

**COEXISTENCE OF MINING AND CONSERVATION:  
POLICY LESSONS FROM THE ARTISANAL DIAMOND MINES AND  
ADJOINING TIGER RESERVE OF PANNA, INDIA**

by

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

- ADM – Artisanal diamond mining
- ASM – Artisanal and small-scale mining
- ASDM – Artisanal and small-scale diamond mining
- BPL – Below Poverty Line
- CISF – Central Industrial Security Force
- CSR – Corporate social responsibility
- EIA – Environmental Impact Assessment
- MoEFCC – Ministry of Environment, Forest, and Climate Change
- MPFD – Madhya Pradesh Forest Department
- MPPCB – Madhya Pradesh Pollution Control Board
- NGO – Non-governmental organization
- NMDC – National Mineral Development Corporation
- NMML – Nehru Memorial Museum and Library
- NREGA – National Rural Employment Guarantee Act
- NTFP – Non-timber forest product
- OBC – Other backward classes
- PNP – Panna National Park
- SC – Scheduled castes
- SDM – Small-scale diamond mining
- ST – Scheduled tribes
- TEK – Traditional ecological knowledge

## **ABSTRACT**

India, historically one of the world's major diamond producers, is no longer a player in the global diamond economy. Nevertheless, diamond mining still occurs in the country, primarily in the greater Panna region of the state of Madhya Pradesh. The mining region borders Panna National Park, a major tiger reserve and conservation zone. In this thesis, based on fieldwork carried out in the summer of 2019, I present a treatment of artisanal and small-scale diamond mining (ASDM) in Panna that considers its social and environmental impacts on society as derived from and perpetuated by its historical, geophysical, institutional, cultural, economic, and ecological influences. I further offer suggestions to reform ASDM in Panna in a manner that prioritizes social equality, economic stability, environmental protection, and ecological conservation while allowing for continued diamond mining.

## Chapter 1

### INTRODUCTION

#### 1.1 A Brief Overview of the History and Impacts of Mining

Human beings have been engaged in mining for over 40,000 years (Coulson 2012). The archaeological tripartite system divides the broad sweep of history into ages named for extracted resources: from the Stone Age to the Bronze and Iron Ages, humankind's progress has been measured by our escalating ability to mine, refine, and use the earth's non-renewables. Thus, "extraction of mineral resources marks temporal milestones" in the very fabric of human civilization (Clifford et al. 2018: xvii). In the millennia between the first stone quarries and the Industrial Revolution, mining was largely artisanal, small, or medium in scale, dependent on manual and animal labor (Coulson 2012). In the modern age, mining is generally understood to mean a large-scale operation that requires the acquisition of vast tracts of land and uses mechanized processes for excavation and sorting (Mishra and Mishra 2017). Nevertheless, artisanal and small-scale mining (ASM), traditional or otherwise, still takes place on six of the world's seven continents. There are at least 30 million artisanal and small-scale miners across the globe (Huggins 2016). Among other things, they extract ores (like gold, copper, and coltan), gems (like diamonds, rubies, and sapphires), and bulk material (like sandstone, limestone, and granite) (Veiga and Morais 2015).

The extraction of non-renewable resources has been linked to economic growth, prosperity, development, and expanding livelihood portfolios (Hentschel, Hruschka, and Priester 2002; Maconachie and Binns 2007). Diamond mining in

Botswana (1967-present), for example, has dramatically transformed that country's economic indicators, taking it from one of the poorest countries in Africa to one of the wealthiest (Ali 2009). ASM, especially, can provide insurance against the economic stress that attends crop failure or drought, and often serves as a form of complementary, off-season employment for farmers and peasants in the Global South (Lahiri-Dutt 2018). Neither are mining and environmental conservation necessarily at odds: Botswana has directed its diamond-sourced wealth toward preserving the Okavango delta system (Cochrane 2017).

Mining has also been linked to disputes over land, erasure of traditional identities, environmental decline, adverse health effects, conflict, civil war, neo-colonization, and bonded and child labor (Saha et al. 2011; Mishra and Mishra 2017; Huggins 2016; Cochrane 2017; Ali 2018). In particular, the environmental and social impacts of ASM include land, water, and air degradation, negative health externalities, labor exploitation, and loss of property rights (Jacka 2018; Veiga and Morais 2015; Conde and Le Billon 2017; Temper and Martinez-Alier 2013). Landscapes subject to ASM activities are often “moon-like”, marked by craters, high rates of erosion, extreme deforestation, and little-to-no environmental remediation (Jacka 2018: 66). Artisanal and small-scale miners work in these conditions for minimal pay and at great risk to their health, hazarding lung disease, nerve damage, sunstroke, and extreme exhaustion (Veiga and Morais 2015).

## **1.2 Artisanal and Small-Scale Mining in India**

More than 100 million people the world over are directly or indirectly dependent on ASM practices for their daily bread (Hirons 2011). In India, ASM is commonly understood to be an informal activity that is carried out primarily by

peasants, migrant labor, farmers, indigenous people (often referred to as scheduled tribes, designated ST), and members of scheduled castes or other backward classes (designated SC and OBC respectively) (Roy Chowdhury and Lahiri-Dutt 2018; Shah and Lerche et al. 2018; Yadav 2018). Indian artisanal and small-scale miners work, for the most part, in four sectors: metals, coal (peat/lignite/bituminous/anthracite), gemstones, and industrial/bulk/construction material (Deb, Tiwari, and Lahiri-Dutt 2008). As with their compatriots worldwide, miners in India mine either to make a living (e.g. the Khond people of the state of Odisha, as a continuation of a traditional livelihood) or to supplement their income (e.g. farmers throughout the country between harvests), but make very little money overall (Deb, Tiwari, and Lahiri-Dutt 2008; Lahiri-Dutt 2018).

Around 90% of all mines in India are artisanal or small-scale operations (Ghose 2003). Because most mining in the republic does not occur in urban centers, when miners engage in ASM, they do so at the peripheries of civilization (Lahiri-Dutt 2018). Pre-colonial divides between statist and self-governing societies were exacerbated under British rule, such that those who lived in forests and hills were written off as primitive, wild, backward, and ungovernable (Bhukya 2017; Lahiri-Dutt and Roy Chowdhury 2018). Forests, hills, and their residents, however, are not geographically located solely at the borders of independent India. Their presence throughout the subcontinent has resulted in the creation of border areas and peripheries of existence across the country (Bhukya 2017). It is in such places that most mining occurs. A long history of conflict and uneasy truce makes the governance of ASM on the 'fringes' of civilization particularly fraught (Lahiri-Dutt 2018; Deb, Tiwari, and Lahiri-Dutt 2008).

### **1.3 Diamonds and Diamond Mining**

Prior to their discovery in Brazil in the early eighteenth century, India was the world's primary source of diamonds (Ogden 2018). Radhakrishna (2007) traces knowledge of diamonds as a gem as far back as 320 BC, and posits that an early trade in Indian diamonds existed with the Romans, Phoenicians, and Egyptians. By the height of the Mughal empire in the early 1600s, diamonds meant for ornamentation were in high demand, and western European cutting and polishing techniques had made their way to India (Hofmeester 2013). Diamond deposits in the country were found across a large portion of the Deccan, including in and around Golkonda (in the modern-day state of Telangana in southeast India) and Panna (in the modern-day state of Madhya Pradesh in central India) (Roy Chowdhury and Lahiri-Dutt 2019). Jean Baptiste Tavernier's descriptions of diamond mines in southern India in the 1660s depict a thriving industry, with well over 10,000 workers at some mines (Ogden 2018).

Increased Brazilian and South African output and the identification of kimberlites as a primary source of diamonds in 1887 is commonly thought to have signaled the end of British interest in the mining of diamonds in India (Lahiri-Dutt and Roy Chowdhury 2018). In 1930, Sinor lamented the diffuse nature of diamond distribution in Panna: "though nature has bestowed on Panna State the gift of the most precious of gemstones, it has been made with rather a niggardly hand in comparison with the enormous store of diamonds occurring in South Africa" (Sinor 1930: iii). South Africa remained the world's foremost producer of rough diamonds until it was eclipsed by the combined production of Angola, the Belgian Congo, and western African countries in the 1930s; the market continued to grow with the entrance of the Soviet Union, Australia, and Canada in the 1970s, 80s, and 90s, respectively (Janse

2007). Major diamond producers at the dawn of the 21st century include Canada, the Democratic Republic of the Congo, Australia, Botswana, and Russia (Linde, Geyler, and Epstein 2018).

#### **1.4 Diamond Mining in India**

Today, India is a bit player in the global diamond-mining enterprise, but even in its heyday, only a fraction of the diamonds mined within the country left its shores in trade (Ogden 2018). Most came into the possession of kings, princely states, and various luminaries; stones larger than ten carats were appropriated by local rulers (Hofmeester 2013). In Panna, the indigenous Gonds, dependent largely on subsistence agriculture in the monsoon season and on non-timber forest products (NTFPs) for the rest of the year, mined diamonds for the Bundela kings in exchange for staple foods (Lahiri-Dutt and Roy Chowdhury 2018). Bundela kings also acted as revenue agents and mining intermediaries during colonial-era indirect rule of the Central India Agency, the province containing Panna State at the time (Franklin 1833). Under the British East India Company and the British Raj, traditional mining techniques in India were overlooked and disparaged in favor of modern methods of surveying, exploration, and excavation (Kumar 1995; Ghose 2003). Nonetheless, traditional techniques have survived to the present day: Tavernier's observations of traditional ecological knowledge (TEK) in the year 1635 continue to hold true, so that Panna's Gond miners "*still* know 'all the places where the diamonds grow' ... and dig the ground in much the same manner" (Lahiri-Dutt and Roy Chowdhury 2018: 1621, emphasis added).

Whether small-scale or artisanal, the basic technique for extracting diamonds from secondary deposits is as follows: shallow mines are excavated (by machine or by

hand) until a kimberlitic sedimentary layer is reached, at between 2 and 20 feet below the earth's surface. The unearthed diamondiferous rock (muddha) is broken into small pieces (by a stone crusher or by hand), which are then washed in a series of large earthen pits in hand-woven baskets (daliya) to get rid of sedimentary mud and dust. When the water runs clear, the pieces are rinsed a few more times in a metal sieve (channi) and spread out to dry on a flat, rectangular section of ground (khanna). Once dry, they are picked through (by a team of laborers or by an individual) in the hope that a diamond hides within. Similarly, though extracting diamonds from surficial placer (tertiary) deposits requires little-to-no initial digging, the diamondiferous gravel is washed (in the nearest stream rather than in pits), dried, and picked through much as described above. It is back-breaking, involved work that very rarely results in a big find (Santoshi 2017).

As the area in and around Panna has gradually become the center of diamond extraction in India over the last century, to the near-complete exclusion of other mine sites, a diamond bureaucracy that governs the various types of mining in the region has slowly taken form (Lahiri-Dutt and Roy Chowdhury 2018; Roy Chowdhury and Lahiri-Dutt 2019). Diamond mining in Panna occurs in two ways: formally (mechanized mining of a kimberlite pipe by the Indian government through the National Mineral Development Corporation) and informally (ASM of secondary and tertiary deposits across Panna district and portions of neighboring districts) (Patel 2017; Sethi 2013). Informal mining, in this context, can be legal (licensed) or illegal (unlicensed), and is defined by “small-sized production, low productivity, free entry and exit, [and] labour-intensive production” (Roy Chowdhury and Lahiri-Dutt 2018:

92). By law, informally-found diamonds must be turned over to the Panna Diamond Office for evaluation and eventual auction.

The Panna Diamond Office, acting on behalf of the Panna District Treasury in all matters related to diamond extraction in the region, is located in a run-down building in the center of Panna town. Roy Chowdhury and Lahiri-Dutt (2019) describe it as being a lean operation, populated by the Diamond Officer, a diamond inspector, two diamond evaluators, a revenue officer, two dedicated clerks, a guard, and a few floating peons, security guards, and military/paramilitary guards. The Diamond Office shares resources with the Panna District Mining Branch; both units are run by the Directorate of Geology and Mining under the Mineral Resources Department of the Government of Madhya Pradesh (Government of Madhya Pradesh: <http://www.mineralresources.mp.gov.in/>). The office is nominally responsible for permitting all diamond mining in Panna district, including the government-run large-scale kimberlite mine at Majhgawan. In addition, the office evaluates and auctions off all diamonds it receives as a result of artisanal and small-scale diamond mining (ASDM) in the region (Roy Chowdhury and Lahiri-Dutt 2019).

ASM, unless conducted on protected land, is legal throughout India (Ghose 2003; Roy Chowdhury and Lahiri-Dutt 2018). However, certain instances of Indian ASM may be non-legal or extra-legal (e.g. there are no laws criminalizing panning for gold along riverbanks in the state of Jharkhand, but the act is nonetheless done quietly) (Deb, Tiwari, and Lahiri-Dutt 2008). Such loopholes do not exist in the case of ASDM in Panna: informal miners without a license risk running afoul of the law. Nevertheless, unlicensed mining occurs all over the district (Santoshi 2017; Roy Chowdhury and Lahiri-Dutt 2019). In addition to the nearly 1000 licensed pits in and

around Panna, Roy Chowdhury and Lahiri-Dutt (2019) note that there could be more than 30,000 unlicensed pits, representing many thousands of people trying their luck at diamond mining.

## **1.5 Research Focus**

This project began with two goals: 1. To document the relationship between diamond mining in India and the policies and regulations that govern it, and 2. To find opportunities for coexistence between diamond mining and ecological/conservation concerns. To that end, I asked two questions: *what are the current policy and regulatory responses to unlicensed diamond mining and illegal diamond sales in Panna?* and *what is the prevailing local attitude towards environmentalism and conservation?* However, over the course of my field work, I found that the social inequalities that inform and are perpetuated by Panna's ASDM sector are, much like the environmental damage from mining, an ever-present and critical issue. Equally, the people of Panna have lived experience with conservation efforts in the form of a national park nearby, a circumstance that informs specific complaints and grievances that present as obstacles to reducing the environmental fallout from ASDM. Crucially, it became clear that the chances for greater environmental remediation and preservation in Panna are improved by tying such proposals to reduced social inequality (and concomitant improved economic stability).

Ultimately, though marked by the particular pre-colonial and colonial history of the region, modern-day ASDM in Panna is also shaped, among other things, by the geographic spread and availability of the diamonds; the rules of the Diamond Office; Panna's societal structure; its employment opportunities (or lack thereof); and the presence in the district of Panna National Park (PNP), a conservation area that siloes

off much of Panna's land from development efforts. These (and other) determinative factors can be broadly condensed into five interlinked and mutually-influencing dimensions: geophysical, institutional, cultural, economic, and ecological. Following this framework, the academic import of this study is two-fold:

1. To provide a holistic view of ASDM in Panna, situating it within its historic and present-day geophysical, institutional, cultural, economic, and ecological spheres.
2. To consider the ways in which Panna's ASDM complex can be restructured in a manner that addresses and ameliorates its social and environmental costs.

This work is divided into seven chapters. Chapter 2 describes the methods used in this study. Chapter 3 provides background on Panna's historical/formative geophysical, institutional, cultural, economic, and ecological contexts. Chapter 4 delineates the different ways in which their workings burden Panna's artisanal and small-scale diamond miners and is based primarily on field data. Chapter 5 lays out various lenses through which engagement with ASM can be examined and considers which, if any, of those lenses allows for the best solutions to Panna's mining-induced social and environmental costs. Chapter 6 focuses tightly on these costs and proposes reforms to Panna's ASDM complex. Chapter 7 concludes the paper.

## **Chapter 2**

### **METHODS**

Primary data for this study was obtained over the course of seven weeks of fieldwork in India in the summer of 2019. Assembling a picture of the everyday experience of ASDM in Panna required the use of social science methods, namely, archival research and short and long interviews. In addition to these, I used scenario planning exercises to allow interview subjects to sketch hypothetical images of Panna's likely future. These subjective visions provided a basis for recognizing present-day pain points in the life of a Panna resident, whether geophysical, institutional, cultural, economic, or ecological.

#### **2.1 Archival Research**

Archival research was conducted at the Nehru Memorial Museum and Library (NMML) in New Delhi and the Diamond Office in Panna. At NMML, I reviewed pre- and post-colonial geological surveys and maps of the Bundelkhand region, where Panna is located, colonial-era Imperial and State Gazetteers, and British administrative and revenue reports. These documents granted me a picture of the governance of Madhya Pradesh over the centuries and an idea of the earliest dates by which the British were discussing the occurrence of diamonds in the state's northeast. Archival research at the Diamond Office in Panna involved perusing documents that described the rules governing ASDM in the region and led to an understanding of the bureaucratic structure within which artisanal and small-scale miners must work. In

addition, secondary information on the historical and present-day state of ASDM was gleaned from online newspaper archives.

## **2.2 Interviews**

Interviews were semi-structured, responsive to the participants' leads, between 20 minutes and five hours in length, and conducted in Hindi or English without a translator. Forty-one total interviews were conducted. Four interview subjects, in Hyderabad, Delhi, Panna, and Bhopal respectively, were identified and contacted prior to arriving in India in the course of preliminary research. Once in Panna, further subjects were identified through the use of snowball sampling, with subjects mining their personal and professional networks to put me in touch with contacts with whom they thought I should speak. Many interviews were conducted over the course of several days and entailed multiple in-person conversations. Seventeen interviews were group undertakings, wherein several people (between two and nine) answered questions and elaborated on each other's answers. One interview subject reviewed a print-out of my questions overnight and addressed them in two hour-long in-person sessions the following day. Interview subjects included National Mineral Development Corporation (NMDC) officials in Hyderabad; professors of Deccan history and environmental history in Hyderabad and New Delhi, respectively; laborers, contractors, artisans, merchants, the local police, a local politician, villagers, townspeople, NMDC officials, non-governmental organization (NGO) representatives, students with the Wildlife Institute of India, an officer in the Central Industrial Security Force (CISF), a forest official, and Madhya Pradesh state mining officials in Panna; and a journalist in Bhopal (see Appendices A and C).

All interviews began with an intake questionnaire to gather background information on the subject, including name, occupation, and duration of employment at their current positions. Questions covered a range of topics, from straightforward requests for information on the history of diamond mining in India, whether in Panna or elsewhere, to more subjective requests for opinions on the Diamond Office, the frequency of illegal diamond mining and sales, and the primacy of conservation and environmental concerns. At the outset of each interview, I attempted to determine the subject's level of knowledge regarding ASDM and/or environmental conservation within Panna. All subsequent questions were tailored to subjects' expertise and available time (see Appendix B).

### **2.3 Scenario Planning**

Scenario planning is a method from the field of future studies, whereby futurists structure and condense diverse perspectives on the unknown and unknowable future into axes that serve as a backbone for predictions (van 't Klooster and van Asselt 2006). The axes represent the two most important driving forces that will shape the future and differ from participant to participant, depending on their view of the situation. Driving forces are chosen to be both uncertain (i.e. they can develop in either direction) and impactful (i.e. they will have a profound effect on the situation that is being studied) (Schwartz 1991).

The scenario planning exercise was explained to each subject in person, with the use of generic axes as a visual aid (Figure 1). The exercise commenced with participants being presented with two possible axes and four possible future scenarios for Panna, based on my understanding of their (completed) interview and revealed mindset. They were then asked if they agreed or disagreed with my assessment and

were offered a chance to select or suggest other axes. Once axes had been finalized, participants picked two scenarios (from the four possibilities): one that seemed to best represent the destination/trajectory/future they thought most likely to manifest, and another that represented their ideal outcome. The exercise concluded with participants discussing what steps they thought might be required to attain their favored scenario.

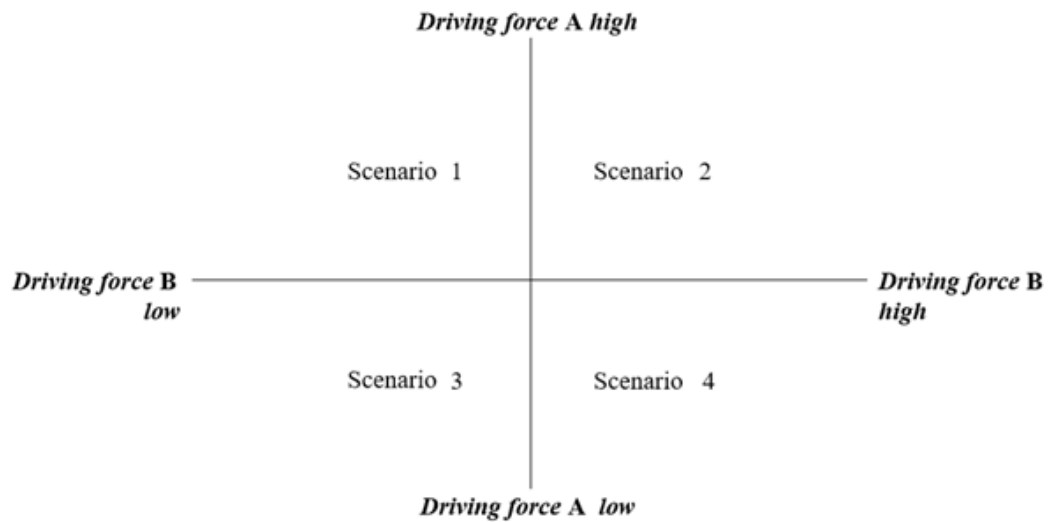


Figure 1: Generic scenario axes (adapted from van 't Klooster and van Asselt 2006).

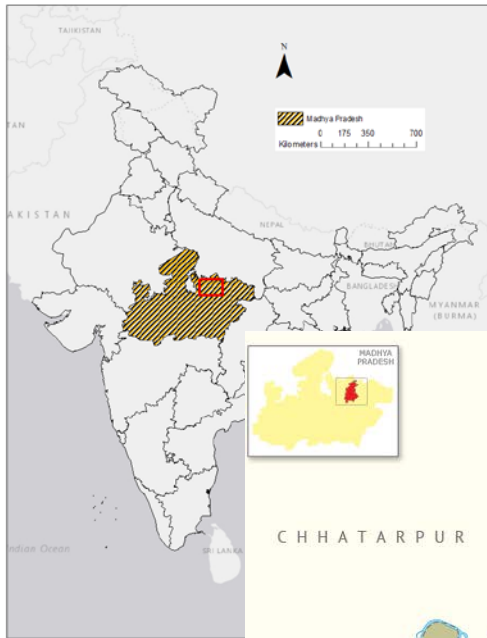
## Chapter 3

### SITE DESCRIPTION

#### 3.1 Geophysical Context

Located in central India, Panna district is one of 13 in the Bundelkhand region, a drought-prone semi-arid area almost entirely dependent on the southwest monsoon (mid-June to early October) for its rainfall (Thomas et al. 2015). The area's poor soil quality supports only one crop per year, traditionally rainfed but increasingly groundwater-irrigated (Niazi 2018). An additional water source, the Ken river, a tributary of the Yamuna, is not reliably perennial, slowing to a trickle by the summertime. The NMDC, in India's only mechanized diamond mining operation, mines a diamond-bearing pipe in Majhgawan, 25 km outside Panna town (NMDC Limited 2010) (Figure 2). A second pipe, developed for mining between 2004 and 2017 by Rio Tinto, is located in Bunder in the neighboring district of Chhatarpur (Singh 2017). The source rock in the greater Panna region is a micaceous igneous diatreme known as orangeite, distinct in composition from kimberlite, but referred to in the local mining community (and throughout this paper) as 'kimberlite'. Secondary and tertiary diamond deposits occur across the region.

Figure 2: [Following page] Left: a map of India with the state of Madhya Pradesh shaded in. The geographic extent of diamond incidence is indicated in red. Right: a representation of the district of Panna, wherein most of the land mined for diamonds in central India is located (not to scale). The NMDC site at Majhgawan is situated to PNP's northeast in a portion of the park specifically carved out to allow mining. The productive secondary mine sites of Dahlan Chauki, Patti, and Sarkoha lie between Panna and Ajaygarh. The proximity of these and other mine sites to PNP is a source of concern to tiger protectionists and the Forest Department.



### **3.2 Institutional Context**

The cost of a license for an 8 m × 8 m plot at the Panna Diamond Office is a few hours to fill out some forms and Rs. 200 (just under \$3). Proof of land-ownership is required unless applying for a permit to dig on government-owned land; such land is the least desirable option, having already been mined many times over (Roy Chowdhury and Lahiri-Dutt 2019). If a diamond is found, it must be submitted to the Diamond Office for evaluation and auction within a week. Auctions happen four times a year, and diamonds are only sold if bids exceed a certain threshold (set by the diamond inspector). Despite receiving a base valuation, the amount a diamond will fetch at auction is not assured: while a stone's weight can be predetermined, its color and clarity are, to a large extent, a matter of personal opinion. A diamond may go through several auctions unsold, leaving the person who turned it in without compensation for a year or more. In addition to merchants, brokers, and traders from other parts of India, buyers at Diamond Office auctions include local businessmen and members of small-scale mining collectives, who, unlike laborers and artisanal miners, often have multiple entry points into Panna's diamond economy (as, for example, speculators, employers, jewelers, buyers, or sellers). The NMDC holds its own auctions in Mumbai and Surat.

### **3.3 Cultural Context**

The Indian social markers of class, caste, and religion are highly interdependent and often mutually reinforcing (Shah and Lerche et al. 2018). Discrimination based on inherited caste or on tribal background remains quite as strong throughout North India, and certainly in Panna, as in centuries prior; I was asked about my caste three questions into an interview with one NMDC official in

Panna (Mosse 2018). Political parties are often aligned with certain caste categories and affirmative action policies (or the lack thereof); Panna, with its entrenched class discrimination, sizeable tribal populations, and extreme poverty, has been represented in the Lok Sabha (akin to the US House of Representatives) by a member of the Bharatiya Janata Party for 25 of the last 35 years. Throughout the country, at the lowest level, governance is handled by gram panchayats, whose members are likely drawn from the richest families or highest sub-castes in the village in question (Shah and Lerche et al. 2018). In Panna's Lok Sabha constituency of Khajuraho, power similarly accrues (at this higher level of government) to those with money or status: the two most recent representatives have been from the Kshatriya caste and have sizeable estates in and deep family ties to the region. Panna's ASDM economy is likewise divided along class and caste lines, with miners and laborers often representing the least financially stable populations of the country and auction attendees often being heirs to or representatives of local or national gem-processing and jewelry houses.

### **3.4 Economic Context**

Agriculture has long been the primary source of income in Panna, and even today, it exists side-by-side with ASDM (Roy Chowdhury and Lahiri-Dutt 2019). Other available jobs in the region involve cattle-rearing, dairy-farming, working at the NMDC's large-scale mine in Majhgawan, engaging in the ASM of sandstone and sand, and setting up stalls or shops in town and throughout the countryside. Many of Panna's able-bodied adults depend on jobs provided by the National Rural Employment Guarantee Act (NREGA), a rights-based public employment scheme that provides up to 100 days of paid employment per year for one member of every rural

household. Seasonal migration is not uncommon; neither is dependence on the sale of firewood and NTFPs (Yadav 2018). Bundelkhand's multi-year droughts have devastated the state of local subsistence and semi-commercial/small-scale agriculture, driving owners and workers of once-arable or -pasture land to seek out more uncertain work, which could include departing Panna as migrant labor (Niazi 2018). Those who remain join Panna's (non-agricultural) informal economy; among other things, they may then work as artisanal miners or as wage laborers in small-scale mines.

### **3.5 Ecological Context**

Panna National Park, a 1545.08 sq. km. protected area originally under the conservatorship of the Government of Madhya Pradesh, is divided into a small core zone, where no human beings may enter, and a much larger buffer zone, which is populated by a few villages and where the collection of firewood and NTFPs is permitted, though mining is not (Government of Madhya Pradesh, Panna Tiger Reserve: <https://pannatigerreserve.in/>). The park was designated a Tiger Reserve in 1994 and absorbed into the larger Panna Biosphere Reserve in 2011, placing it under the joint jurisdiction of the Indian Ministry of Environment, Forest, and Climate Change (MoEFCC) and the Madhya Pradesh Forest Department (MPFD), together referred to, locally and in this paper, as 'the Forest Department' (Government of Madhya Pradesh, Environmental Planning & Coordination Organisation: [http://www.epco.in/epco\\_biosphere\\_panna.php](http://www.epco.in/epco_biosphere_panna.php)). In this paper, I shall use the original label of Panna National Park (PNP) to refer to the area's continuum of conservation designations.

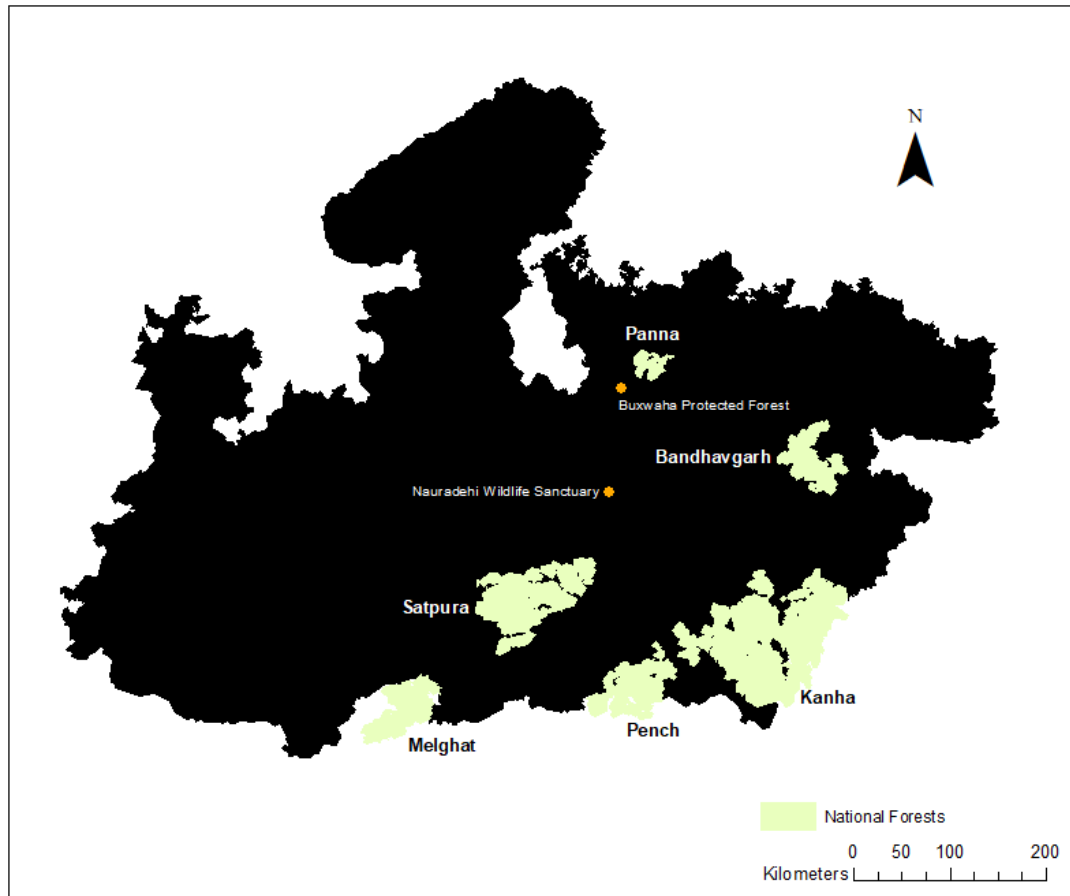


Figure 3: National forests in Madhya Pradesh and the state-managed Buxwaha Protected Forest and Nauradehi Wildlife Sanctuary.

The NMDC's mining works in Majhgawan, which commenced with the receipt of its mining lease in 1965, predate the establishment of PNP (NMDC Limited 2010). Indeed, the borders of PNP have been drawn to carefully exclude the NMDC site, so that it technically lies outside the park (no such allowances are made for artisanal or small-scale mines) (Figure 2). Nevertheless, in managing PNP, the Forest Department has the ability to forestall the Majhgawan operations at any time, a power they wielded, on the advice of the Madhya Pradesh Pollution Control Board (MPPCB),

between August 2005 and May 2009. The NMDC must now renew its permit to mine every five years; the 2019 renewal remains unresolved as of May 2020. In return for giving up a portion of PNP to the central government's pending proposal to link the Ken and Betwa rivers to help alleviate Bundelkhand's water scarcity, the Forest Department is also reported to have negotiated for the formal notification of Buxwaha Protected Forest (BPF) as a national park, signifying its power in local and regional politics (at present, BPF is a state-run wildlife corridor between PNP and the state-run Nauradehi Wildlife Sanctuary, to the southwest of PNP) (Vishnoi 2016) (Figure 3). Similarly, the 2017 withdrawal of Rio Tinto from its diamond-mining prospect in BPF has been attributed to environmental activism and MPFD obstruction (this despite the Government of Madhya Pradesh's subsequent decisions to award mining permits for that very area to the NMDC and the Aditya Birla Group) (Singh 2017; Dasgupta and Bhardwaj 2020).

## **Chapter 4**

### **FINDINGS**

Panna's claim to fame is its diamonds. Nearly everyone I met assumed my presence had something to do with diamonds – guesses ranged from an internship at the NMDC to an interest in starting up my own mine. The people of Panna are acutely aware of the fact that their little wealth results almost entirely from the region's diamond-based economy. Recent rumblings of a complete NMDC/Majhgawan shutdown and worries over the increasing reach of the Forest Department have contributed to a general sense among local villagers, townspeople, artisanal miners, and wage laborers of being left behind by the central government, in an echo (and possible re-creation) of the wilderness-state under which colonial-era administrators justified their inactive governance of forested peripheries.

#### **4.1 Geophysical Dimension**

It is common knowledge that government-owned land in and bordering Panna town has been exhausted of its store of diamonds. The Diamond Office's running list of finds logs the outlying localities of Patti, Sarkoha, and Dahlan Chauki (see Figure 2) as especially productive areas recently, and is aware of surveying and occasional ASDM in the neighboring districts of Chhatarpur to the west and Satna to the east. While there is some concern that the office might eventually be called upon to regulate diamond-related activity outside Panna district, the primary worry is the growing unsustainability of subsistence and semi-commercial agriculture in the midst of

prolonged water shortages. People will likely turn to ASDM in desperation, but the progressively diffuse nature of diamond availability, already noted by Sinor in 1930, does not bode well for the sustainability of diamond mining as an alternate livelihood.

#### **4.2 Institutional Dimension**

The Panna Diamond Office, staffed only by a diamond evaluator, a clerk, and a guard each time I visited, seems to be running on fumes. As it stands, the staff is physically incapable of monitoring the large number of digs it has permitted; it certainly does not have the human resources to patrol the district for unlicensed or illegal mining. Applications to the Mineral Resources Department of the Government of Madhya Pradesh for increased funding and more guards have been unsuccessful: “we have been asking for more people for the last ten years. It’s impossible – we had a bigger staff in the 1980s” (MP state mining official, Hindi). As state revenue from ASDM decreases, the funding crisis will likely worsen; though the official line at the Diamond Office and the local police is that illegal diamond sales are few and far between, the office employees maintain that the amount of revenue lost to the state exchequer is an open secret around town (though no one would give me an actual number). The office claims that it is prepared to offer an advance of half the estimated value of any diamond submitted or Rs. 1 lakh (around \$1333), whichever is lower, to the person submitting it, but requires claimants to have a bank account and to apply for such advances within one week of turning over a diamond. This thicket of red tape can be particularly daunting for those who are not literate.

Whose responsibility is it to put a stop to illegal mining and sales? The Diamond Office and the local police each claim that the onus to act lies with the other. When pressed, both committed to working with each other, but could offer me no

concrete information as to what form such cooperation might take. My suggestions of a permanent task force or of working with the CISF, which guards the Majhgawan mine, were met with noncommittal shrugs. This vagueness, though perhaps an acknowledgement of the sensitive nature of the information for which I was asking, may also illuminate the incredible complexity of mining governance in Panna. Illegal ASDM can be illegal in many ways: miners may dig without a license, dig with an expired license, dig beyond the boundaries of their 8×8 plot, dig at an entirely different site, or fail to fill their mines in once done. The people who are charged with checking for such infractions, unable to inspect all of Panna's shallow mines and being low-paid public-sector employees, frequently accept (and expect) bribes from the small population of miners they apprehend.

### **4.3 Cultural Dimension**

The practice of ASDM in Panna appears to be highly stratified, with the higher castes engaged in small-scale diamond mining (SDM) and the lower castes and ST populations working as wage laborers in small-scale mines and, separately, participating in artisanal diamond mining (ADM). The work structure in a small-scale mine is similarly stratified, so that the supervisory staff are of a (low) caste while the manual laborers belong to (even) lower castes or migrant, immigrant, refugee (likely Bangladeshi), or tribal populations. The remuneration for carrying out the physical labor of mining is pitiful: as little as Rs. 150 per day in the mines of Ajaygarh and Brijpur and up to Rs. 300 closer to Panna town (this amounts to around \$2 and \$4 per day respectively). The historically forest-dependent populations of Panna continue to collect firewood and NTFPs every day, venturing into the core zone of PNP for gooseberries and tendu leaves at great risk to life and limb from both wildlife and

forest officials. In the maintenance of such traditional subsistence activities, a profound lack of social mobility in Panna is evident.

In addition to the seriousness of the long-term health implications of practicing ADM, miner safety can be further threatened once a diamond is found. Townspeople whisper of a diamond mafia in the region that expects a percentage of every payout, and several sources told me stories of artisanal miners who turn up dead within days of having found a diamond. The impacts of a mafia, if it exists, would disproportionately affect Panna's poorest, being the most likely to turn to ADM. The police refer to the underbelly of the ADM sector as a 'goonda raj' – an empire of petty thugs. According to one interview subject, "they [the mafia], meet them [the miners] at home at night and threaten to shoot them if they don't give up the diamond. No one knows how they find out when someone has found a diamond. They cut off their heads" (townspeople, Hindi).

#### **4.4 Economic Dimension**

Despite the presence of diamonds throughout the region, Panna remains one of the poorer districts in Madhya Pradesh (World Bank 2016). For the members of the SC and ST populations with whom I spoke, a Below Poverty Line (BPL) card was a prized possession, and accusations against others over misrepresentation of need and instances of bribery to gain undeserved cards were very common. BPL cards guarantee families a certain amount of rice, lentils, and other staples every month based on income per head, which varies wildly with season. Panna district is extremely underdeveloped; the only industrial area in the district, Udyog Giri Purena, is over 100 km from PNP and Panna town (Government of Madhya Pradesh: <https://invest.mp.gov.in/>). Formalization of ASDM, with the ostensible benefits of a

steady income stream, improved workplace safety, retirement benefits, and labor and social protection for those who perform the manual work of mining, has been discussed occasionally at the Panna District Mining Branch, but there is no consensus on what shape a formalization drive might take or by whom it could be implemented. The NMDC has turned down repeated offers to oversee such an effort.

Participation in Panna's diamond-based economy can occur in many ways: as a subsistence miner in an ADM effort; as a wage laborer, overseer, speculator, or landowner/lessor in an SDM cooperative; as a diamond artisan involved with the cutting and polishing of stones circulating in the local market; as a trader, merchant, or jeweler bidding for lots at the quarterly auctions run by the Diamond Office; or as a black-market purchaser of rough stones. Representatives of cutting and polishing companies in Mumbai and Surat are known to have taken houses in Panna and are suspected of making direct deals with SDM collectives for their diamonds. Miners are increasingly bypassing the government and selling their finds directly to such jewelers and intermediaries (Santoshi 2017).

#### **4.5 Ecological Dimension**

The seemingly greater importance granted to the tigers of PNP than to the lives of the human beings living alongside those tigers is a source of great dissatisfaction and anger in the district. In every quarter of Panna, opinions of the Forest Department are highly unfavorable. Villagers who live in the PNP buffer zone complain of their cattle being unfairly seized in cases of accidental encroachment into the core zone; villagers must petition the court for a return of their cattle, which could take weeks, and detained cattle may not be fed or watered in that intervening time. Women and children who collect firewood (for personal use and for sale) in the buffer and core

zones often come across guards who threaten to arrest them for trespassing and offer to let them pass in return for sizeable bribes (men who forage for firewood, on the other hand, are immediately arrested).

Now that the NMDC venture in Majhgawan appears doomed, there is also a genuine fear that the Forest Department will extend its apparent anti-development animus to ASDM, putting an end to one of the few traditional non-agricultural- or husbandry-related livelihood options still available to the people of Panna. If all mining is halted, out-migration rates will undoubtedly rise. The outrage is as high as it is because of the perceived failures of the Forest Department when it comes to tiger protection: tigers went locally extinct in PNP in 2009, long after the Tiger Reserve designation. There is also some question as to whether the environment can support the tigers, or if active management and intervention will always be required to keep them alive. Because this is water-scarce Bundelkhand, nearly all the watering holes in PNP must be filled with trucked-in water on a daily basis. A villager I interviewed told me this was a sign that the local environment had evolved past tigers. He also pointed out that the tigers' presence is especially hard on those who run the risk of losing their livestock to predation. Compensation for livestock-death, I was told, is very rarely received.

## Chapter 5

### ANALYSIS

#### 5.1 “If the mines go, the tigers go”

It was nearing 5 pm, and I was caught in a sudden thunderstorm in Panna town, some distance from my accommodations in Majhgawan at the NMDC guest house. I had journeyed into town to interview the District Superintendent of Police about the extent of unlicensed diamond mining and black-market sales in the region. The rain caused me to miss the bus by which I had intended to return, but I had another interview to conduct in Majhgawan, so I decided to catch an autorickshaw back. Over the course of the 45-minute journey, the driver and I chatted (in Hindi) about the state of tiger conservation in PNP, how the Forest Department ruled over Panna with an iron fist, and the crores of rupees’ worth of diamonds that surely lay just beneath the surface of Panna’s protected lands. As I climbed out of the auto, he ended our conversation with a prophecy: “if the mines go, the tigers go.”

*Should diamond mining in the region ever be completely banned, the tigers would be poached into extinction.* It was the most clearly articulated statement I would hear all summer of the tie between economic and ecological concerns in poor, undeveloped, rural Panna. Artisanal and small-scale diamond miners know that, for better or worse, their activities affect the environment. Farmers who mine their own fields and landowners who lease their agricultural property to small-scale mining collectives sacrifice the real possibility of future crop yield for the distant possibility of profiting from lucky finds. Yet, a cessation of mining might result in a different

type of environmental destruction: the local extinction of the tigers in PNP. How, in this landscape, can the seemingly opposed goals of economic and environmental advancement be reconciled?

## **5.2 Ecological Discourses**

ASM's "notorious association with environmental degradation and social deprivation" has long been considered a management problem (Hirons 2011: 347). There can be no doubt that ASDM in Panna affects and is affected by the region's twin ecological and cultural landscapes. Panna's social structure and cultural mores dictate who participates in artisanal versus small-scale mining, who bears the brunt of the environmental damage wrought by mining, and the extent to which miners benefit from unearthing a diamond. However, miners are not merely victims of their circumstances: Lahiri-Dutt and Roy Chowdhury (2018) note that Panna's practitioners are aware of both their position in the global supply chain and the value of their finds. The agency of Panna's wage laborers and artisanal and small-scale diamond miners is thus just as crucial a piece of the ASDM complex as the hyperlocal contexts within which they operate.

Issues of bad management can be resolved in many ways, depending on the theoretical perspectives employed to analyze them. Geologic governmentality holds that a 'good' government "must articulate territory and population together, and pursue strategies to optimize the employment of 'territory with its qualities'" (Braun 2000: 28). The sustainable development discourse, kickstarted by the 1987 publication of *Our Common Future*, broadens the agenda implied by 'optimal use of geological resources' to include environmental rehabilitation and preservation. Sustainable development posits the existence of win-win scenarios that maximize economic

growth (meeting basic needs) while minimizing environmental cost (improved inter- and intra-generational equity) (Brundtland Commission 1987). A ‘good’ government, interested in prompting those it governs to do what they ought whilst following their own self-interest, could craft policies that frame conservation as being in the best interest of its population. Where mining and non-subsistence agriculture are prototypical examples of the commodification of nature, so might win-win scenarios in the vein of sustainable development provide an economic incentive to commodify ecological restoration and environmental protection.

Dialectical naturalism, as defined by Murray Bookchin, answers questions pivotal to debates between human existence and environmental wellbeing: “What is nature? What is humanity’s place in nature? And what is the relationship of society to the natural world?” (Bookchin 2017: 1). ASM, as a societal adaptation strategy against poverty with the problematic of attendant environmental degradation, rests squarely at the center of the human-nature dialect. Ali (2018) suggests that alleviating the environmental impacts of decentralized activities like ASM might be best achieved by the application of social ecology theory, which recognizes that human-environment interactions are dynamic and influenced by a multiplicity of factors. He further notes that solutions rooted in dialectical naturalism, which posits both that change is developmental (it builds on itself in successive cycles of deployment) and that such incremental change can suddenly blossom into sweeping transformation, may have the greatest potential for policy formulation and lasting metamorphosis.

Because it holds the present and the long sweep of the future simultaneously when studying entities and relations, dialectical naturalism provides a framework for organizational reform: “the ‘what-should-be’ becomes an ethical criterion for judging

the truth or validity of an objective ‘what-is’ .... Whether a society is ‘good’ or ‘bad’, moral or immoral, for example, can be objectively determined by whether it has fulfilled its potentialities” (Bookchin 2017: 24). When the goal is sustainable development, the pathway for achieving it via dialectical naturalism is one of building on small changes over time (say, financial rewards for avoided deforestation that depend on forest density in combination with ever stricter consequences for non-compliance), a progression that will “eventually lead to a dialectical ‘turning point’, whereby [the people] see ecological consciousness as a necessary part of their social system” (Ali 2018: 124). Thus, reforms at the nexus of dialectical methods and social ecology would take advantage of the continuous, ever-evolving, reciprocal nature of human-environment interactions while making room for a progression of coordinated efforts across sectors and scales (following Sainath 2017 and Shah and Lerche et al. 2018’s analysis of why India’s social and environmental problems require such an approach).

Roy Chowdhury and Lahiri-Dutt (2019) use the human geographical concept of assemblage to describe Panna’s heterogenous, dynamic, and interconnected diamond-production system. Assemblage thinking, the authors explain, makes clear the need for hybrid governance in the particular socio-material, political-economic, and spatial realm occupied by the diamond mining enterprise in Panna. Panna’s ASDM activities, as carried out by individuals and small cooperatives (in comparison to the central government’s sanctioned dig at Majhgawan), are the oldest and least powerful part of this assemblage (Roy Chowdhury and Lahiri-Dutt 2019). Given these specific circumstances, solutions that incorporate hybrid governance might address the visible lack of trust miners, peasants, and the poor place in Panna’s institutional

structure. Indeed, in addition to the free schooling the NMDC offers the children of its employees as part of its corporate social responsibility (CSR) efforts, the Taj at Pashan Garh (within PNP) leads a literacy drive for children in local villages. Similar pluralistic forms of governance could explore and attend to the power dynamics at play in Panna's ASDM complex.

### **5.3 Discrete Problems, Discrete Solutions**

Any plans to restructure ASDM in Panna must include considered analysis of the issues inherent to the complex's geophysical, institutional, cultural, economic, and ecological dimensions. Proposals that decrease social inequality and increase financial security while reducing environmental pillage may include any number of highly specific and coordinated sector reforms; as the list of issues that plague the people of Panna compiled in Chapter 4 demonstrates, a wholesale change to the ASDM complex can be achieved even when tackling one problem at a time. In fact, the picture that has emerged from my research is not one of an intractable clash between ASDM on the one hand and environmental and social good on the other, but of a set of specific and concrete harms throughout Panna that will respond to specific and concrete resolutions. A multi-sector, multi-stakeholder, hybrid governance approach is called for (see Appendix D). In keeping with the social ecology/dialectical naturalism framework, the combined weight of the resolutions proffered herein will expand the set of possible futures for Panna's ASDM complex, seeding revolution with every ameliorative act.

## **Chapter 6**

### **DISCUSSION**

#### **6.1 The Unequal Costs of ASDM**

Though ASM is described in the literature as being largely poverty-driven, SDM in Panna does not appear to fit neatly into this narrative. Most of the people who engage in SDM do so speculatively, hoping to enhance their wealth, and able to withstand the loss if their investment does not bear fruit. They form cooperatives and split the burden of hiring equipment and labor, ensuring that no one person's share of the cost is too high to recover from. They do not mine their own land, instead entering into agreements with farmers and peasants to either pay a fixed rate for the lease or share some of the profits from unearthing a diamond. They obtain licenses for multiple adjacent plots of land and arrange to dig up entire fields at a time, leaving no stone unturned in their pursuit of a diamond. They are people of inherited wealth and power who have access to extensive networks of diamond brokers, traders, and merchants in the big cities of Mumbai and Surat, and therefore feel no obligations to follow the Diamond Office's submission, evaluation, and auction rules. They do not bear the direct environmental or social costs of diamond mining in Panna; rather, they outsource those costs to the landowners and wage laborers upon whose backs they stand to participate in Panna's ASDM complex.

### **6.1.1 Social costs**

Panna's laborers and artisanal diamond miners, being primarily of the SC/ST/OBC categories, experience what Philippe Bourgois refers to as 'conjugated oppression' in life and the labor market (further developed by Shah and Lerche et al. 2018). Their impoverishment is a consequence of many concatenating factors, including historic marginalization, bureaucratic indifference, wealth capture by dominant castes, and a purposeful lack of development and employment opportunities as a result of conservationist tendencies. ASDM, though one way to make a living in Panna, has inherent livelihood uncertainty, made worse by the physical toll it takes on miners' bodies, the scattered availability of alluvial diamond reserves, the unpredictable length of the waiting period for compensation imposed by the Diamond Office, and the employment of migrant labor in SDM. Artisanal diamond miners who mine without a license or who sell their diamonds on the black market rather than deposit them at the Diamond Office likely do so because they can afford neither a license nor to wait to be paid for their find. If caught, they have no choice but to struggle with a bureaucracy that does not make allowances for hardship.

Families cope with the uncertainty of living and working in Panna by deploying multiple subsistence strategies at once: some members may engage in seasonal migration, while others stay behind, farm, mine, collect and sell firewood and NTFPs, and pursue NREGA and SDM jobs (Yadav 2018). Panna's societal structure is such that these alternate sources of income can be just as risky: occupational injuries for migrant laborers and miners occur at an uncommonly high rate (Saha et al. 2011). Forest-based practices take time – hours every day – and may engender legal consequences, monetary loss (to institutional corruption), livestock loss (to predation), or death (by predation, accident, or overwork). The compensation for wage laborers is

low and may be further depressed by migrant labor; additionally, such jobs are not contracted and may come to an abrupt end. When families live hand-to-mouth, education may fall by the wayside, thus perpetuating the reproduction of economic inequality (Shah and Lerche et al. 2018).

### **6.1.2 Environmental costs**

The geomorphological effects of ASDM include reduced agricultural and ecological productivity due to topsoil clearance, accelerated erosion due to the erection of temporary human settlements and vegetation-loss, and silted waterways from the gravel-washing required to mine tertiary deposits (Rajaei et al. 2015). Ali (2018) notes that gemstone mining rushes can impact soil and water quality enough to make other land uses, like agriculture and fishing, impossible. Unfilled mines all over Panna serve as breeding grounds for mosquitoes and other pests, leading to incidences of malaria (Roy Chowdhury and Lahiri-Dutt 2019). Mining within a forest has ramifications for biodiversity loss as a consequence of forest cover fragmentation and is a direct cause of higher human-animal interaction and conflict (Hilson 2002; Vishnoi 2016). In PNP, human-tiger antagonism has been further stoked by unsatisfactory dealings with the Forest Department, so that in effect, the people of Panna do not view tigers or conservation as vital parts of their natural or moral ecosystems. Finally, the loss of forest cover can adversely affect regional patterns of non-monsoon dependent rainfall (Rajaei et al. 2015).

## **6.2 Suggested Reforms**

How might social equality, economic stability, environmental protection, and ecological conservation be granted greater importance in Panna's ASDM complex?

How can the complex be restructured to better the lives of the people who propagate it and the condition of the natural world within which it operates? Based on methods that involve dialectical transformation and cross-sectoral cooperation, I suggest a realignment of the ways in which the various dimensions of Panna's ASDM complex interact with each other. The three categories of solutions offered here are treated separately, but, in the tradition of social ecology, are interrelated to such an extent that the boundaries between them are sometimes indistinct (Figure 4).

### **6.2.1 A proposal for the diamond bureaucracy**

The Diamond Office must cast off its historical path dependency and embrace policies that serve to build trust in the government while rooting out petty corruption amongst its employees. Steps to seriously investigate and prosecute reports of corruption will help in this regard, as will raising the low civil service salaries that perhaps contribute to employees feeling the need to seek out bribes. Corruption might also be eradicated by the addition of new and meaningful work, like establishing and supervising a 'diamond park' in Panna. The idea of a diamond park, meant to serve as a hub for diamond processing, cutting, polishing, diamond-based import/export training, and artisanal jewelry setting, has been around since at least 1996, but has yet to become a reality (Trivedi 2011). The founding of a diamond hub that provides jobs and the opportunity to learn various trades under the aegis of the Diamond Office would vastly improve local lives and public perception of the diamond bureaucracy.

The office must also discourage the illegal sale of rough diamonds as part of its good-faith-efforts by, for example, reconsidering its mandatory 11.5% royalty deduction on all sales. Offering miners an automatic advance of well over 50% of the estimated value of any diamond deposited at the office immediately upon deposition,

without the requirement of a bank account, will also demonstrate the office's concern for the economic wellbeing of the region's miners. Cooperation with the local police to track and prevent sales to merchants and middlemen from Surat and Mumbai is also necessary, as is a crackdown on local organized crime, should it exist.

Incremental measures to strengthen public trust in the government's operations can then be leveraged into requiring remediation efforts from practitioners of ASDM. As it stands, those who engage in ADM and organize SDM undertakings are not required to conduct Environmental Impact Assessments (EIAs) for their projects. Neither is the Diamond Office's rule that shallow mines must be filled in upon lease-expiry or the conclusion of the mining endeavor, whichever occurs first, enforced in any substantive manner. But with policy improvements and incentives working in tandem with fines, an institutional implementation and eventual moral adoption of land reclamation goals is possible. The first step in remediating Panna's mined landscapes could be for the local government to pay people to fill in and afforest the region's abandoned mines. A second step can involve occupational training in the restoration of productivity to reclaimed land that lays the basis for livelihoods centered around reclamation and conservation.

### **6.2.2 A proposal for the Forest Department's bureaucracy**

As with the Panna Diamond Office, the Forest Department needs to engage in trust-building exercises with the people of Panna. It might begin by addressing the many grievances of those who depend on the forest for any or all of their daily existence: convoluted processes to secure the return of domestic animals that have wandered into the PNP core zone; inadequate and delayed compensation for livestock lost to predation within PNP; denial of traditional livelihoods and TEK in banning

people from the PNP core zone; rent-seeking by forest guards; and land-grabbing tendencies that manifest in relocating villages from the core zone for insufficient restitution. Two themes are apparent: an unsatisfactory level of concern for the socio-economic loss stemming from PNP's operations sustained by forest-dwelling and forest-adjacent communities, and a failure to secure community buy-in for any conservation efforts.

In contending with these issues, the Forest Department must create and publicize a strategy that details its past and planned future Social Responsibility initiatives. PNP is open every year for tourism between October and June; the Forest Department should pledge to plough the resultant tourism money back into the region by investing in childhood education, basic utilities, the production of renewable energy, subsidized housing, improved infrastructure, and training programs for the local employment of guards, trackers, and rangers. Social and environmental education programs to advertise the ecosystem services and climatic benefits of dense forests and restored landscapes, like superior air quality, the abatement of topsoil erosion, and a greater possibility of rain, will be necessary to gain community acceptance of PNP's presence. The Forest Department could also collaborate with the Diamond Office on trainings focused on reclamation, afforestation, and conservation, and could contribute funding to hire laborers who carry out land remediation, with the understanding that rehabilitated government land be officially incorporated into the PNP buffer zone. Investments in encouraging entrepreneurship and in the occupational training of those who would make a living out of restoring previously mined land would contribute to the long-term benefit of Panna's workforce. Measures must also be taken to curtail corruption amongst forest employees.

### **6.2.3 A proposal for the Forest Department's methods**

According to the Forest Department, because the 542.66 sq. km. PNP core zone is quite well-monitored, the chances of illegal ADM therein are fairly low; the PNP buffer zone, on the other hand, being larger and less well-monitored, might see some illegal mining. However, forest ecological integrity does not depend solely on activities that take place within a demarcated boundary, but on ecosystem activities as a whole. ASDM outside PNP affects soil and water quality throughout the area and degrades land that could otherwise be part of a wildlife corridor or of the PNP buffer zone. The Forest Department might find managing these challenges to be made easier by the adoption of policies associated with forest-smart mining, an initiative undertaken by the World Bank-run Program on Forests (World Bank 2019; PROFOR: <https://www.profor.info/content/forest-smart-programs>). Among other things, forest-smart principles for ASM include: recognition of the autonomy of indigenous peoples over mined and to-be-mined lands and resources; institution of strong ASM regulations that can anticipate development rushes; crafting a holistic poverty-reduction strategy that incorporates ecological integrity; ensuring political stability and legitimacy; implementation of separate policies for artisanal mining and the significantly more destructive small-scale mining; and cooperation between ASM and large-scale operations for meaningful forest-impact mitigation.

These principles can be applied to the governance of ASDM in Panna with some creativity and cross-sectoral cooperation. Allowing for flexible buffer zone delineation could open up rotating sections of PNP to local forest-dependent peoples, while instituting a silviculture training program and paid silviculture efforts could contribute to regional poverty alleviation. Policies that prioritize forest protection could be part of Panna's plan to regulate ASDM rushes and can be implemented in

tandem with an NMDC partnership to reforest past and future mined terrains. Recognizing the greater degree of capitalization and attendant environmental impacts of SDM over ADM could compel the requirement of EIAs for small-scale operations, which could make enforcement of remediation requirements easier by disallowing the licensing of particularly destructive SDM endeavors.

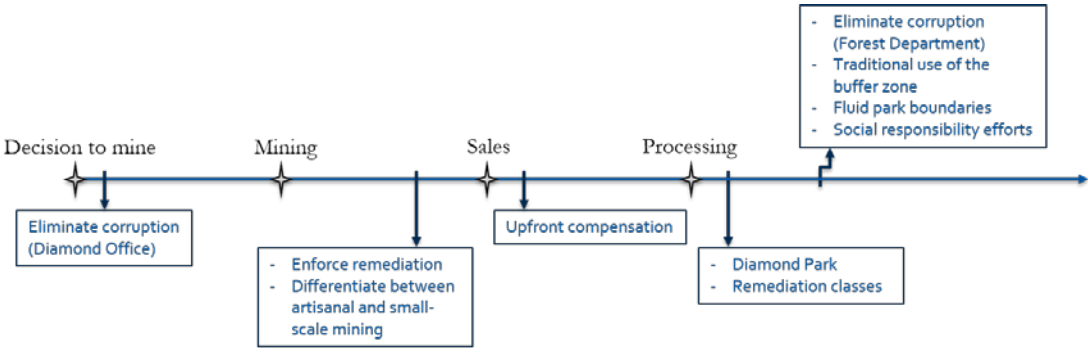


Figure 4: Suggested reforms and where they would occur on a process diagram of Panna’s diamond-based economy.

## **Chapter 7**

### **CONCLUSION**

Artisanal and small-scale diamond mining in India, an industry of old, is today practiced by only a few thousand people in the country's center. This work traces the practice of diamond mining in Panna from antiquity to present-day, anchoring it in its physical, institutional, cultural, economic, and ecological circumstances and geographies. In addition, I demonstrate here the viability of achieving social objectives (increased wellbeing and decreased economic disparity) and a global good (reduced environmental destruction) simultaneously in Panna's ASDM sector. In line with the dialectical principles of social ecology theory and practice, some of the sector reforms suggested herein are cyclical, in that they express sincere effort on the part of the government to lessen social and economic disparity, thus engendering long-term trust. Other suggested reforms are incentivizing, marking a direct connection between economic betterment and environmental gain.

Diamonds have the potential to serve as a boon to Panna's socio-ecological development, giving the lie to their reputation as a 'resource curse'. However, Panna's ASDM complex is not a hermetic unit. It sits within the larger context of informal activities in a modern capitalist society, with all the attendant pressures and violations. The creation in 2002 of the Kimberley Process Certification Scheme differentiated between rough diamonds mined legitimately and those connected to human rights abuses and warfare (Davidson 2016). Though Indian diamonds are not considered conflict diamonds, as they finance neither rebel movements nor conflicts aimed at undermining legitimate government, ASDM in Panna occurs in connection with some

human rights violations, these being primarily economic and social. Restructuring Panna's ASDM complex to change its treatment of miners and laborers should be a governmental and societal imperative.

Conservation is easiest when people have a greater incentive to protect the environment than to exploit it. Following Sonter, Ali, and Watson (2018), that means serious consideration of the possibility of coexistence between conservation and extraction in Panna's case. ASM, I have learnt, though sometimes a traditional livelihood, is increasingly practiced to offset vulnerability to poverty and market uncertainties. Changes in land use and land cover due to ASDM lead to soil, air, and groundwater degradation and compound societal vulnerability to such things as health hazards, accidents, and natural disasters, among other things (Mishra and Mishra 2017). Because the five dimensions of Panna's ASDM complex influence and amplify each other, alleviating any of its impacts and effects requires cross-sectoral cooperation. This work offers some contributions in that regard.

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**Appendix A**  
**INTERVIEW SUBJECTS**

<b>Subject(s)</b>	<b>Participants</b>	<b>Location</b>
NMDC official	1	Hyderabad
NMDC official	1	Hyderabad
Professor of Deccan history	1	Hyderabad
Professor of environmental history	1	New Delhi
NMDC official	1	Panna
NMDC official	1	Panna
NMDC officials	2	Panna
NMDC official	1	Panna
NMDC officials	3	Panna
Students (Wildlife Institute of India)	2	Panna
NGO representatives	2	Panna
Merchant	1	Panna
MP state mining officials + merchant	2+1	Panna
Merchants	2	Panna
NMDC officials	2	Panna
CISF officer	1	Panna
Villager (sarpanch)	1	Panna
Merchants	5	Panna
Contractor	1	Panna
Laborer	1	Panna
Laborer	1	Panna
Laborers	2	Panna
Merchant	1	Panna
Townsperson	6	Panna
Politician + townsperson	1+1	Panna
Politician	1	Panna
Artisan + townsperson	1+1	Panna
Townsperson	1	Panna
Merchant	1	Panna
Laborer	1	Panna
Merchants + townsperson	2+1	Panna
Forest official (officer in the Indian Army posted to Panna)	1	Panna

(Continued)

<b>Subject(s)</b>	<b>Participants</b>	<b>Location</b>
Villagers (sarpanch + panchayat + others)	1+4+4	Panna
MP state mining officials + townsperson	3+1	Panna
Police	1	Panna
NMDC official + townspeople	1+2	Panna
MP state mining official	1	Panna
Police (District Superintendent)	1	Panna
Merchant	1	Bhopal
Merchants	2	Bhopal
Journalist	1	Bhopal

## Appendix B

### INTERVIEW GUIDE

#### General goals for semi-structured interviews

- Gather background information on participant – name, age, employer, position within organization, years working there
- Discuss what the participant knows about informal diamond mining in Panna
  - who mines for diamonds
  - whether licensed mining is more or less common than unlicensed mining
  - where the mines are
- Discuss whether the participant thinks illegal diamond sales occur
  - whether such activity has increased over the years
  - what is being done to prevent illegal sales
  - whether it must be curtailed
  - the type of miner who engages in illegal sales
- Determine if the participant thinks the current process for legal diamond sales can and/or should be reformed
  - what the current process is
  - what they would like to see happen
  - who has the power to make it happen
- Determine a timeline of diamond mining across India
  - where and when in history diamonds have been mined
  - why other mine sites have fallen out of favor
  - what colonial-era geological surveys of India say about other diamond-mining locations
- Discuss current and former Indian law governing Scheduled Tribes, the Gond, Scheduled Areas, informal diamond mining, and legal avenues for diamond sales
  - what the British colonial attitude towards central India and tribal populations was
  - what the post-Independence Indian attitude towards tribal populations has been
  - whether the legal system for selling informally-found diamonds can be considered fair, out-of-touch, discriminatory, or indifferent
  - whether reliance on illegal modes of diamond sales can be considered an act of resistance
- Snowball sampling – ask if the participant knows of anyone else who they would recommend I talk to

### **Guide for semi-structured interview with bureaucrats**

- I. Background information on participant
  - a. What is your name and place of employment?
  - b. What is your position here and what does that entail?
  - c. How long have you worked here? And in this particular position?
- II. General awareness of informal diamond mining in Panna
  - a. Demographically, who is most likely to mine informally?
  - b. How likely are they to be licensed? What might prevent them from getting a license?
  - c. Where are the licensed mines? The unlicensed mines?
- III. Opinions on illegal diamond sales
  - a. Are direct, non-auction sales happening? Are they a problem?
  - b. How is the law requiring auction currently being enforced?
  - c. Are illegal sales increasing?
  - d. Demographically, who is most likely to sell on the black market?
- IV. Opinions on sales reform
  - a. Walk me through the current process for turning diamonds over to the government.
  - b. Do you think it needs reform? In what way?
  - c. Who has the power to turn your ideas into concrete policy?
  - d. In the past, have you tried making the need for change known to these people?
- V. Current law governing Scheduled-designations
  - a. Are the Gond people being affected by auction requirements? In what way?
  - b. Is biodiversity conservation affecting the designation of tribal land?
  - c. Are there laws that distinguish subterranean property from surface property?
  - d. Give me a brief history of tribal and non-tribal coexistence in Panna.
- VI. Snowball sampling
  - a. Is there anyone else you think I should talk to?
  - b. Can I use your name as a reference when I contact them?

### **Guide for semi-structured interview with law enforcement officers**

- I. Background information on participant
  - a. What is your name and place of employment?
  - b. What is your position here and what does that entail?
  - c. How long have you worked here? And in this particular position?
- II. General awareness of informal diamond mining in Panna
  - a. Demographically, who is most likely to mine informally?
  - b. How likely are they to be licensed? What might prevent them from getting a license?

- c. Where are the licensed mines? The unlicensed mines?
- III. Opinions on illegal diamond sales
  - a. Are direct, non-auction sales happening? Are they a problem?
  - b. How is the law requiring auction currently being enforced?
  - c. Are illegal sales increasing?
  - d. Demographically, who is most likely to sell on the black market?
- IV. Opinions on sales reform
  - a. Walk me through the current process for turning diamonds over to the government.
  - b. Do you think it needs reform? In what way?
  - c. Who has the power to turn your ideas into concrete policy?
  - d. In the past, have you tried making the need for change known to these people?
- V. Current law governing Scheduled-designations
  - a. Are the Gond people being affected by auction requirements? In what way?
  - b. Is biodiversity conservation affecting the designation of tribal land?
  - c. Are there laws that distinguish subterranean property from surface property?
  - d. Give me a brief history of tribal and non-tribal coexistence in Panna.
- VI. Snowball sampling
  - a. Is there anyone else you think I should talk to?
  - b. Can I use your name as a reference when I contact them?

**Guide for semi-structured interview with elected officials**

- I. Background information on participant
  - a. What is your name?
  - b. What is your position and what does that entail?
  - c. How long have you been in politics? And in this particular position?
- II. General awareness of informal diamond mining in Panna
  - a. Demographically, who is most likely to mine informally?
  - b. How likely are they to be licensed? What might prevent them from getting a license?
  - c. Where are the licensed mines? The unlicensed mines?
- III. Opinions on illegal diamond sales
  - a. Are direct, non-auction sales happening? Are they a problem?
  - b. How is the law requiring auction currently being enforced?
  - c. Are illegal sales increasing?
  - d. Demographically, who is most likely to sell on the black market?
- IV. Opinions on sales reform
  - a. Walk me through the current process for turning diamonds over to the government.
  - b. Do you think it needs reform? In what way?
  - c. Do you intend to pursue legislative or policy reform in this matter?

- d. Have you done so in the past?
- V. Current law governing Scheduled-designations
  - a. Are the Gond people being affected by auction requirements? In what way?
  - b. Is biodiversity conservation affecting the designation of tribal land?
  - c. Are there laws that distinguish subterranean property from surface property?
  - d. Give me a brief history of tribal and non-tribal coexistence in Panna.
- VI. Snowball sampling
  - a. Is there anyone else you think I should talk to?
  - b. Can I use your name as a reference when I contact them?

### **Guide for semi-structured interview with academics**

- I. Background information on participant
  - a. What is your name and place of employment?
  - b. What is your background?
  - c. What is your general theoretical worldview?
- II. General awareness of informal diamond mining in Panna
  - a. Demographically, who is most likely to mine informally?
  - b. How likely are they to be licensed? What might prevent them from getting a license?
  - c. Where are the licensed mines? The unlicensed mines?
- III. Opinions on illegal diamond sales and reform
  - a. Walk me through the current process for turning over diamonds.
  - b. How is the law requiring auction currently being enforced?
  - c. Demographically, who is most likely to sell on the black market?
  - d. Do you think the current process needs reform? In what way?
  - e. Who has the power to make reform happen?
- IV. Current law governing Scheduled-designations
  - a. Are the Gond people being affected by auction requirements? In what way?
  - b. Is biodiversity conservation affecting the designation of tribal land?
  - c. Are there laws that distinguish subterranean property from surface property?
  - d. In what way are the Gond resisting their positions on the periphery?
- V. Former law governing Scheduled-designations
  - a. How did the British govern the Gond?
  - b. To what extent is current law governing the Gond an artifact of colonial rule?
  - c. What might be the reason such laws have not been updated?
  - d. Give me a brief history of tribal and non-tribal coexistence in central India.
- VI. Snowball sampling
  - a. Is there anyone else you think I should talk to?
  - b. Can I use your name as a reference when I contact them?

## Guide for semi-structured interview with NGO workers

- I. Background information on participant
  - a. What is your name and place of employment?
  - b. What is your position here and what does that entail?
  - c. How long have you worked here? And in this particular position?
- II. General awareness of informal diamond mining in Panna
  - a. Demographically, who is most likely to mine informally?
  - b. How likely are they to be licensed? What might prevent them from getting a license?
  - c. Where are the licensed mines? The unlicensed mines?
- III. Opinions on illegal diamond sales and reform
  - a. Walk me through the current process for turning over diamonds.
  - b. How is the law requiring auction currently being enforced?
  - c. Demographically, who is most likely to sell on the black market?
  - d. Do you think the current process needs reform? In what way?
  - e. Who has the power to make reform happen?
- IV. Current law governing Scheduled-designations
  - a. Are the Gond people being affected by auction requirements? In what way?
  - b. Is biodiversity conservation affecting the designation of tribal land?
  - c. Are there laws that distinguish subterranean property from surface property?
  - d. In what way are the Gond resisting their positions on the periphery?
- V. Former law governing Scheduled-designations
  - a. How did the British govern the Gond?
  - b. To what extent is current law governing the Gond an artifact of colonial rule?
  - c. What might be the reason such laws have not been updated?
  - d. Give me a brief history of tribal and non-tribal coexistence in central India.
- VI. Snowball sampling
  - a. Is there anyone else you think I should talk to?
  - b. Can I use your name as a reference when I contact them?

## Appendix C

### ADDITIONAL INTERVIEW NOTES

#### On governmental intransigence

“There isn’t supposed to be anyone living in the core zone, but women and children venture into it all the time. And they’re treated as criminals. Simply trying to collect firewood or gooseberries or tendu leaves, they have to hide to do it. Did you know that their babies are criminalized from the moment they’re born because they’re born in the forest?” – NGO representative, English

“My village has lost so many cows to the Forest Department. If they wander into the forest, they get taken and then we have to file a case to get them back, which costs money. But while we wait for the court, they do not feed the cows or take care of them, so they could die. And they do not compensate us for our dead cows. That is a separate court case too. They have already taken our land, and we have found out that they could have given us more money to relocate us from the forest. They promised us Rs. 10 lakhs, but they only disbursed Rs. 7 lakhs. They are talking about relocating the village again, and this time we will not move unless they give us a LOT more money. At least Rs. 25 lakhs. Do you think we could get more?” – villager, Hindi

“We make no money from mining. Do not start your own mine, because the Diamond Office takes so much money and never pays us on time. Some of the money goes into the District Mineral Foundation, but what is it?” – merchant, Hindi

“The District Mineral Foundation directly benefits the Tiger Reserve. It’s why the animal population is increasing. It’s supposed to be for general societal betterment.” – NMDC official (Panna), English

“The NMDC mines in the core zone, and they have huge piles of soil and rock that they say they will use to refill the mine when they leave. We will fill in our mines! Let us mine in the forest! That is where all the big diamonds are. Of course, even though I want to have my own mine now, I cannot do it because the places I want to mine are closed. The forest is closed.” – laborer, Hindi

“A socialist approach to governmental formalization of the shallow diamond mining sector is not economically feasible. You just cannot expect the government to form a PSU that controls the shallow mines and employs people in an organized manner. Who would want to do that extra work?” – NMDC official (Panna), English

“There are only 5 guards. How are 5 men to guard all the currently operating public leases against illegal sales? They cannot. Of course, the guards are ALSO supposed to verify land allotment for the lease applications. It is just too much work.” – MP state mining official, Hindi

“Many people from outside say many things about how the Diamond Office is run, but I have been here for years, and I have learnt the local language, and I am friends with everyone who comes because they are poor and desperate and grateful for my support. But you will believe them and not me because I am nobody. But I am telling you, it is my duty to help them.” – MP state mining official, Hindi

“The signature of the Diamond Officer is extremely powerful. It can save a man from a murder charge. We are responsible for all the diamonds mined in the region, so when people get into trouble for having a diamond without a lease, we help them. We can change the dates on the submission form so it looks like they had a lease all along, even if they apply for the lease only when they are submitting. Even though they found the diamond long ago.” – MP state mining official, Hindi

“[In response to the two quotes above] Of course he is corrupt. He is telling you all this about how he helps people, but I guarantee he charges people money to ‘help’ them.” – townsperson, Hindi

### **On money**

“Why would you sell a diamond illegally? Because the law is to submit it immediately. If you have not submitted it yet, then the longer you wait, the more you are in danger from the law. Plus, selling illegally means no tax and no royalty. This means a higher overall rate for the seller.” – local police, Hindi

“We sell to middlemen because we get more money from it. It is easier. Everyone does it. They give us the money immediately. The networks start in Panna, but it helps if you know someone in Mumbai or Surat.” – merchant, Hindi

“Will we get any money from talking to you? Will you help us file BPL paperwork with the government? Our collector is good, but he has too many people to help. There is a lot of ration corruption.” – villager, Hindi

“There are no jobs here. North of Ajaygarh, I heard that most of the villages are empty. I do not know what they are complaining about – it is not like they live next to the forest like we do. Look: over there, that is the official forest boundary. They paid some of us money four years ago to erect that stone wall, but it is just for show – any tiger could easily jump over it. But at least the job lasted for two years.” – villager, Hindi

“I learnt how to find diamonds from my husband’s family. My family does not do diamond work. Now that I know how to do this, my husband can travel to Jhansi or Gwalior and find other work, and I can work here.” – laborer, Hindi

“He is five months old. I have to bring him with me, there is no one to take care of him. All of us are working.” – laborer, Hindi

“I started when I was 15. I lied about my age. I needed to work. Now it has been 10 years and my wife works with me.” – laborer, Hindi

“This is our landlord. His family used to farm all this land, but he has decided to try mining it. Sometimes the farmers will ask for a flat rate every month or every year to lease their land, because that is a guarantee. But sometimes they want a percentage of all our finds. Our friend here is confident that his land is lucky, so he is taking a percentage. He will let us dig for free if we don’t find anything. He is not only working with us – all that land over there also belongs to him, and someone else is mining it.” – merchant, Hindi

“They have been talking about a Diamond Park forever. I went to Mumbai to learn how to do this. I do not get a lot of diamonds – only the ones with obvious marks inside. For good diamonds, the merchants will take them directly to Surat to get them cut and polished. There are only a few of us in Panna. If they have a Diamond Park here, maybe I could teach how to cut and polish.” – artisan, Hindi

“Why are people poor? Poor soil, not much water, the Forest Department forcing less commercial activity, no train connectivity, a monarchy that lasted for centuries, petty feudalism. Everyone is poor. There really aren’t any rich people in Panna.” – local police, English

“The infrastructure is bad here. Imagine waiting for a bus for two days. That happens here.” – NMDC official (Panna), Hindi

“People are very poor. You can pay someone in Rs. 100 worth of liquor and buy a murder.” – CISF officer, Hindi

“We know illegal mining is increasing. We know because people are getting richer. It is common knowledge. Why would there be so many mines if diamonds are not being found? Of course they would stop mining. That they are mining means there are diamonds. Meanwhile, MP state diamond revenue is decreasing. So there are illegal sales.” – townsperson, Hindi

“When they find the diamonds and sell them illegally, they could easily be taken advantage of. We should try to reduce illegal sales to at least reduce the cheating of the tribal people.” – local politician, Hindi

### **On the environment**

“The tiger watering holes are artificial tanks that are filled daily. There are some natural watering holes, but most are tanker-filled. This is a dry deciduous forest type, so it’s to be expected. There are also some check dams on old drainage ditches and nallahs, and the old system of wells and tanks was exceptional, but when the kings lost power, their maintenance was ignored.” – student (Wildlife Institute of India), English

“Why does the Forest Department need so much land? They do not take care of it – the tigers keep dying and they keep bringing new tigers from other places. We have no water and no money, and we have to give up what we do have for the tigers. The tigers die. They cannot live here. The forest does not have enough water for them. This place is not for tigers anymore.” – townsperson, Hindi

“Forest protectionism is already high and may yet get higher. Given that societal opinion of your artisanal miners is likely low, higher protectionism can only mean increased migration, landlessness, poverty, and pockets of an extra-legal forest economy.” – Professor of Deccan history, English

“The waterfalls are very popular. We make a lot of money from tourism at the falls. The forest is closed in the monsoon, but actually, throughout the year, most of the money is spent in Khajuraho. Panna does not even have a train station.” – Forest official, Hindi

“Environmentally, shallow mining is a big problem. Plots are 8×8, but there are so many, and they require so much water. We have to update our Environmental Impact Statement often at the NMDC. We recycle our water. We are storing the overburden to refill the mine when we leave.” – NMDC official (Panna), Hindi

“How long does it take for soil to become fertile again? 300 years? If you convert fertile soil to mining, you lose cropland for centuries. This region only supports one rabi crop.” – NMDC official (Panna), Hindi

“Wheat, sorghum, pulses, and vegetables. It is not agricultural soil.” – local politician, Hindi

### **On society at large**

“Do you really think Rio Tinto just left? They extracted and sold diamonds illegally during their gestation period. They wouldn’t just leave having made a loss.” – NMDC official (Panna), English

“We used to mine Ramkhiriya before moving to Majhgawan. There is possible illegal mining happening there right now. If the grade was good enough for us, it is definitely good enough to everyone else.” – NMDC official (Panna), Hindi

“Consider that the NMDC gets some 2 carats per 100 tonnes of source rock. How much could possibly be found in the small mines? Not much. So there really can’t be very much being sold.” – NMDC official (Hyderabad), English

“We can’t be too heavy-handed. The people who come to buy diamonds illegally also participate in legal auctions.” – local police, English

“There are two layers between the auction and me, so I have no way of knowing whether the diamond is from the auction or is illegal. Normally, unless somehow there is a large number of gem-quality diamonds, auction purchases happen in bulk. Then the buyer splits up his large lot into smaller lots and sell those to other people. Then at that stage, someone will give me some diamonds to cut and polish to his requirements, though I also make some decisions and can be artistic. So by the time I see the diamond, it has already passed through multiple buyers. Who knows if one of those buyers was at the auction or not? Who knows if the diamond is even from Panna?” – artisan, Hindi

“You cannot trust the Diamond Office’s blackboard of diamond locations. People lie about where they found their diamond, because if they do not, other people might come to their sites and compete. People also lie because maybe they do not have a lease to mine the site where they actually found the diamond.” – merchant, Hindi

“I do not mine illegally. None of us mines illegally. But all these workers, they work here during the day, then in the evening they go and dig their own shallow mines somewhere else. They will tell you no, but you cannot believe them. Everyone thinks that they will be the ones to get lucky.” – contractor, Hindi

“I do not know what makes people want to mine. They have so much confidence in their luck. I could never do that. It takes a special type of person.” – townsperson, Hindi

“Where did you hear that shallow miners dig in the forest and sell illegally because they think the government has no right to tell them what to do? No, selling illegally is more of an economic issue than some ‘sons of the soil’ issue. They are not the only ones mining.” – local police, Hindi

“You might find that you’re running into a fundamental disagreement over notions of property. The forest means different things to different claimants.” – Professor of environmental history, English

“Everyone knows the value of a diamond. It is not hard to look at the size and color of the diamond you have found and figure out how much you can get for it. But these workers, they do not know. All they know is how to dig and break the stones and search for the diamonds in the gravel. But that is difficult – I do not know how to do that. I watch them every day and try to learn, but the diamonds just look like rocks, so I do not know how they find them.” – contractor, Hindi

“Of course there is a mafia. Of course they expect a cut. You do not know, you are from the South where the police are better and you are in college, but us poor, uneducated people cannot depend on the government to save us. We have to make our own way or they cut off our heads.” – villager, Hindi

“The women of our village wake up at 2, go into the forest to collect firewood, and come back with their bundles for the market at 6 am. It is 20 km to go and sometimes the girls meet them on the way back to help them. We cannot let them take any cows or donkeys to carry the firewood because they might get eaten by the tigers. We get Rs. 50 per bundle.” – villager, Hindi

“We are not allowed into the core zone. We were relocated from there, but now we send the women, and if they get caught, they can beg for permission to leave and promise not to come back. But if we go, we get arrested and beaten. So the women have to do all the forest work.” – villager, Hindi

“They work really hard, you know. You can teach them how to be trackers or guides on safaris, and because they’ve spent a whole life living in the forest, they already know how to be careful around the wild animals. But so many of the civil jobs go to people who have enough pull to bribe someone to secure the job for their wastrel sons or sons-in-law. And all those people do is turn around and extract bribes from the tribes and villagers.” – NGO representative, English

“The kids, especially, are so enthusiastic about learning things and meeting new people. The Indian government is supposed to educate them for free BY LAW, but what if letting your child go to school means not enough people are working to support your family? What if there’s no food for the next meal? The Taj has a tie-up with a few villages to lead village tours, so those people have a passive source of income, but what of the people who don’t live in a picturesque-enough village for the Taj? The Bangladeshis have their own villages, they don’t mix, and they are primarily farmers. A failed monsoon means disaster.” – NGO representative, English

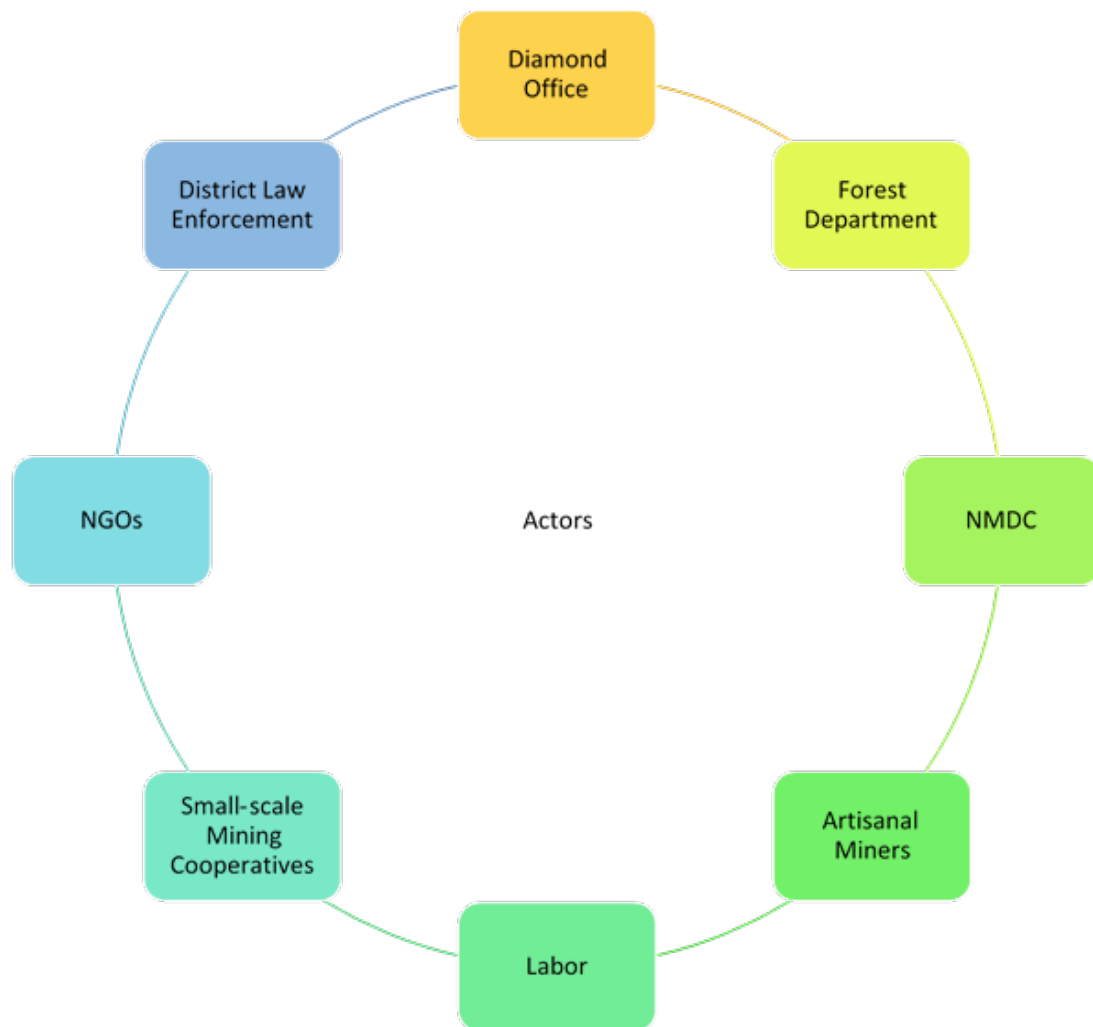
“There is a very dismissive governmental attitude towards the locals. The officers will chase them away, will shout that they are bothering them. There is so much casteism and sexism.” – NMDC official (Panna), Hindi

“Of course people aren’t trying to get something for nothing! There’s such a strong governmental and cultural belief in not allowing people access to direct governmental support. People may have ration cards, but no actual rations. People may be entitled to pensions, but not receive them. The corruption occurs in combination with the belief that creating jobs is more important than simply implementing foundational social programs.” – NGO representative, English

“The happiest women today, they stopped playing victims. They stopped whining in self-pity and dining in pity parties. They moved past their anger, tears and bitterness. They realized that happiness is a personal choice and responsibility.’ This is a general statement meant for the women you meet in local mines who work for Rs. 200 per day. It is not meant for you. But certainly it is meant for someone who has the notion that women are always oppressed by men and live lives that are always dictated by a male-dominated society. There is a difference between you and the lady in the village: at least you are educated and aware of your rights. You know how and where to express what you want to. Men and women are gifted with different qualities and capabilities which can be utilized together for the betterment of society. If ‘empowerment’ is an effort to achieve some society in which a particular status can be a man’s or a woman’s, then I disagree. I may not have completely understood women in my life, but I have always respected them and their freedom.” – NMDC official (Panna), English

**Appendix D**  
**STAKEHOLDER MAP**

External requirement: funding from national and state governments



## Appendix E

### IRB HUMAN SUBJECTS APPROVAL



**Institutional Review Board**  
210H Hulihan Hall  
Newark, DE 19716  
Phone: 302-831-2137  
Fax: 302-831-2828

DATE: June 7, 2019

TO: Sindhuja Sunder  
FROM: University of Delaware IRB

STUDY TITLE: [1434044-1] Diamond mining in Panna  
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS  
EFFECTIVE DATE: June 7, 2019

REVIEW CATEGORY: Exemption category # (2)

Thank you for your New Project submission to the University of Delaware Institutional Review Board (UD IRB). According to the pertinent regulations, the UD IRB has determined this project is EXEMPT from most federal policy requirements for the protection of human subjects. The privacy of subjects and the confidentiality of participants must be safeguarded as prescribed in the reviewed protocol form.

This exempt determination is valid for the research study as described by the documents in this submission. Proposed revisions to previously approved procedures and documents that may affect this exempt determination must be reviewed and approved by this office prior to initiation. The UD amendment form must be used to request the review of changes that may substantially change the study design or data collected.

Unanticipated problems and serious adverse events involving risk to participants must be reported to this office in a timely fashion according with the UD requirements for reportable events.

A copy of this correspondence will be kept on file by our office. If you have any questions, please contact the UD IRB Office at (302) 831-2137 or via email at [hsrb-research@udel.edu](mailto:hsrb-research@udel.edu). Please include the study title and reference number in all correspondence with this office.

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