رانچی جارکند، هند

ارسال 2023/04/27، پذیرش 2023/06/01

* نویسنده مسئول مکاتبات: debasmitabasu.123@gmail.com

چکیده:

اگرچه مشکلات بسته شدن معدن در گذشته مورد تحقیق قرار گرفته است، تحقیقات اندکی به اثرات بسته شدن معدن متروکه پس از بازسازیء اختصاص داده شده است. اگرچه بازسازی یک تکنیک شناسایی قدیمی بوده است، ادراک ذی‌نفعان نقش مهمی در تعریف روش اجرا داشته است. بنابراین، این مطالعه در نظر دارد روش‌های اجرایی مختلف را از طریق ارزیابی ادبیات دقیق 112 نشریه شناسایی شده از منابع مختلف شناسایی کند. عوارض نظری و عملی در زمینه اثرات زیست محیطی، اجتماعی- فرهنگی و اقتصادی بسته شدن معدن شناسایی شده است. این مطالعه نشان داد که بیشترین استراتژی بازسازیی اجرا شده، تکنیک‌های بازسازیی فشرده و غیر فشرده تفریحی/مبتنی بر گردشگری است. بنابراین این مطالعه راه را برای ادغام یک استراتژی بین رشته‌ای از طریق همکاری بین سهامداران مختلف و زمینه‌های تحقیقاتی برای دوام طولانی مدت بازسازی سایت معدن هموار می‌کند.

کلمات کلیدی: معادن متروکه، اثرات اقتصادی، اثرات زیست محیطی، راهبردهای احیا، اثرات اجتماعی-فرهنگی.