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MINING TOURISM POTENTIAL ASSESSMENT OF RANIGANJ COALFIELD, INDIA

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ABSTRACT

This study focuses on the potential of mining tourism in the oldest coalfield of India. To conduct the research, five mines from Raniganj coalfield have been selected based on their comparatively high degree of preservation, good connectivity, and quality to show the interconnectedness of mining tourism with other forms of tourism such as geotourism and heritage tourism. The tourism attractions for each mining site are classified following Jolliffe and Conlin (2011), whereas, the assessment criteria are prepared after Kubalíková (2017). The guidelines of the Ministry of Tourism of India are followed for tourism circuit demarcation. The outcome highlights that although risk factors cannot be neglected in some cases, each site represents diverse mining tourism attractions along with having good connectivity and accessibility. However, the result shows only around 50% feasibility for mining tourism, mainly because of the non-availability of proper tourism infrastructure. Road network analysis is done and two possible tourism routes are suggested. This study raises basic and initial issues indicating the mining tourism potential of Raniganj coalfield. Initiatives by the stakeholders in terms of an awareness campaign and generation of basic tourism facilities are necessary which may lead to the successful development of mining tourism in these sites in the future.

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INTRODUCTION

Mining tourism is special interest tourism that includes exploration of the mining landscape, interpretation of mining technology, preservation of mining heritage; and also provides education and amusement to mining tourists. This kind of tourism is gaining popularity all over the world especially in the developed countries (Różycki & Dryglas, 2017). Mining is

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one of the essential activities for the economic development of a country. To conduct this activity a huge amount of land to be engaged, which would possibly have no use after mines are exhausted. Therefore, it is necessary to think of (re)using the mining land for other purposes too, and mining-based tourism turns out to be useful in this regard. The development of mining tourism has many benefits, which includes— a) expansion of tourism in regions where it was absent previously, b) additional opportunities for economic activities and employment through tourism, c) opportunity for tourists to visit unexplored places, and d) awareness, protection, and preservation of mining heritage (Edwards & Coit, 1996).

Review of Literature

The concept of mining tourism developed during the 1990s as a result of growing concern within academics about the management of huge unproductive land that occurred during mineral extraction. Mines, on one hand, have been seen as geoheritage and a part of the human-made or secondary geo(logical)diversity hence it is considered as an element of geotourism (Sadry, 2009; Kubalíková et al., 2016; Hose, 2017). On the other hand, it is perceived as a cultural heritage that conveys the development of industrial societies and technological excellence of the human race (Edwards & Coit, 1996; Conlin & Jolliffe, 2011a). Interestingly, the development of the concepts of geotourism and industrial heritage tourism is somehow associated with the idea of using mining sites for tourism purposes. Thomas A. Hose, a geologist from the University of Bristol, is credited for defining the concept of geotourism for the first time in 1995, who later wrote that one of the key factors behind this concept was "the increasing losses of mines and quarries (due) to unsympathetic after-uses and reclamation programmes" (Hose et al., 2011, p. 339; Hose, 2012, p.7). Likewise, in 1996, Edwards and Coit, geographers from the University of Wales, brought into discussion the potential of mines and quarries as industrial heritage and how society could be benefitted from this. Both the publications of Hose (1995) and Edwards and Coit (1996) addressed the situation in the United Kingdom (UK). In the UK, the place where industrialisation began, the amount of unproductive land due to mining was in a surge, it made scholars from different academic backgrounds think for alternative use of the mining landscape. Presently, mining tourism is a topic of academic discussion both from geotourism perspective (Nita & Myga-Piątek, 2014; Beranová et al., 2017; Hose, 2017; Kubalíková, 2017; Baczyńska et al., 2018; Goki et al., 2018; Mero et al., 2018; Sikora & Daron, 2019) and industrial heritage perspective (Cole, 2004; Ballesteros &

Ramírez, 2007; Vargas-Sánchez et al., 2009; Conesa, 2010; Conlin & Jolliffe, 2011a; Marot & Harfst, 2012; Różycki & Dryglas, 2017; Jelen, 2018). These publications deal with different approaches and methodologies to interpret mining tourism, and highlight myriad examples and case studies across the world.

However, Rybár and Štrba (2016) argue that there are significant differences between geotourism, industrial tourism, and mining tourism, therefore, mining tourism should be considered as "an individual form of tourism which, in many cases, is related to geotourism and industrial tourism but is on the same level as geotourism and industrial tourism" (Rybár & Štrba, 2016, p. 5). They defined mining tourism a form of tourism which encourage both general and specialist public to visit in-situ mines, mining museums, culturo-historical monuments, miners' community to experience the ambiance and also gather insight (Rybár & Štrba, 2016; Rybár & Hronček, 2017).

Yet the conversion of post-mining landscape to tourism attraction is not an easy task and poses many challenges for stakeholders, tourism managers, and local people (Mendes, 2013). First of all, the concept of mining heritage differs, in many ways, from the standard idea of beauty (Edward & Coit, 1996; Mendes, 2013; Jelen, 2018). It is often perceived as ugly, dusty, and unattractive compared to other tourist destinations (Conlin & Jolliffe, 2011b). Moreover, mines are high-risk zones that many people do not consider worth visiting due to safety concerns. Sometimes increase in demand for the material mined in the mining site may make it potential for further production of material discarding its touristic value (Ateş, 2016). All these difficulties must be overcome before mining tourism could start. However, despite the difficulties, there are many mining tourism sites that experience a significant number of footfalls annually. For instance, Big Pit National Coal Museum, a UNESCO certified heritage site in UK, where around 150 thousand people visited the museum in 2019 alone.[2] At present over 20 mining sites from across the world is included in the UNESCO's world heritage site list and many of them are being used for tourism purpose.[3]

Mining Tourism: Indian Scenario

In India, tourism is an important source of national revenue generation, in 2018 travel and tourism sector alone contributed 9.2% of the country's GDP

[2] https://museum.wales/visitor_figures/

[3] https://whc.unesco.org/en/list/

making it the 8th largest travel and tourism economy in the world (World Travel and Tourism Council, 2019). In this country, a well-structured tourism industry exists emphasising the natural, cultural, religious, and architectural attractions of the country (Ministry of Tourism, Government of India, 2019). The idea of geotourism in India has developed lately based on geographical heritages belonging from different environments like the Himalayan region, the desert in the west, the coastal region, and peninsular India (Singh & Anand, 2013). Over 30 sites from all over the country are given the status of National Geological Monuments by the Geological Survey of India (GSI) for preservation, maintenance, and promotion of tourism (www.gsi.gov.in). Indian National Trust for Art and Cultural Heritage (INTACH) (2016) a United Nation recognised non-governmental organisation, has contributed more by giving detailed accounts of geosites recognised by GSI. Mining tourism, on the other hand, came into practice only recently when in 2016 Saoner and Gondegaon mines near Nagpur, in the state of Maharastra have been opened for tourists as a joint project of Maharastra Tourism Development Corporation and Western Coalfields Limited (Goradia, 2016) and welcomed over 145 thousand of visitors by 2018 (Singh & Mishra, 2018). At present more than fifteen coal mines across the country are being used as eco-parks and mining museums by undertaking sustainable mining closure practices and a few more will be added to the list by 2021-2022.[4] It shows that all the efforts have been made towards developing eco-mining-tourism in coal mines.[5] But there are many other sectors of tourism that may explore the scope of mining tourism in a more meaningful way as highlighted in Różycki and Dryglas (2017).

Aims and Objectives

This paper is dedicated to exploring the possibilities of mining tourism in India in association with other forms of tourism like heritage tourism, geotourism, dark tourism, etc. because India is a highly populated country with a high population density and unemployment rate. The development of mining tourism will possibly generate new employment opportunities and help in better land management by reusing mining land for tourism purposes. To conduct a preliminary research, this examination is started with a smaller area of study. Five mining sites of Raniganj Coalfield, the oldest coalfield of India, have been selected namely, Chinakuri Pits, Narankuri mines remnant, Mahabir Colliery, Sonepur-Bazari Open Cast Project (OCP), and Khottadihi OCP (see, Figure 2). These mines are located

[4] www.coal.nic.in

[5] www.coal.nic.in; www.bcclweb.in and www.wclnucleus.wordpress.com

close to each other and well-connected through roadways with major towns and cities of Raniganj coalfield. The objectives of the study are to integrate mining tourism with other forms of tourism such as adventure tourism, heritage tourism, dark tourism, geotourism, and movie-induced tourism; and to assess the tourism potentiality of the selected mining sites through criteria of the degree of preservation, connectivity, accessibility, safety, tourist infrastructure, availability of tour guide, and requirement of permission to visit the mines. In addition, this study aims to find the scope of circuit tourism involving these mining sites through road network analysis.

SELECTION OF MINING SITES

This study could be divided into three major sections; the selection of the mines; assessment of the mines, and demarcation of the tourism circuit. The mines are selected based on good connectivity and the ability of the sites to attract visitors. The connectivity is measured through the distance of the sites from the major highways, railway stations, and airports; and attractiveness is measured by the higher degree of preservation of the sites and how these sites are capable to interrelate other niche tourisms with mining tourism. Gürer et al. (2019) have proposed a compound geotourism concept, where geotourism is combined with mining tourism. They associate coal mine tourism with other elements of geotourism such as geoparks, neotectonic structures, water springs, etc. for the overall development of geotourism (Gürer et al., 2019). This research expands the idea, keeping mining tourism as the central focus, and examines the feasibility of other niche tourism such as adventure tourism, heritage tourism, dark tourism, geotourism, and movie-induced tourism in Raniganj coalfield. Table 1 briefly defines each of these types of tourism and explains how the sample mining sites from Raniganj coalfield connect them with mining tourism.

These mines are assumed to be capable of mining tourism with a particular set of tourism attractions and are considered potential mining tourism sites on an ad hoc basis. Most of the sites are virgins from the touristic viewpoint because they are not officially developed for tourism purposes. Yet, unorganised and random visits by students of different disciplines such as geology, mining engineering take place occasionally for educational or research purposes. However, academic discussions regarding the potential of these mines as a tourism site have already started and the outcomes are reflected in the preliminary works such as Singh and

Ghosh (2019, 2021). This research furthers the previous studies using a quantitative approach and suggesting a tourism circuit.

Table 1. *Definition of various tourism types and their association with potential mining tourism sites of Raniganj Coalfield*

Types of tourism	**Definitions**	**Examples of potential tourism sites from Raniganj coalfield**
Adventure tourism	Adventure tourism provides the adventurous experience by mimicking the real situation without risk and hardship associated with that particular situation (Fletcher, 2010, p. 16). It generally involves specialised equipment and guided activity (Buckley, 2006).	Chinakuri pit is the deepest coal mine in India (Singh & Ghosh, 2019) which is 613 meters deep and at present operating but not producing (information collected during a field visit January 2021). This mine can be used for adventure tourism where people will go and enjoy several guided activities underground.
Heritage tourism	History is the main theme of heritage tourism (Edward & Coit, 1996). It provides authentic experience and narratives about the past in the present (DeLyser, 1999).	Narankuri is one of the oldest places where coal mining in India was initiated (CMPDIL, 1984). And still, now there are several remnants of old mines and buildings are present here, part of which is already recognised as the heritage of the state by the West Bengal Heritage Commission in 2018.[6]
Dark tourism	Dark tourism is special interest tourism that uses the places of accident, death, and suffering as tourist destinations (Stone, 2006). Traveling to the places associated with death, sufferings or disasters is not new and there is ample evidence of it in Stone and Sharpley (2008).	In 1989 a fatal accident occurred in Mahabir Colliery followed by an unprecedented rescue operation that catches the eyes of global media.[7] This incident makes this mine capable of dark tourism.
Geotourism	Geotourism is geology and geomorphology-based tourism (Hose, 1995). It promotes abiotic elements of nature adds touristic values to the geological and geographical resources of a place (Dowling, 2011).	Sonepur-Bazari opencast project is one of the largest opencast coal mines in India with 2404.86 Ha of area coverage (CMPDIL, 2014) and the capacity of producing up to 12 million tonnes per year (see, www.easterncoal.gov.in). It has several geological and geo-anthropogenic features which would make geotourists interested to visit the site (Singh & Ghosh, 2021). Hence, this mine can expand the area of mining tourism towards geotourism.
Movie-induced tourism	Movie-induced tourism is a type of tourism when tourists visit places or attractions that are featured in cinemas (Busby & Klug, 2001). People who watch tourists' destinations in movies are more likely to visit the places (Riley & Van Doren 1992) and there are several examples of such kinds of tourism in Rewtrakunphaiboon (2009).	Khottadihi opencast project was a normal coal mine before 2013. It became famous overnight after the shooting of the Bollywood movie *Gundey* (The Goons) (2014) took place at this site. The movie casts several nationally and internationally acclaimed actors and the incident of movie shooting at Khottadihi OCP was covered by national media such as 'The Statesman' and 'India Today' (see, Siddiqui, 2013 and Mankermi, 2013). Ever since local people started visiting this mine.

Source: *Prepared by the author with information from various sources.*

[6] www.wbhc.in

[7] www.ismenvis.nic.in

MATERIALS AND METHODOLOGY

It is a field-based study where major information regarding the mining sites is obtained from the field observation and consultation with administrative stakeholders during January 2021. No questionnaire is prepared to collect information. Photographs are taken by the author during the field survey.

After field visit and bibliographic consultation assessment of tourism potentiality is divided into two parts, i.e.,

I. Identification of tourism attractions at the site and
II. Analysis of the tourist value of the site.

For the identification of tourism attractions, the work of Jolliffe and Conlin (2011) has been followed with slight modification. Inspired by Swarbrooke's (2002) general tourist attraction categories, Jolliffe and Conlin (2011) have clubbed mining-related attractions into four categories (p. 244) such as

a. natural attractions,
b. human-made but not originally designed for visitation,
c. human-made and designed for visitation, and
d. special events.

This study almost followed the same categorisation, and identify the mining tourism attractions at the selected coal mines with the addition of activity and experience in the fourth category along with special events.

The touristic value of the site is assessed through certain criteria. The criteria selection is mainly based on Kubalíková (2017) with modifications in certain places. Kubalíková (2017) prepared a set of criteria to assess geotourism and geoeducation potential of mining landscape based on previous publications like Doktor et al. (2015) and Brilha (2016). Unlike Kubalíková (2017), the general description of the site is replaced by introducing the categorisation of Jolliffe and Conlin (2011) to identify the tourism attractions.

Kubalíková (2017) presents seventeen criteria based on five different values such as scientific value, educational value, touristic value, added value, and conservation value. This study focuses only on the tourism attractiveness and the degree of preservation of the sites, and not on the geoedutation, hence considered only the criteria under tourist value and preservation value.

To assess the touristic value, Kubalíková (2017) put four questions or criteria, such as accessibility, safety, tourist infrastructure, and viewpoints and visibility. Whereas, in the current study, three more criteria like connectivity, availability of tour guides, and procedure of obtaining a permit, are added. And Kubalíková's (2017) one criterion i.e., 'viewpoint and visibility' is removed because it does not apply to some of our case studies such as underground mines.

For assessment of conservation value, Kubalíková (2017) took two criteria, i.e., 'existing legislative protection' and 'current threats'. This work considers the later one with slight modification keeping a criterion named 'degree of preservation' while neglecting the first one because currently none of the case studies is enjoying any legislative protection.

Thus, this research has seven criteria in total to assess the tourism potentiality. Equal weightage is assigned to each criterion. The criteria are structured as questions and for each criterion 3 pre-defined answers are prepared to indicate the availability of the criteria with scores ranging from 0-1.0, where 1.0 stands for high; 0.5 stands for medium, and 0 stands for low. Hence the total score of a site would range from 0-7.0. A similar set of criteria is used in Singh and Ghosh (2021). The only differences are, in that study the 'degree of preservation' is not considered, whereas, it has a separate criterion for the 'visibility and viewpoint'. In addition, unlike the current research, no weightage is given to the assessment criteria discussed in Singh and Ghosh (2021).

For the demarcation of the mining tourism circuit, the guidelines of the Ministry of Tourism, Government of India are followed. In India, to encourage circuit tourism in 2014-15, the *Swadesh Darshan* scheme is launched for theme-based development of tourist circuits in the country.[8] Tourism circuit, as defined by the Ministry of Tourism, Government of India (2012), is a route that connects at least three tourism destinations of the same theme that are neither located in the same town or city nor far from each other, and tourists who visit one destination are encouraged to visit all of the destinations within the route. Road network analysis is done to understand the feasibility of circuit development with the help of QGis 3.10 software and open street map. Where the distance between each site and distance from the major towns and cities are examined.

[8] www.swadeshdarshan.gov.in

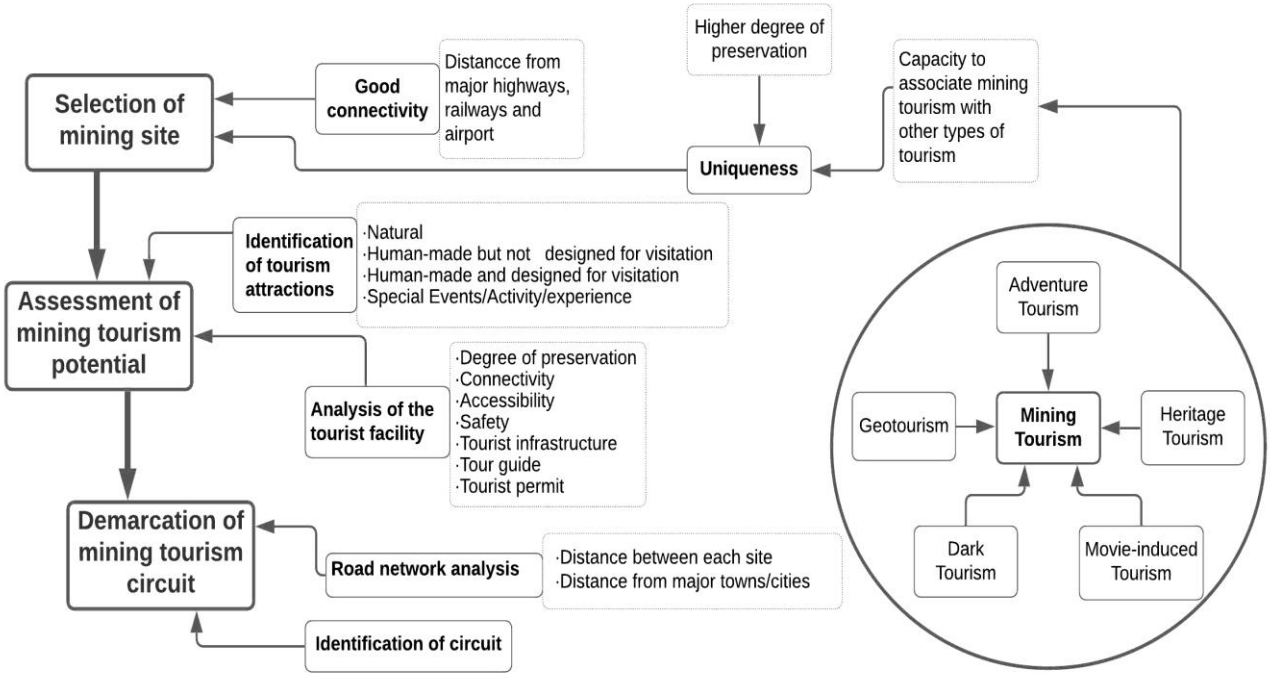

Figure 1. *Research framework*

FINDINGS

In Raniganj coalfield, commercial mining was started as early as 1774 by the Englishmen and it still is one of the important coalfields located in eastern India (CMPDIL,1984). This coalfield is spread over parts of West Bengal and Jharkhand states of India and produced over 50 million tonnes in the year 2019-20.[9] This coalfield is an extended part of the Chhota Nagpur plateau and consisted of the Gondwana rock of Raniganj measures (Murthy et al., 2010). At present, almost 100 mines are operating in this coalfield under Eastern Coalfield Limited (ECL), a subsidiary company of Coal India Limited (CIL)[10] and five out of them are chosen to examine the preparatory potential for mining tourism based on their distinct pull factors.

[9] www.easterncoal.gov.in

[10] www.easterncoal.gov.in

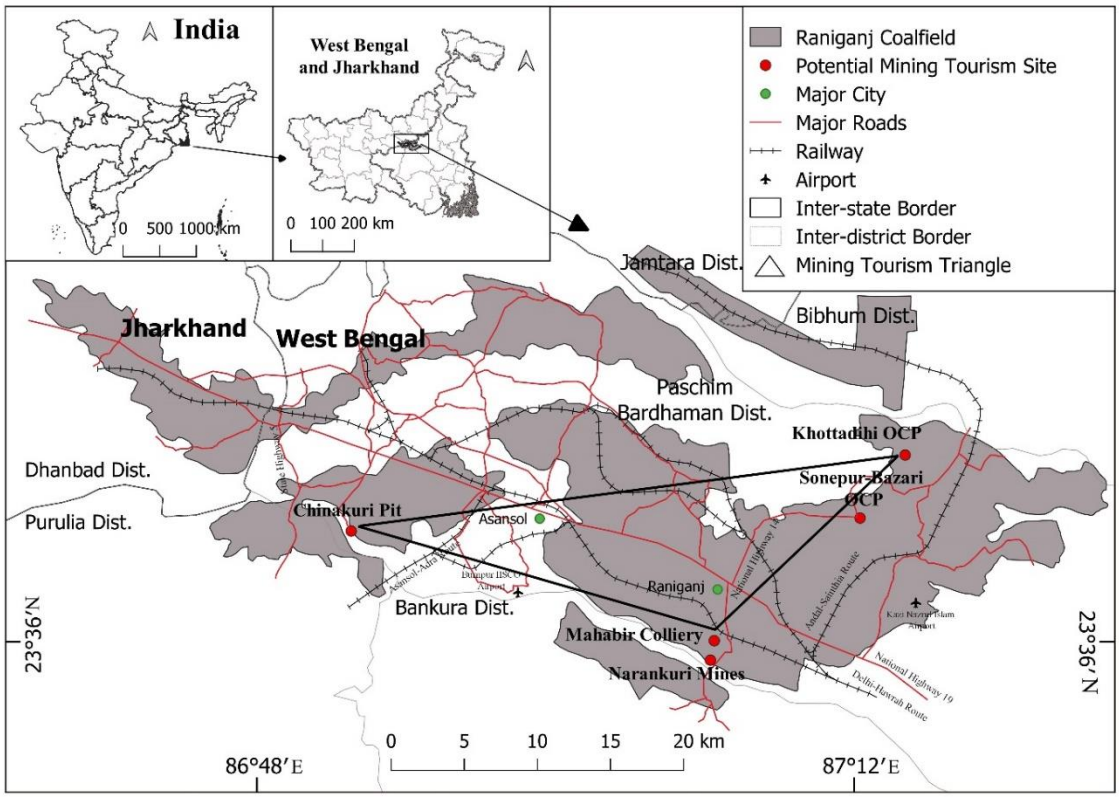

Figure 2. *Location map of the study area with potential mining tourism sites and important transport networks*

(Source: *Prepared on QGis 3.10 with the help of open street map and map provided by Central Mine Planning and Design Institute (CMPDIL), Asansol.)*

Assessment of Mining Tourism Potential of Selected Mines

Chinakuri Pit

Adventure tourism is always kept at the centre of mining tourism by the advocates who differentiate mining tourism from geotourism or industrial tourism and perceive the former as a form of adventure and cognitive tourism that is based on visitors' experiences and activities (Rybár & Štrba, 2016; Rybár & Hronček, 2017). The underground visit is a great example of adventure tourism because it provides a very different and mysterious experience than what is above-ground (Spalević & Igračev, 2011). Therefore, tourism attractions, that are found at Chinakuri pit, are capable to build insights about underground mining functionality based on experiences and activities. Activities like underground trek, vertical and horizontal movement of the visitors using the mine's transport system would be a great way to develop mining adventure tourism in this mining site. The 'well preserved' and 'well-connected' status of this mining site indicates that there is no risk of deterioration in near future, and the site is

easy to visit from local cities and towns, which may act in favour of tourism development. Whereas, the development of tourist infrastructure and assurance of visitors' safety needs to work on for the successful development of adventure-based mining tourism. However, according to the general manager Mr. B. Sarkar only 10% to 20% coal reserve is explored here, which may push decision-makers towards reopening the mine instead of exploring tourism (Ateş, 2016).

Table 2. *Tourism attractions at Chinakuri Pit*

Natural	**Human-made but not originally designed for visitation**	**Human-made and designed for visitation**	**Events/Activity/ Experience**
• Structure and inclination of coal seam underground. • Dyke intrusion within the coal seam.	• Winding machine operating since 1959. • Head tower of winding machine • A fan of 7 meters in diameter regulation underground air circulation. • Underground locomotive system • Underground points where River Damodar is flowing overhead. • Mining machinery scraps on the surface.	• No significant element is designed for visitation so far.	• Experiencing a 2-minute 11-second journey to the mine's base at 613-meter depth in an elevator with a speed of 4 meters/sec. • Experience of an underground locomotive transport system through the track. • Experience of a surface-under-surface telephonic operation.

Table 3. *Tourism facilities at Chinakuri Pit*

Criteria	**Questions**	**Status/Answer**	**Score***	**Remarks**
Degree of Preservation	What is the status of preservation?	Well-preserved	1.0	Though production is ceased in this mine the site is regularly maintained by the staff appointed there.
Connectivity	What is the status of connectivity?	Well-connected	1.0	This is located about 17 km away from Asansol city. Connected with the main city by bus service. One can easily drive to this place.
Accessibility	What is the status of accessibility?	Limited access	0.5	One needs to get permission from the General manager to get access to the mine.
Safety	Is there any safety problem?	Some specific limitations	0.5	It is an underground mine so safety measures like wearing a helmet, boots, and carrying safety lamps are mandatory.
Tourist infrastructure	What is the status of tourist facilities? (such as restroom, parking, marked trails, etc.)	No tourist infrastructure	0	This place is not designed for tourism.
Tour guide	Is there any tour guide available who can assist the visitors?	Guidance available	0.5	No professionally appointed tour guide available, but the officials or miner help visitors to explain various activities.

Permission guidelines	How tough it is to get permission to visit the site?	Permission can be granted but it is not an easy process.	0	One has to sign a bond stating that mine authority would not be responsible for any physical damage.
*1.0 stands for high; 0.5 stands for medium, and 0 stands for low.				**Total Score: 3.5**

Narankuri Mines Remnant

Mines and mining landscapes for a long time were associated with fear and darkness and neither considered heritage nor preserve-worthy (Edward & Coit, 1996; Conlin & Jolliffe, 2011b). But eventually, it became a specialised form and integrated part of industrial heritage (Cole, 2004). India holds a considerably long history of mining starting back in 1774 (CMPDIL,1984), yet mines are merely considered heritage in the country. Narankuri mines were one of the oldest coal mines in India. And the first place where a native Indian (Prince Dwarkanath Tagore) entered the mining business breaking the monopoly of the Englishmen (CMPDIL,1984). From this perspective, Narankuri mines are important assets of the mining heritage of India and already got recognition from the local authority. The potential tourism attractions at this site revolve around built heritage that needs immediate protection. An 'overburden' dumping site is established very close to the *Kuthi Bari*, garbage disposals and community toilets are built within the haulage room, which poses threats to their sustainability. It is also an indication of ignorance of the local people and mismanagement of mining heritage. However, the table 5 shows that other factors like connectivity, accessibility, safety issues are in favour of tourism. Therefore, if the right planning is done and executed properly to protect the mining history, built heritage, and infrastructure development, then mining heritage tourism is possible at Narankuri.

Table 4. *Tourism attractions at Narankuri Mine Remnant*

Natural	**Human-made but not originally designed for visitation**	**Human-made and designed for visitation**	**Events/Activity/Experience**
• Riverbank with the remnant of the old port used for coal transportation	• The remnant of *Kuthi Bari* the main office building of Prince Dwarakanath Tagore. • Old haulage room with a big banyan tree holding it. • Openings of the mine covered with bushes.	• A statue of Prince Dwarakanath Tagore with written information about the Narankuri mine.	• Experience being amidst one of the oldest coal mines in India, and the oldest coal mine owned by a native Indian person.

Table 5. *Tourism facilities at Narankuri Mine Remnant*

Criteria	Questions	Status/Answer	Score*	Remarks
Degree of Preservation	What is the status of preservation?	Moderately preserved.	0.5	This site is recently recognised as heritage by the state government, however, monuments like the *Kuthi Bari* and haulage room are deteriorating and need protection.
Connectivity	What is the status of connectivity?	Moderately connected	0.5	Only 5 km away from Raniganj town. But well-constructed roads are not present everywhere. No public transport is available.
Accessibility	What is the status of accessibility?	Accessible without any problem	1.0	This is an abandoned mine so anyone can go and visit the place.
Safety	Is there any safety problem?	No safety problem	1.0	No safety measure is required unless one tries to enter the old mining caves which are not recommended.
Tourist infrastructure	What is the status of tourist facilities? (such as restroom, parking, marked trails, etc.)	No tourist infrastructure	0	Though a statue and information board are installed but no tourist infrastructure like a proper road or a gateway is made.
Tour guide	Is there any tour guide available who can assist the visitors?	No tour guide available	0	No official tour guide is appointed, but locals are spontaneous to share their knowledge which is sometimes erroneous
Permission guidelines	How tough it is to get permission to visit the site?	No permission required	1.0	The site is poorly maintained and degrading very fast, because of open access to the site.
*1.0 stands for high; 0.5 stands for medium, and 0 stands for low.				**Total Score: 4.0**

Mahabir Colliery

The phenomenon of dark tourism, worldwide, has expanded a lot over the last century (Stone & Sharpley, 2008). In India too, there are several well-established tourist destinations such as Jaliwanwala Bagh, Punjab; Cellular Jail, Andaman, and Nicobar Islands, etc. which are characterised by death, sufferings, and accidents (Dey, 2018). Mining accidents are very common in the country, between 2015 and 2020 around 200 cases of fatal accidents are recorded by ENVIS Centre of Environmental Problems of Mining.[11] But what makes Mahabir colliery different is its outstanding rescue operation. On 13 November 1989, an accident occurred at Mahabir colliery which led to the death of six workers while another 64 workers were trapped inside and rescued after four days.[12] The rescue mission was a huge success and the rescue technique was acclaimed and used internationally afterward (Banerjee, 2010). Stone and Sharpley (2008) project dark tourism as a tool to

[11] www.ismenvi.nic.in

[12] www.ismenvi.nic.in

reduce and normalise the dread and grief of death, it reminds the visitors that they are the fortunate ones (Korstanje, 2015). The unprecedented success of Mahabir colliery's rescue mission would give people hope and establish faith in humankind. It would share positivity through its dark history. Although, for proper use of the site for tourism, generation of basic infrastructure and cleanliness is required.

Table 6. *Tourism attractions at Mahabir Colliery*

Natural	**Human-made but not originally designed for visitation**	**Human-made and designed for visitation**	**Event/ Activity/Experience**
• No such natural attraction is present.	• The rescue holes. • The mouth of the underground mine. • The headgear of the mine. • The boiler, which was used to produce electricity for the haulage machine.	• The capsule, which was used to rescue the miners*. • Martyr memoir*. • *(Both are kept in Kunstoria area office)	• Experiencing the place where a horrifying mining accident was held, but human willpower and courage had successfully overcome that.

Source: Prepared by Author

Table 7. *Tourism facilities at Mahabir Colliery*

Criteria	**Questions**	**Status/Answer**	**Score***	**Remarks**
Degree of Preservation	What is the status of preservation?	Moderately preserved	0.5	The rescue capsule is well-preserved ex-situ, but the rescue hole is fully covered under thick bushes and almost impossible to identify.
Connectivity	What is the status of connectivity?	Moderately connected	0.5	This site is very near to the Raniganj town, so one can easily visit the place. Though the location of the rescue hole is covered by jungle so it is not easy to notice.
Accessibility	What is the status of accessibility?	Moderately accessible.	0.5	Some elements of this site can be accessed easily like the display of the capsule. But the rescue holes are fully covered by jungle and very difficult to visit.
Safety	Is there any safety problem?	Some safety issues present	0.5	The rescue holes are covered with thick bushes and not covered properly so one has to be very careful while exploring the place.
Tourist infrastructure	What is the status of tourist facilities? (such as restroom, parking, marked trails, etc.)	No tourist infrastructure	0	Not designed for tourism.
Tour guide	Is there any tour guide available who can assist the visitors?	No tour guide available	0	No official tour guide is available but local people help to reach the site.
Permission guidelines	How tough it is to get permission to visit the site?	No permission required	1.0	This is a closed mine so no permission is needed.
*1.0 stands for high; 0.5 stands for medium, and 0 stands for low.				**Total Score: 3.0**

Sonepur-Bazari OCP

Table 8. *Tourism attractions at Sonepur-Bazari OCP*

Natural	**Human-made but not originally designed for visitation**	**Human-made and designed for visitation**	**Event/Activity/ Experience**
• Mining landscape with undulation giving the impression of hills and valleys. • A geological formation like Raniganj stratigraphic formation, Gondwana sediment, different types of rock structures. • Overburden dumping heaps depicting different stages of the succession of different plant species. • Artificial water bodies at the bottom of the mine. • Fossils of Glossopteris. • The occasional sight of wild lives like python, fox, wild boar, and porcupine.	• Huge pieces of machinery like hydraulic shovels, dragline, dumper, loaders. • Mining excavation. • Walking trails to reach different horizons of the mine.	• No significant element is present. Earlier there were three viewpoints, that are now abolished due to the extension of mine.	• Walking through the mine trail and exploring the mining landscape. • Watching the functionality of different types of machinery. • Acquiring knowledge of geology and mining processes and technology.

In academic writings, mining tourism is commonly dealt in association with geotourism probably because, mining landforms are the most attractive landforms from the viewpoint of geotourists (Kubalíková et al., 2016). It also fits well with other types of geotourism (Gürer et al., 2019), while projecting mechanically exposed geological structures, fossils, excavation, and dumping sites as geo-attractions (Singh & Ghosh, 2021). Therefore, Kubalíková et al. (2016) considered mines and quarries as anthropological landforms which poses the geological diversity calling them secondary geodiversity (p. 226). In Sonepur-Bazari OCP diverse range of natural, human-made, and experience-based geo-attractions are available which are in good condition and have no serious threat of deterioration. It has excellent connectivity and a good location for tourism development. This site is also popular among nature and geoscientists and mentioned in numerous local to global level publications (Biswas et al., 2013; Kumar et al., 2015; Gautam et al., 2016; Majumder & Palit, 2017; Mondal & Mistri, 2021) which rise its scientific value as a tourist destination. On the other hand, frequent visits of the academician for research purposes to Sonepur-Bazari OCP somehow make the workers prepared for handling tourists in the future.

Table 9. *Tourism facilities at Sonepur-Bazari OCP*

Criteria	Questions	Status/Answer	Score*	Remarks
Degree of Preservation	What is the status of preservation?	Well preserved	1.0	This is an active mine so there is no sign of deterioration but sometimes fossils get damaged from mining activity.
Connectivity	What is the status of connectivity?	Well-connected	1.0	This mine lies beside National Highway 14. Located around 15 km away from Raniganj town.
Accessibility	What is the status of accessibility?	Limited access	0.5	This is a working mine hence accessibility is restricted so that the safety of the visitors and production of coal does not get affected.
Safety	Is there any safety problem?	Some specific limitation	0.5	Visitors should be kept at a safe distance from working machinery.
Tourist infrastructure	What is the status of tourist facilities? (such as restroom, parking, marked trails, etc.)	No tourist infrastructure	0	Being an active mine no tourist infrastructure is developed however, a visit to the mine for education and research purposes is entertained.
Tour guide	Is there any tour guide available who can assist the visitors?	Guidance available	0.5	No professionally appointed tour guide is available, though the officials or miner could be given the charge to explain various activities temporarily.
Permission guidelines	How tough it is to get permission to visit the site?	Permission can be easily granted	0.5	A written permit is required from the higher authority.
*1.0 stands for high; 0.5 stands for medium, and 0 stands for low.				**Total Score: 4.0**

Khottadihi OCP

Movie and tourism are both well-established industries that sell pleasure and help their clients to cope with everyday monotony (Gjorgievski & Melles Trpkova, 2012). The best campaign for a tourist destination is through the film shot at that location (Riley & Doren, 1992). It does not only help in cutting the cost of advertisement and increasing the number of visitors, but it may also act as a tourist pull factor in the places which are otherwise considered ill-favoured for tourism (Busby & Klug, 2001). An example of this kind of incident is observed at Khottadihi OCP. This mine probably, never considered as a place visit-worthy unless a Hindi movie shooting took place here. Many people gathered to witness the shooting while many showed up to visit the mine after watching it on the silver screen (Mankermi, 2013). Though the main allure for the visit is movie-induced but being an active mine, it also offers an overview of how mines function. From this point of view, the site shows sufficient potential for tourism development. Yet, it is unfortunate that little attention has been paid to the development of tourism. Moreover, the ongoing excavation

process threatens the places where the movie was shot, and if not protected these locations may be excavated soon leaving no trace or resemblance of the shooting spots. Which may lead to tourist dissatisfaction and a gradual decrease in tourist inflow.

Table 10. *Tourism attractions at Khottadihi OCP*

Natural	**Human-made but not originally designed for visitation**	**Human-made and designed for visitation**	**Event/Activity/ Experience**
• Excavated area and artificial hillocks. • Exposed rock structures.	• Spots where the shooting of the movie took place. • General mining activities. • Different machinery such as drill machine, dragline, dumper, loader, etc. • Railway track carrying coal-loaded wagons.	• There is no significant attraction available which is made for visitors.	• Experiencing the places in real life which are seen on screen.

Table 11. *Tourism facility at Khottadihi OCP*

Criteria	**Questions**	**Status/Answer**	**Score***	**Remarks**
Degree of Preservation	What is the status of preservation?	Well-preserved	1.0	Being an active mine, this site is well preserved.
Connectivity	What is the status of connectivity?	Well-connected	1.0	This site is also located very close to national highway 14. Specific spots are also easily noticeable or else workers could show the visitors.
Accessibility	What is the status of accessibility?	Limited access	0.5	Work is still in progress so not fully accessible due to safety issues.
Safety	Is there any safety problem?	Some specific limitations	0.5	Mining activities can be observed from a safe distance.
Tourist infrastructure	What is the status of tourist facilities? (such as restroom, parking, marked trails, etc.)	No tourist infrastructure	0	Though local people sometimes visit this mine yet no tourism infrastructure is developed.
Tour guide	Is there any tour guide available who can assist the visitors?	Guidance is available.	0.5	Officially recruited guidance is absent but staff at the mine would help.
Permission guidelines	How tough it is to get permission to visit the site?	Permission can be easily granted	0.5	No permission is required to visit this mine beforehand. Yet permission may be required or even declined at some specific spots.
*1.0 stands for high; 0.5 stands for medium, and 0 stands for low.				**Total Score: 4.0**

Figure 3: *Photographs of the potential mining tourism sites, Raniganj Coalfield*. (a) Mine cage and the signboard at Chinakuri pit. b) Old haulage room at Narankuri. c) Rescue capsule used in 1989 at Mahabir colliery. d) Excavated coal seam at Sonepur-Bazari OCP. e) Dragline-dumper combined operation at Khottadihi OCP.)
Source: Photographed by the author.

Results and Evaluation

Tourism attractions are fundamental for tourism development and consist of all those elements of a place that motivate people for visitation (Lew, 1987). Therefore, an examination of the tourism attractions available at the mining sites is useful to fathom the potential of tourism. From tables 2, 4, 6, 8, and 10, it appears that each mining sites are distinct and their potential tourist pull factors are diverse ranging from hardcore human-made monuments and machinery to unique geo-structures. Very little to no modification is made to the attractions for tourism development, hence, left original. The authenticity and diversity of the sites may encourage visitors of different tastes to visit all the sites to get a holistic insight into the mining landscape.

Considering the total scores for each mine on a 0-7 scale, it is found the highest score (4.0) is obtained by the abandoned mine (Narankuri) and running open cast mines (Sonepur-Bazar and Khottadihi), followed by

underground mines i.e., Chinakuri (3.5) and Mahabir (3.0). The mean of the total scores of the select mining sites is 3.7 which is 52.85% of the full score (7.0). The result concludes that Raniganj coalfield has a 52.85% potential for mining tourism development (based on the five particular sample mines on).

Table 12. *Assessment scores of the mining sites*

Criteria	**Score**				
	Chinakuri pit	**Narankuri mine remnant**	**Mahabir colliery**	**Sonepur-Bazari OCP**	**Khottadihi OCP**
Degree of Preservation	1.0	0.5	0.5	1.0	1.0
Connectivity	1.0	0.5	0.5	1.0	1.0
Accessibility	0.5	1.0	0.5	0.5	0.5
Safety	0.5	1.0	0.5	0.5	0.5
Tourist infrastructure	0	0	0	0	0
Tour guide	0.5	0	0	0.5	0.5
Permission guidelines	0	1.0	1.0	0.5	0.5
Total Score	**3.5** (50%)	**4.0** (57.14%)	**3.0** (42.85%)	**4.0** (57.14%)	**4.0** (57.14%)

Score: 1.0 stands for highly favourable; 0.5 stands for moderately favourable, and 0 stands for least favourable.

Source: Prepared by Author

The degree of preservation and maintenance is comparatively high at the working mines, whereas, abandoned mining sites pose lesser risk. All the mining sites consist of authentic tourist attractions, good connectivity, and accessibility, but tourism infrastructure is merely developed. Not a single mine has essential services like toilet facilities, cafeteria, restroom, or separate parking. Neither a professional tour guide is available. To increase the attractiveness of the sites as tour destinations, proper tourism infrastructure and reduction of potential risks is necessary. The establishment of a mining museum probably increases its tourism value among the visitors. The awareness and willingness of policy makers, tourists, and local stakeholders will play a vital role in the successful development of mining tourism at Raniganj coalfield (Singh & Ghosh, 2021) especially in the form of tourism circuit.

Mining Tourism Circuit

In India, the '*Swadesh Darshan'* scheme has been launched under the 'Product Infrastructure Development for Destinations and Circuits' (PIDDC) programme to encourage theme-based tourism and fifteen themes

for development tourism circuit have been identified so far.[13] And there is a possibility of incorporation of many more theme-based tourism circuits. Mining tourism could be certainly one of the themes. This study tries to demarcate a local tourism circuit by incorporating the potential mining tourism sites discussed above through road network analysis.

Table 13. *Distance of the sites from each other and distance of the sites from main urban centres*

Distance (Km)	**CKP**	**NKMR**	**MHC**	**SBOCP**	**KHOCP**
CKP	**0**	38	34	48	54
NKMR	38	**0**	04	20	26
MHC	34	04	**0**	18	24
SBOCP	48	20	18	**0**	06
KHOCP	54	26	24	06	**0**

Distance (Km)	**CKP**	**NKMR**	**MHC**	**SBOCP**	**KHOCP**
ASN	14	24	20	31	37
RNG	32	6	2	16	22

CKP- Chinakuri pit; **NKMR-** Narankuri mines remnant **MHC-** Mahabir Colliery **SBOCP-** Sonepur-Bazari opencast project **KHOCP-** Khottadihi opencast project **ASN-** Asansol city **RNG-** Raniganj town

Source: Prepared by Author

The road network analysis shows that the distance between two respective tourism sites as well as the distance from the nearest town or city ranges from 4km to 54km and 2km to 37km, respectively. These locations can be travelled easily. Moreover, most of the sites are located very near to the important highways (see figure 2) and well connected to the nearby urban centres by bus services. The tourism attractions in these mining sites are discretely located and visitors do not need to spend a lot of time in one location, instead, they could visit all the sites during one tour. The location of the potential mining tourism sites forms a perfect mining tourism triangle (see figure 2). Considering the distance and connectivity within the mining sites, this study suggests two possible mining tourism circuits, i.e.,

a) Chinakuri---Mahabir---Narankuri---Sonepur-Bazari---Khottadihi; this route would be appropriate for the visitors travelling through railways and roadways. The Delhi-Hawrah Rail route and National Highway 19 pass through Asansol City, which is only 14 km from the first destination of the circuit. A visitor can stop at Asansol to visit the first destination (14 km); come back to the city (14 km); reach Raniganj by road (18 km); visit the next two destinations which are close to the town (6 km); take the

[13] www.swadeshdarshan.gov.in

National Highway 60 and visit the last two destinations (26 km). The visitors have to travel 78 km to visit all the destinations via this circuit.

b) Khottadihi---Sonepur-Bazari---Mahabir---Narankuri---Chinakuri; this circuit would be a better option for the tourists reaching the locality by air. Kazi Nazrul Islam International Airport is 24 km away from Khottadihi. A visitor can start from this point then visit Sonepur-Bazari OCP (6 km); then through National Highway 60 reach Raniganj (16 km) visit the next two destinations Mahabir (2 km) and Narankuri (4 km); come back to Raniganj (6 km); reach Asansol via railway or roadway (18 km); end the tour at Chinakuri (14 km). A total distance of 90 km needs to be travelled by the visitors when taking this circuit.

CONCLUDING REMARKS

The tourism circuits in India under the *Swadesh Darhsan* schemes primarily follow the trend of popular tourism and mostly based on religio-spiritual (Buddhist circuit, Krishna circuit, Sufi circuit, etc.) and natural (Himalaya circuit, Coastal circuit, Desert circuit, etc.) themes[14] and little attention is paid to enhance special interest tourism. The concept of mining tourism, however, is a recent addition to the Indian tourism sector, where policies are made to repurpose mining sites as eco-parks following the ecotourism line[15] which, as this paper claims, is not enough to explore the true touristic value of the mining sites.

That is why in this study, the compound and more inclusive relation of mining tourism with other types of niche tourism types such as adventure tourism, heritage tourism, dark tourism, geotourism, and movie-induced tourism is examined. For this purpose, five mining sites from Raniganj coalfield, India are assessed where each mine represents one form of the tourism mentioned above. These mines are also selected based on their comparatively higher degree of preservation and good connectivity.

During the bibliographic consultation for this research, it is found that the association of geotourism and mining tourism is the most common association made in academic literature followed by the association between 'mining tourism and heritage tourism' and 'mining tourism and adventure tourism'. Beside these associations, this study brings forth and highlights the interconnectedness of mining tourism with dark tourism and

[14] www.swadeshdarshan.gov.in

[15] www.coal.nic.in; www.bcclweb.in and www.wclnucleus.wordpress.com

movie-induced tourism. In other words, present study tries to establish a rational and systematic connection of mining tourism with some other forms of tourism and justifies the connections with examples. Following the line of Gürer et al. (2019), this type of association can be called 'compound mining tourism'.

The tourism potentiality assessment results show that the sites are capable of offering various types of mining-related insights and experiences to visitors. Which in turn would make use of otherwise unproductive land and equipment. Moreover, the initiation of tourism would help in the preservation of mining heritage and employment generation for the locals. The mean of the total scores of the mining sites reflects that Raniganj coalfield presently is slightly over 50% potential for mining tourism development thanks to the diversity of tourism attractions, higher degree of preservation, good connectivity, and accessibility. However, its susceptibility to have lower score is because of certain risk factors and poorly constructed tourism infrastructure, which make these sites less attractive as tourism destinations (Swarbrooke, 2002). For a better result, systematic tourism planning and development of particular theme-based tourism circuit might be helpful. For example, when visitors reach to one site, they would be encouraged to visit other sites, too. Thus visitors could get a holistic insight into mining heritage, mining technology, mining community, and mining landscape. Moreover, in this way, the development of one site would positively influence the development of other sites (Ministry of Tourism, India, 2012). Yet, for successful mining tourism development in this region, awareness of the stakeholders and policy-makers and the willingness of visitors to visit the sites are important. Constructive awareness campaigns may help in this regard (Jaafar, 2016).

To assess the tourism potentiality of the study area, this research relied on quantitative methods aided with field observation. Three characteristics of the examined sites are taken into consideration i.e., its attractiveness or pull factors; touristic value; and the linkages with other sites and major cities and towns. However, the primary factor for tourism development is the presence of tourism attractions at the site (Lew, 1987), hence the identification of tourism attraction is the utmost important task to initiate the process of tourism development. Tourist facilities, infrastructures, and linkages can be built later on to speed up the process.

This study relies on simple fact-based criteria that indicates the physical feasibilities of tourism development and produces a comparatively generalised result. Therefore, it is best for assessment of mining tourism

potential at the initial stage or prior to tourism development. The proposed criteria give a lucid vision of what is already available and what is needed to start a tourism project. However, complex social and psychological aspects like the perception of potential tourists, stakeholders' and experts' opinions, and political connotations at the local level are not considered in the assessment, which possibly be more important determining factors for tourism development. Thus, further studies with advanced and inclusive criteria may come out with more realistic results.

The result indicates that there are possibilities for mining tourism development after examining available tourism attractions, the touristic value of the sites, and their capability to connect mining tourism with other forms of tourism. Despite the limitations, the significance of this work remains in the facts that it brings forth the approach of studying mining tourism from the perspectives of other niche tourisms; it draws attention to the aspect which has the potentiality to contribute to regional development, sustainable tourism, and mining management; and most importantly, it builds the foundation to warrant further research.

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REFERENCES

Ateş, Y. (2016). The significance of historical mining sites as cultural/heritage resources: A Case study of Zilan Historical Mining Site, Erçiş, Van, Turkey. *Journal of Underground Resources, 5*, 15-24.

Baczyńska, E., Lorenc, M.W., & Kaźmierczak, U. (2018). The landscape attractiveness of abandoned quarries. *Geoheritage, 10*, 271–285. https://doi.org/10.1007/s12371-017-0231-6

Ballesteros, E. R., & Ramírez, M. H. (2007). Identity and community—Reflections on the development of mining heritage tourism in Southern Spain. *Tourism Management*, *28*(3), 677-687.

Banerjee, A. (2010, October 19). Chile-like rescue in Bengal 21 years ago: Metal sheets beaten into a capsule to save 64 miners trapped 380ft underground for 4 days. *The Telegraph.* Retrieved August 18, 2019, from https://www.telegraphindia.com/west-

bengal/chile-like-rescue-in-bengal-21-years-ago-metal-sheets-beaten-into-a-capsule-to-save-64-miners-trapped-380ft-underground-for-4-days/cid/480370

Beranová, L., Balej, M., & Raška, P. (2017). Assessing the geotourism potential of abandoned quarries with multitemporal data. *GeoScape, 11*(2), 93–111. https://doi.org/10.1515/geosc-2017-0008

Biswas, C. K., Mishra, P., & Mukherjee, A. (2013). Floral diversity in sites deranged by opencast mining in Sonepur Bazari of Raniganj coalfield area, West Bengal. *Journal of Applied and Pure Biology*, *28*(2), 265-273.

Brilha, J. (2016). Inventory and quantitative assessment of geosites and geodiversity sites: A review. *Geoheritage, 8*(2), 119-134. doi:10.1007/s12371-014-0139-3

Buckley, R. (2006). *Adventure Tourism.* UK: Cabi.

Busby, G., & Klug, J. (2001). Movie-induced tourism: The challenge of measurement and other issues. *Journal of Vacation Marketing,7*(4), 316-332.

Central Mine Planning & Design Institute Limited (CMPDIL). (1984). *Coal mining in India*. New Delhi, India.

Central Mine Planning & Design Institute Limited CMPDIL. (2014). Form-I Application, Pre-Feasibility Report and Addendum EIA & EMP for Sonepur – Bazari (Combined) OCP for Capacity Enhancement from 8.0 MTY to 12.0 MTY. CMPDI.

Cole, D. (2004). Exploring the sustainability of mining heritage tourism. *Journal of Sustainable Tourism*, *12*(6), 480-494. Doi: 10.1080/09669580408667250

Conesa, H. M. (2010). The difficulties in the development of mining tourism projects: the case of La Unión Mining District (SE Spain). *PASOS. Revista de Turismo y Patrimonio Cultural*, *8*(4), 653-660. https://doi.org/10.25145/j.pasos.2010.08.056

Conlin, M.V., & Jolliffe, L. (2011a). *Mining heritage and tourism: A global synthesis* (1st ed.). Oxon: Routledge.

Conlin, M.V., & Jolliffe, L. (2011b). What happens when mining leaves? In M.V. Conlin, & L. Jolliffe (Eds.), *Mining heritage and tourism: A global synthesis* (1st ed., pp. 3-10). Oxon: Routledge.

DeLyser, D. (1999). Authenticity on the ground: Engaging the past in a California ghost town. *Annals of the Association of American Geographers*, *89*, 602-632

Dey, P. (2018, October 8). Dark tourism in India: Walking though the alleys of India's dark past. Retrieved May 23, 2021, from https://timesofindia.indiatimes.com/travel/destinations/dark-tourism-in-indiawalking-through-the-alleys-of-indias-dark-past/as66107504.cms

Doktor, M., Miśkiewicz, K., Welc, E. M., & Mayer, W. (2015). Criteria of geotourism valorization specified for various recipients. *Geotourism, 3-4*(42-43), 25-38. http://dx.doi.org/10.7494/geotour.2015.42-43.25

Dowling, R. K. (2011). Geotourism's global growth. *Geoheritage, 3*, 1–13. https://doi.org/10.1007/s12371-010-0024-7

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

Fletcher, R. (2010). The emperor's new adventure: Public secrecy and the paradox of adventure tourism. *Journal of Contemporary Ethnography, 39*(1), 6-33. Doi: 10.1177/0891241609342179

Gautam, S., Prasad, N., Patra, A. K., Prusty, B. K., Singh, P., Pipal, A. S., & Saini, R. (2016). Characterization of PM2. 5 generated from opencast coal mining operations: A case study of Sonepur Bazari Opencast Project of India. *Environmental Technology & Innovation*, *6*, 1-10.

Gjorgievski, M., & Melles Trpkova, S. (2012). Movie induced tourism: A new tourism phenomenon. *UTMS Journal of Economics*, *3*(1), 97-104.

Goki, N. G., Iyakwari, S., & Umbugadi, A. (2018). Geotourism and mining heritage: A potential gold mine for central Nigeria. *Acta Geotouristica, 9*(1), 9–22. https://doi.org/10.1515/agta-2018-0002

Goradia, A. (2016, December 20). First time in India, coal mine opens for visitors. *The Times of India.* Retrieved September 23, 2019, from https://timesofindia.indiatimes.com/city/nagpur/first-time-in-india-coal-mine-tourism-opens-for-visitors/articleshow/56084022.cms#:~:text=Tourists%20will%20now%20be%20allowed,1.5km%20from%20its%20entrance.

Gürer, A., Gürer, Ö. F., & Sangu, E. (2019). Compound geotourism and mine tourism potentiality of Soma region, Turkey. *Arabian Journal of Geosciences, 12*(734), 1–14. https://doi.org/10.1007/s12517-019-4927-6

Hose, T. (1995). Selling the story of Britain's stone. *Environmental Interpretation, 10*(2), 16-17.

Hose, T. A. (2012). 3G's for modern geotourism. *Geoheritage, 4*, 7-24. doi:10.1007/s12371-011-0052-y

Hose, T. A. (2017). The English Peak District (as a potential geopark): Mining geoheritage and historical geotourism. *Acta Geotouristica, 8*(2), 32-49. doi:10.1515/agta-2017-0004

Hose, T. A., Markovic, S., Komac, B., & Zorn, M. (2011). Geotourism: A short introduction. *Acta Geographica Slovenica, 51*(2), 339-341. doi:10.3986/AGS51301

INTACH. (2016). *A monograph on national geoheritage monuments of India.* Delhi: INTACH.

Jaafar, M., Rasoolimanesh, S. M., & Md Noor, S. (2016). An investigation of the effects of an awareness campaign on young residents' perceptions: a case study of the Lenggong World Heritage Site. *Tourism Planning & Development*, *13*(2), 127-139.

Jelen, J. (2018). Mining heritage and mining tourism. *Czech Journal of Tourism*, *7*(1), 93-105. Doi: 10.1515/cjot-2018-0005

Jolliffe, L., & Conlin, M.V. (2011). Lessons in transforming mines into tourism attractions. In M.V. Conlin, & L. Jolliffe (Eds.), *Mining heritage and tourism: A global synthesis* (1st ed., pp. 241-247). Oxon: Routledge.

Korstanje, M. (2015). The anthropology of dark tourism, exploring the contradictions of capitalism. *Centre for Ethnicity & Racism Studies*. Retrieved June 5, 2021, from https://www.researchgate.net/publication/287968233_The_anthropology_of_dark_tourism_Exploring_the_contradictions_of_capitalism

Kubalíková, L. (2017). Mining landforms: An integrated approach for assessing the geotourism and geoeducational potential. *Czech Journal of Tourism, 6*(2), 131-154. doi:10.1515/cjot-2017-0007

Kubalíková, L., Bajer, A., & Kirchner, K. (2016). Secondary geodiversity and its potential for geoeducation and geotourism: A case study from Brno city. In J. Fialová, & D. Pernicová (Eds.), *Public recreation and landscape protection: With nature hand in hand…* (pp. 224-231). Brno: Mendel University in Brno.

Kumar, S., Maiti, S. K., & Chaudhuri, S. (2015). Soil development in 2–21 years old coalmine reclaimed spoil with trees: A case study from Sonepur-Bazari opencast project, Raniganj Coalfield, India. *Ecological engineering*, *84*, 311-324.

Lew, A. A. (1987). A framework of tourist attraction research. *Annals of Tourism Research*, *14*(4), 553-575.

Majumder, P., & Palit, D. (2017). Isolation, identification and characterization of bacteria of coal mine soil at Sonepur Bazari of Raniganj Coalfield, West Bengal. *International Journal of Applied Environmental Sciences*, *12*(6), 1131-1140.

Mankermi, S. (2013, September 25). Durgapur gathers to watch Gundey shoot. *India Today.* Retrieved June 4, 2020, from https://www.indiatoday.in/movies/bollywood/story/durgapur-gathers-to-watch-gunday-shoot-212178-2013-09-25

Marot, N., & Harfst, J. (2012). Post-mining potentials and redevelopment of former mining regions in Central Europe–Case studies from Germany and Slovenia. *Acta Geographica Slovenica*, *52*(1), 99-119. Doi: 10.3986/AGS52104

Mendes, I. (2013). *Mining Rehabilitation Planning, Mining Heritage Tourism, Benefits and Contingent Valuation* (No. wp032013). Socius, Socio-Economics Research Centre at the School of Economics and Management (ISEG) of the Technical University of Lisbon.

Mero, P. C., Franco, G. H., Briones, J., Caldevilla, P., Domínguez-Cuesta, M. J., & Berrezueta, E. (2018). Geotourismand local development based on geological and mining sites utilization, Zaruma-Portvelo, Ecuador. *Geosciences, 8*(205), 1–18. https://doi.org/10.3390/geosciences8060205

Ministry of Tourism. (2012). *Identification of Tourism Circuits across India, Interim Report, West Bengal.* India: Government of India.

Ministry of Tourism. (2019). *Annual Report: January, 2018-March 2019.* India: Government of India. Retrieved September 28, 2020, from https://tourism.gov.in/sites/default/files/2019-10/Ministry%20of%20Tourism%20Annual%20Report%20English%20for%20Web.pdf

Mondal, R., & Mistri, B. (2021). Impact of displacement on place attachment, landscape value and trust in the Sonepur–Bazari open cast coal mining area, Raniganj Coalfield, West Bengal. *GeoJournal*, 1-15.

Murthy, S., Chakraborti, B., & Roy, M. (2010). Palynodating of subsurface sediments, Raniganj coalfields, Damodar Basin, West Bengal. *Journal of Earth System Science, 119*(5), 701–710. https://doi.org/10.1007/s12040-010-0049-y

Nita, J., & Myga-Piątek, U. (2014). Geotourist potential of post-mining regions in Poland. *Bulletin of Geography-Physical Geography Series, 7*, 139–156. https://doi.org/10.2478/bgeo-2014-0007

Rewtrakunphaiboon, W. (2009). Film-induced tourism: Inventing a vacation to a location. *BU Academic Review*, *8*(1), 33-42.

Riley, R. W., & Van Doren, C. S. (1992). Movies as tourism promotion: A 'pull' factor in a 'push' location. *Tourism Management*, *13*(3), 267-274.

Różycki, P., & Dryglas, D. (2017). Mining tourism, sacral and other forms of tourism practiced in antique mines: Analysis and results. *Acta Montanistica Slovaca, 22*(1), 58-66.

Rybár, P., & Hroncek, P. (2017). Mining tourism and the search for its origins. *Geotourism, 3-4*(50-51), 1-40. DOI: 10.7494/geotour.2017.50-51.3

Rybár, P., & Štrba, L. (2016). Mining tourism and its position in relation to other forms of tourism. In F. Ugolini, V. Marchi, S. Trampetti, D. Pearlmutter, A. Raschi (Eds.), *Proceedings of the Geotour 2016* (pp.7-12). Firenze: IBIMET-CNR, Firenze.

Sadry, B. N. (2009). *Fundamentals of geotourism with a special emphasis on Iran.* Tehran: Samt Organization Publishing.

Siddiqui, K. (2013, September 11). Bollywood film to focus on coal mafia. *The Statesman.* Retrieved May 21, 2021, from https://www.thestatesman.com/bengal/bollywood-film-to-focus-on-coal-mafia-14638.html

Sikora, A., & Daron, P. (2019). Post-mining lands use for the function of geotourism and spa. *IOP conference series: Materials science and engineering, 603*(3), 032033. https://doi.org/10.1088/1757-899X/603/3/032033

Singh, G., & Mishra, T. (2018, June 12). 'Clean, green' coal mines attract lakhs of tourists in Maharastra. *The Hindu.* Retrieved May 10, 2021, from https://www.thehindubusinessline.com/news/clean-green-coal-mines-attract-lakhs-of-tourists-in-maharashtra/article24146780.ece

Singh, R. B., & Anand, S. (2013). Geodiversity, geological heritage and geoparks in India. *International Journal of Geoheritage, 1*(1), 10–26.

Singh, R.S., & 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* (1), 101-114

Singh, R.S., & 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. https://doi.org/10.1016/j.ijgeop.2021.02.007

Spalević, A., & Igračev, N. (2011). The natural-geographical basics for the development of the adventure tourism in Serbia. *Journal of the Geographical Institute" Jovan Cvijic", SASA*, *61*(3), 137-150.

Stone, P. R. (2006). A dark tourism spectrum: Towards a typology of death and macabre related tourist sites, attractions and exhibitions. *Turizam: međunarodniznanstveno-struènièasopis*, *54*(2),145- 160. doi: 338.482:130.2

Stone, P.R., & Sharpley, R. (2008). Consuming dark tourism: A thanatological perspective. *Annals of Tourism Research, 35*(2), 574-595. Doi. 10.1016/j.annals.2008.02.003

Swarbrooke, J. (2002). *The Development and Management of Visitor Attractions.* New York, USA: Routledge.

Vargas-Sánchez, A., Plaza-Mejia, M. D. L. Á., & Porras-Bueno, N. (2009). Understanding residents' attitudes toward the development of industrial tourism in a former mining community. *Journal of Travel Research*, *47*(3), 373-387. https://doi.org/10.1177/0047287508322783

World Travel and Tourism Council. (2019). *Travel and Tourism: Global Economic Impact and Trends, 2019.* Retrieved August 24, 2021, from https://ambassade-ethiopie.fr/onewebmedia/Tourism-WTTC-Global-Economic-Impact-Trends-2019.pdf

Web References

<https://museum.wales/visitor_figures/>last visited on 26-05-2021.
<https://whc.unesco.org/en/list/> last visited on 26-05-2021.
<www.bcclweb.in > last visited on 26-05-2021.
<www.coal.nic.in> last visited on 26-05-2021.
<www.easterncoal.gov.in> last visited on 26-05-2021.
<www.gsi.gov.in> last visited on 26-05-2021.
<www.ismenvis.nic.in> last visited on 26-05-2021.
<www.swadeshdarshan.gov.in> last visited on 26-05-2021.
<www.wbhc.in> last visited on 26-05-2021.
<www.wclnucleus.wordpress.com> last visited on 26-05-2021.