

## **The coal cycle: small scale illegal coal supply in eastern India**

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### **Abstract**

A characteristic of the Jharia–Raniganj coalfields area is the sight of bicycles carrying sacks of coal, the bike being used as an inanimate packhorse with men pushing them along the roads connecting the mines with the neighbouring towns instead of pedalling. This is one tiny part of an extensive illegal coal supply network involving millions of tonnes annually. Who are these coal cycle *wallahs*, how much coal do they carry, where does the coal come from, and where does it go? Our objective here is to provide an estimate of one part of the ‘black’ (or illegal) coal economy in one part of the coal-producing tracts of India by describing the nature and extent of the supply of coal (or coke) provided by bicycles. We recognize that it is indeed a rather tiny part of the entire gamut of illegal coal mining, transportation, and distribution network that is in place in the colliery tracts of India.

This paper examines this cycle distribution network and provides an estimate of the amount of coal supplied in this manner throughout the eastern Indian coalfields of Jharkhand and West Bengal. This estimate is based on recent field surveys of the amount of coal loaded onto cycles for transport to a particular town, assuming demand was local- and urban-population driven. The study was supported by previous experience in the field and by interviews with key informants. At the end, the paper attempts to explain the occurrence of the phenomenon of illegal coal mining and tries to provide some policy suggestions.

*Keywords: coal, illegal, mining, cycle, supply, village, eastern India*

## Introduction

At a production rate of over 300 MT (million tonnes) per year, India is the third-largest coal miner after China and the US (IEA 2002). Until the 1980s, much of India's coal was extracted from the eastern coalfields (Jharia and Raniganj) in Jharkhand/West Bengal. Now, with the thrust on industrial development, besides intensifying extraction in existing projects through increased mechanization, other coalfields have opened up around India, in particular, the central coalfields of north Karanpura, stretching across Jharkhand (once south Bihar) to the west of Dhanbad, the 'coal' capital of India, located on the Jharia coalfields. The Raniganj–Jharia coalfields<sup>1</sup> are still significant, producing about 25 MT per year. Until the advent of open cut<sup>2</sup> development, most coal came from relatively shallow underground mines, extracted using board and pillar technology. Today, large-scale open cut mining is providing about two-thirds of India's coal production.

Alongside, piggy-backing on, the largely government-operated formal mines, has flourished non-conventional mining that is often seen as illegal. This coal mining is carried out by villagers, digging in small patches or from older abandoned mines in these coal-bearing areas. It is illegal because in India, as in many other developing countries, mineral resources under the ground belong to the state. Coal is considered to be a 'major' mineral and hence collieries can only be operated by a licensed operator who can legally mine coal following various norms set by the government. Illegal mining began full scale in the region about 7–8 years after nationalization and the raising of coal prices, but instead of staying hidden, as it used to be before, it has now become more visible and diversified. A common sight now-a-days along the highways and other roads in the area are bicycles carrying sacks of coal, the bike being used as an inanimate packhorse with men pushing them instead of pedalling.

One naturally asks who are these coal cycle *wallahs*,<sup>3</sup>, how much coal do they carry, where does the coal come from, and where does it go? Again, more broadly, one may ask, why do people engage in illegal activities and why now? The research described here started with these simple questions. Our objective here is to provide an estimate of one part of the 'black' (that is, illegal) coal economy in one part of the coal-producing tracts of India by describing the nature and extent of coal (or coke) supplied by bicycle. The black economy, as a whole, is very extensive and pervasive within India. The non-

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<sup>1</sup> Three major government-owned companies operate in this area, Eastern Coalfields Ltd, Bharat Coking Coal Ltd, and Central Coalfields Ltd. They are subsidiaries of Coal India Ltd. Besides the three companies, there are a handful of 'captive' collieries attached to power or steel plants and owned by them[au. Referring to what?].

<sup>2</sup> a means of extracting the coal by removing the overlying strata with large digging machines; also known as opencast, open pit, or strip mining

<sup>3</sup> '*wallah*' is a common Hindi language word meaning someone connected with a particular activity. Here, a coal cycle *wallah* is one who pushes the coal-carrying bicycle.

formal economy (combination of informal and black economies) is estimated to amount to ~ 88% of the known GDP (Harriss-White 2003); but according to Kumar (1999) at least 40% of the Indian economy is black. Although the latter believes that the black economy is concentrated in the top 3% of India's money earners, it permeates down to the lowest levels: we show the distinction between informal and illegal economies are becoming increasingly blurred. This paper, therefore, deals primarily with a numerical measurement of the size of illegal coal carried by cyclists in eastern India.

The research reported here differs from other studies of the 'black' or 'underground' economy, making use of intensive, quantitative field surveys and qualitative in-depth interviews. Data presented in this paper are based on two types of surveys carried out during November–December 2003. The first type of survey counted the number of cycles coming into town along critical roads whilst the other consisted of interviews with administrators, local police, journalists, as well as opportunistic talks with coal cycle *wallahs*. Information and data collected from the surveys is supported by census data and experience developed in the past three years whilst carrying out research projects in this particular region.

First, we provide a flavour of some of the interviews and anecdotal evidence, second, we describe the sources of coal and small-scale coking procedure, the *wallahs* and their cycles, and the extent of delivery by cycle to a selected town (Hazaribagh in Jharkhand). Finally, we estimate the amount of coal or coke that gets delivered this way from the coalfields in eastern India: the states being Jharkhand and West Bengal, and the coal fields being Bokaro, Jharia, north Karanpura, and Raniganj. The tract covers an area of approximately, 20 000 km<sup>2</sup> (Figures 1 [a and b]), the eastern parts of which are densely populated and more urbanized than much of India.

## **Anecdotal evidences and assessments**

Coal has been mined intensively in eastern India since the mid-1800s. Since then, mines have had an influence on the surrounding social fabric, stimulating migration, leading to urbanization and industrialization, and have modified the physical environment (Lahiri-Dutt 2001). Over 70% of the Indian coal is used for power generation. Coal companies owned by the government-operate both underground and open cut collieries, and use an intricate network of distribution to supply coal to the consumers. Much of this coal, however, is transported by rail, and point-to-point deliveries are made by trucks. The sightings of coal cyclists, especially on the highways of Jharkhand, have become common in the past few years. This time period has also been one of intense change in the coal mining industry; mines have become more mechanized, larger, and have led to more displacement of the local communities than ever before (Lahiri-Dutt 2003). Are there relations between these new developments and the recent proliferation of coal cyclists?

We used qualitative interviews with the local informants to find out about the location, extent, and nature of the workforce of the illegal mining economy. These informants came broadly from six groups: district administrators and police officials, mining managers, key resource persons in the local communities, trade union leaders, members of the civil society organizations, and the cycle *wallahs* themselves. We interviewed both district collectors (administrators) and police officers at various levels. The district collectors generally tend to feel that the problem of illegal coal mining is one of law and order, yet avoid taking any direct responsibility for preventing theft from company-owned land. They also tend to ignore the larger operations on privately owned land as long as the owners maintain peace in the local community. The police officials tend to vary in their views regarding illegal coal; at the highest level of policing is the district SP (Superintendent of Police) who often comes down heavily upon the larger operations, both mining activities and truck transportation, but tends to ignore the cycle *wallahs*. According to the SP of Hazaribagh district, '*we have full knowledge of the large operations, but we let these villagers do this because if we don't then they will commit other crimes and the crime rates will go higher.*' Indeed, as pointed out by the local resource persons, there would be more seasonal migration to other parts of India to look for work. This is becoming quite an issue in some parts of the country, with local resentment building up against migrant labour.

Police officials at the lower levels, however, feel differently. According to them, illegal mining can never be stopped entirely but it should also be noted that some of these police receive regular payments from the illegal mine operators. Similar to the government officials, mine managers appear fully aware of the exact locations of large illegal operations but tend to be ambivalent in their attitudes towards the practice. The trade unionists often mention the role of the mafia in illegal coal mining and transportation. However, operation of the 'mafia' is unclear to them: anyone working in these mines could be potentially a part of the mafia as long as the person does not hold a regular company job and is not in possession of protective membership from a labour union.

A local journalist we interviewed opines that illegal mining and transportation are two separate (but not unrelated) aspects of the 'black' coal business. According to him, both large-scale (by trucks) and small-scale transportation (by cycles) occur in a centrally controlled manner that resembles the illegal *satta* (gambling) business, which is game-run by underground kingpins in the big metropolitan cities. However, from our interviews with cycle *wallahs*, there was no evidence supporting his claim. We met Nirajal Birhor, for example, a member of the Birhor tribe, whose name literally means 'man from the forest' (*bir* = man, and *hor* = forest). This used to be a tribal group comprising a few thousand people subsisting on hunting and food-gathering, possessing unique rope-making skills using jungle twigs, developed over generations of intimate contact with the jungle. Nirajal has now been pushing a coal-laden bike for the past three years.

Another key informant thought that the degree to which the SP tried to combat the mafia depends on how new he was to the job because it would become apparent to him that his career prospects such as

promotion could depend upon turning a 'blind eye' to the illegal coal business as the mafia had plenty of political clout. The problem of the mafia apparently controlling the illegal mining and transportation arises because coal is not freely sold in India. The state-owned mining companies have rights to sell coal as well: this selling process leaves much to be desired. The entire coal-producing region in eastern India does not have a single distribution depot to cater to small and domestic consumers.

A non-government organization member elaborated upon the system of obtaining 'linkage' for coal use by factories. Often, a local coal-based industry owner applies to the central government for a grant of coal to fire its furnaces. This permission paper is rather hard to obtain and might require multiple bribes at various levels. Once granted, these permission papers can be repeatedly used to obtain tax-free coal from sale dumps of the Central Coalfields Limited even though the industry may have subsequently shut down and is only a front. In our view, as evidenced from interviews with coal cycle *wallahs*, this system of illegal coal transport operates at a much higher level and is usually done using trucks.

In our interviews with the cycle *wallahs*, we repeatedly asked whether their supplies were meant for fixed customers or not. Local *chimney bhattas* or brick kilns can be major consumers of this coal throughout the dry months. In most cases, the cycle *wallahs* were indeed itinerant sellers, selling coal to even smaller consumers like individual homes. Most cycle *wallahs* belonged to the local tribal groups (*adivasi* or indigenous communities). Like Nirajal, until only a couple of decades ago, they lived on forestry and farming, but have since been absorbed into the mainstream society, taking up employment as illegal operators.

Often, according to the journalist, the cycle *wallahs* are funded by businessmen operating truck transport. Also, truck transport can be a completely different operation than the cycle *wallahs*. The mafia's presence was mentioned by almost every respondent, although in our view, it comprises another style of operation than that performed by the cycle *wallahs*. The fear of mafia is omnipresent; often, when miners die in illegal mines, the mafia does not let the relatives of the dead man file a 'First Information Report', or FIR, which means that the police do not always have information about such accidents.

A recent newspaper article ([Prabhat Khabar 2004](#)) is relevant here.

*'to control the coal mafia, the Jharkhand government has decided to use the Gunda Act against them. Further, it has decided to put the responsibility for tragedies taking place in illegal coal mining on to the companies. The local administration will cooperate with them, but the government will not be held responsible for these tragedies. This was decided at a high level meeting today, chaired by Secretary Lakshmi Singh. It was also decided to set up a task force, made of the District Commissioner and the SP who will cooperate with coal companies.'*

We hope that this initiative bears fruit, but all too often, such pronouncements are made with little subsequent effect.

## Sources of coal

Coal carried by bicycle to the nearby towns is of an illegal nature. There are three main sources (1) small shallow village-dug mines, (2) village mining on abandoned or orphaned government mines, and (3) coal from official operating mines, that 'fell off the back of truck' or was otherwise scavenged from sale dumps.<sup>4</sup>

### 1) *Village dug mines*

The land on which these mines are dug may be privately owned, but often, in Jharkhand, the land is village commons or *gair majurwa*<sup>5</sup> whilst to the east, in the more densely populated West Bengal, where there is little *gair majurwa* remaining, the mines are generally on private land. The mines are dug into outcrops exposed at the sides of steep hills or rivers. Coal may be extracted through a series of small open-cut holes, which may extend underground a little way. Alternatively, they may be shallow underground operations, entered via a drift or a shaft to a depth of about 10–15 m, and which can extend for up to 200 m horizontally. Small brickworks can exist synergistically, taking some of the coal from the pits where a few kerosene lamps (*hazacs*) provide illumination. Coal is removed by pick-axe by the coal (*koila*) cutter after which loaders (*bojharis*) put the pickings into metal dishes that are carried out on the head, ~25 kg at a time. Some of these mines can operate most of the year; others become unstable during monsoons; while some may get filled up with water requiring the lowering of the water table before being capable of being pumped out. Overall, the rainy season is the slack time as locals get employment in the fields at that time. Those mines that fill tend to be smaller in size and their production too is much less. All three types are found on *gair majurwa* lands. Extensive village mines can be found, for example, in the Barkagaon region about 20 km south-west of Hazaribagh town. In Jharia, too, such mines are to be found, although the amount of *gair mahurwa* land decreases towards the east. Lack of safety equipment and geotechnical knowledge means that accidents can and do happen. These accidents tend to attract a lot more media attention than the cyclists. However, the attention has a flip side as in the case of fatalities, family members are unwilling to identify their members because of the stigma of illegality and the potential ensuing harassment from police.

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<sup>4</sup> Sale dumps are depots where the mining companies store their coal after digging it out from different collieries. These are also distribution points for legal coal. Therefore, these are spots from where trucks leave with 'linkage' papers to their destinations.

<sup>5</sup> *gair majurwa* literally means 'deedless land', that is, land that is not officially recorded and has no legal ownership. Those living or cultivating such land may have *de facto* ownership, although such customary ownership is not recognized by the law when the company takes over land for mining.

From a financial point of view, a local, better-off villager finds the investment (~US\$400) to cut the entrance-way down to the level of the coal seam. Then, contractors from the village cut the coal and carry it out to the surface. The *bojharis* buy coal from the cutter (who gets about ~US\$3 per day) and then sells it to the cycle *wallahs* for about US\$1 per 150–200 kg (a cycle load). They, in turn, retail their load for about ~US\$3. The mine 'financier' receives about US\$3 per day, which is a reasonably good return on his investment. The extra money that a family may get from 'coal' is about the same that they get from traditional agriculture but provides a critical extra amount of money that might, for example, enable them to send their children to school.

### 2) *Abandoned mines*

The eastern coalfields area have a 200-year history of mining that is often poorly documented. The region is dotted with small abandoned mines, some of them orphaned by mining companies owned by individuals. As collieries were brought under state ownership, no one has any responsibility for the remains of such old mines. Moreover, the nationalized company often neglects to entirely refill voids with sand. Villagers have ready access to any coal that is left. For example, coal from orphaned mines around Jarangdih to south-east of Hazaribagh supports at least 25 000 people, the coal remaining for use within the village rather than being carried further afield.

### 3) *Official mines*

There is poor security at many Indian coal mines and hence plenty of opportunity for pilfering. In underground mines, this happens from the coal loading area: coal is loaded by head baskets into awaiting 10-tonne trucks, and there may be some degree of cooperation from some mine staff. This activity is probably more directed to larger scale fraud involving the so-called 'coal mafia'. Coal India also delivers coal to both the local sale dumps located near the mines and big dumps on major highways for long-distance trucks to load and carry interstate. Again small-scale pilfering would not be difficult from these dumps. Some coal also 'falls off the backs of trucks'.

An example of this recounted by one of our local informants comes from the large open-cut Ashoka-Piparwar mine, and involves some local boys who meet a dumper driver (more often than not a local person the boys know). They pay a few hundred rupees to him and the record keeper (*munshi*) who 'becomes abstracted and looks away' as the dumper passes out and fails to record it. The dump truck, instead of going to the railway siding, is driven to a deserted place in the nearby jungle. Later, at night, a truck comes into the jungle where boys load it and it is here that we move into the mafia sphere. This truck would be arranged by somebody who has enough clout to 'fix' the local police (a few thousand rupees), and who has contacts at the marketing end. Much of the coal goes to the brick kilns and urban centres in the Gangetic plains.

## Coke-making

Most, but not all, of the fuel that is delivered by cycle to the neighbouring towns is crudely coked. This is because it is cooking fuel that is most in demand, and removal of volatiles by coking prevents the tainting of food being cooked. The coking is largely carried out on the surface near the mine entrance. Each carrier out of the mine heaps coal from eight dishes into a shallow depression (or *khudi*) to form one pile, which constitutes one bicycle load. These piles are then ignited by the *firers* (who may also be the *bojharis*) and are allowed to burn for awhile. When judged hot enough, they are covered with slack (fine coal) to prevent too much ingress of air. The coke is ready by early morning. Some bicyclists carry raw coal to their homes and heap-coke the coal there, which saves small sums of money.

Many heaps are burning at any one time and one of the consequences is that visibility in these areas, once very good, often becomes very poor, perhaps only 1 km on calm mornings and maybe 2–3 km in the afternoon. This implies atmospheric particle loadings can exceed 200 micrograms per m<sup>3</sup>, which can be contrasted with the fact that modern cities are setting particle limits of 25–50 micrograms per m<sup>3</sup> averaged over 24 h. Haze, however, also results from other activities, particularly those carried out at coal-based power plants, domestic use of biomass as fuel, and particle emissions from brick kilns. However, in areas to the south of Hazaribagh, coke making would be a major contributor.

## The coal cycle

A point to note is that the coal cycles have only become a common sight on main roads and highways in the past 5–6 years, and with expansion of coal mining in India, there has come greater awareness of coal and demand and opportunity for this activity to develop. In Raniganj, other means of transport have traditionally been used, including the cycle van and bullock carts.

### § *The coal cycle wallahs*

A stream of these *wallahs* pushing their loads up a hill reminds one of a line of ants struggling with food seemingly too big to be handle. They provide a fascinating subject of enquiry to the curious person. In most cases, cyclists are friendly and open to chatting, particularly when they stop to catch a breath in an uphill push. However, they are often guarded in their responses when asked where the coal comes from. Locals such as jeep/trekker (a form of open large jeep used commonly for transporting passengers) drivers or even local police may stop to help them if a curious interviewer causes suspicion.

The loads are pushed by the cycle *wallahs* 15–25 km up, sometimes reasonably steep hills, and the return journey may take as long as eight hours. When pushing the coal up the steep inclines, they may stay in groups of 4–8 in order to help each other. On flat roads, individual *wallahs* can be observed. For one destination, Ranchi (the capital of Jharkhand), the cycle *wallahs* undertake a two day journey



of ~60 km, the extra time taken being compensated by a higher price for coal. The stamina needed to undertake this long trip means they only do this twice a week, and return by the local trekkers with their cycles on top. Those who take only one day for their trip often do it every day.

#### § *The daily cycle*

Around Hazaribagh, cycle *wallahs* start early in the morning, arriving at the village mine-site from about 4 a.m. onwards to load up their cycles with raw coal or, more often, newly formed coke—this can take up to an hour. There maybe makeshift tea stalls located on site to cater to their primary needs. The peak arrival time in towns is about 7 a.m., which are maybe two-hours away and then tapering off gradually in afternoon hours. If mines have only limited amounts of coal to sell then the procession tapers off earlier. After selling their fuel, the cycle *wallahs* reinstall the chain and ride the bikes back home.

#### § *The bicycle*

The cycle used for delivering coal is basically a standard cycle but are often strengthened in some ways. All have stouter wheels, such as are found in the cycle rickshaws; the spokes are twice the diameter of normal bikes, and the hubs are stronger. According to one respondent, one cycle tyre costs about 300 rupees. An elite view of these cycles is that they are ‘given’ to the local villagers by the coal mafia who control the delivery systems. Based on our surveys, however, we feel that this does not apply to small-scale delivery to the nearby towns. Some cycles, but not all, have stronger frames through welding reinforcing metal plates to the major part of the frame.

The coal or coke is packed into used plastic or jute bags. The load may range from 8–10 x 20–25 kg bags to one 150–200 kg bag roped onto the bike through the frame. The chain is disconnected but carried with them as the bikes are often ridden back.

In the Raniganj area, bicycles tend to be the standard ones rather than specially strengthened for the purpose with the result that the individual loads are somewhat lighter. In addition to the bicycles, three-wheeler goods rickshaws are also deployed to carry the coal. The overall organization of this coal supply network is rather intricate and can engage the entire village communities in digging up coal from the local, privately owned land. This is because being more densely settled with a longer history of coal mining, the amount of *gair majurwa* is much smaller towards the east. However, even in the Raniganj region, mines have come up on the surface in the past decade and have left a devastating impact on the environmental resources that these communities have traditionally survived on. An example of the overall organization of this coal supply network is diagrammed in [Figure 2](#), involving coal dug up by villagers on the local private land.

## Extent of supply by the coal cycle

Our approach to quantifying the supply of coal or coke by bicycle has been to observe how many coal cycles come to a particular town, Hazaribagh in Jharkhand, and assuming, the demand is population-driven, extrapolating over the towns within a certain distance of the collieries. Surveys of the roads on which coal cycles have been observed define the area across which the extrapolation is made. Anecdotal evidence has also been used.

### *Delivery to Hazaribagh*

Coal cycles enter Hazaribagh by two routes viz. the Ramgarh road from the south-east and the Barkagaon road from the south-west. The cycles start to arrive at about 6 a.m. in winter from both roads. Those from the south-east can still be seen arriving at 4 p.m., whilst those from the south-west seem to cease at about 12 noon. The reason for this difference may be due to the amount of coal that is available for delivery from the sources that use these roads. The latter fuel from the south-west comes from small village-dug mines with limited production rates, whilst the former comes from around the official mines, east of Charhi. The hourly rates of cycles, observed by travelling along the road in question or by counting at a particular point on the road, are listed in [Table 1](#).

For the cycles arriving from south-west, then, then fitting a frequency distribution such that cycles are arriving at 6:00 h rapidly rising to a peak around 7:00–8:00 h and declining to zero at 12 noon allows us to calculate an estimate of the total number of bikes arriving daily. The estimated total is 300 cycles per day. Fitting a similar but wider distribution, terminating about 17: 00 h to those from the south-east, leads to an estimate of 800 cycles per day, giving a total of 1100 cycles. This is reasonably consistent with the anecdotal information from informed locals, suggesting that 900 coal cycles per day enter Hazaribagh. We will use a value of 1000 cycles daily to supply fuel, mostly coke, to small users in Hazaribagh, delivering a total fuel weight of about 150 tonnes. This is equivalent to about 200 tonnes of raw coal.

**Table 1** Rate of coal cycles proceeding into Hazaribagh

Time	<i>Cycles per hour</i>
From south-east	
6:50–7:50	125
12:20–13:20	20
15:50–16:50	36
From south-west	

7:00–8:00	69
8:00–9:00	72
9:00–10:00	85
12:00–13:00	0

The population of Hazaribagh is about 135 000, thus, the market for this sort of fuel is equivalent to ~ 1.5 kg per capita per day. We will use this value to estimate the overall market for the coal cycle in the coalfield region defined by the area in [Figure 1b](#).

#### *Delivery of coal by coal cycle*

Delivery of coal/coke by bicycle to towns up to ~30 km away and return can be accomplished by the coal *wallahs* in one day. In some instances, the coal *wallahs* travel for two days (for example, Ranchi) but probably only to large towns/cities where higher sale coal price makes it worthwhile. Towns, to which it is known the coal cycles go, are listed in Table 2, along with their population taken from the Census 2001 and the estimated weight of fuel that the coal *wallahs* deliver.

India has a large rural population, hence, although the population of Hazaribagh municipality is only 135 000, population of the Hazaribagh district is about 2.2 million. We have used the urban population as the demand driver for coal by bicycle as rural families often use local fuelwood for domestic consumption. The total amount of coal carried by the coal cycle is estimated to be nearly 2.5 MT annually. In the case of Ranchi, the state capital of Jharkhand and a bigger urban centre, it involves a two-day trip for the coal cycle *wallahs* twice a week, the rate of coal carrying could be lower than that to other towns, involving one day for the round trip. We have, however, used the same specific demand factor for Ranchi as used for the other towns.

**Table 2** Annual demand for cycle coal based on population

Town	Population	Amount of coal (thousands tonnes per year)]
Hazaribagh *	135	73
Ramgarh *	110	59
Dhanbad *	1064	575
Ranchi *	862	466
Bokaro Steel City *	498	269
Chas	97	52

Chatra	42	23
Simdega	34	18
Asansol UA	1090	589
Durgapur	490	265
Faridpur	110	59
<b>Total</b>	<b>4555</b>	<b>2463</b>

\* populations refer to urban area conglomerates as per Census 2001

## Coal cyclonomics

In the past 5–6 years, the carrying of coal by bicycle has become a common sight in the coal-producing region of eastern India. The cycle pushers, usually travelling in groups, often come up on the highways and are quite common on the lesser important roads. How much coal is carried in this way? As this is part of a ‘black economy’, not much can be said on a quantitative basis about production or distribution. Some idea of the economics was ascertained by interviewing the miners at Barkagaon. For the village underground mine producing 5–10 tonnes per day, this is summarized in [Table 3](#).

**Table 3** Coal cycle economy in eastern India

Operation	Amount (US\$)
Mine access capital	1000
Return to investor	3 per day
Coal cutter sells to the carrier ( <i>bojharis</i> )	3 per day
<i>bojhari</i> sells eight dishes to a cycle <i>wallah</i>	1 per load
Cycle <i>wallahs</i> sell to the end-user	2 per load

In this paper, we have provided a first-pass estimate of the amount of coal conveyed in this manner, based on observations of the number of cycles going into a particular town Hazaribagh in Jharkhand, each carrying 150 kg of coke or 200 kg of raw coal and extrapolating this around the region assuming the urban population in the neighbouring towns is the main demand driver.

On this basis, we estimate that about 2.5 MT of raw coal (or coke equivalent) is delivered (to surrounding shops, small businesses, etc.), mostly for use as cooking or heating fuel. This is equivalent to the output of a sizeable mine and represents almost one per cent of India’s annual coal production. To deliver this amount of coal, there would have to be approximately 33 000 bicycles per day being pushed along the roads surrounding only the eastern coalfields. In terms of dollars, this trade is estimated to be worth about US\$ 36 million annually.

It can be seen, therefore, that even at the lowest socio-economic level, the size of the black economy is significant probably because of the large number of people involved. We are aware

that this is not the only illegal black economy involved in the coal-mining sector. A range of illegal practices surround the coal mining at a much larger scale than discussed here.

This activity, however, forms an essential part of the subsistence of those involved. In the next section, we give an explanation of the occurrence of such cycles and analyse why they have become such a common feature in the colliery tracts of India.

## **An explanation for coal cycles**

We will now try to explain the occurrence of coal cycles based on this and our previous research, and from extensive interviews with local resource persons who informed us of the qualitative changes and emerging aspects of this illegal trade. As we have found, the cyclists carry a significant amount of coal on an annual basis. This is, however, just one small part of an extensive illegal coal supply network involving extraction and transport of millions of tonnes annually. The cycle *wallahs* come from the surrounding villages where environmental degradation and extreme poverty have resulted in lack of opportunities, whilst at the same time, reinforcing the model of mainstream mining–industrial–urban economy. Illich (1981) distinguished ‘shadow work’ from vernacular activities typical for subsistence. Here too, we see a similar imagery among the coal cyclists who are creating their own economy, an ‘enclave’ similar to that noted by Rothermund and Wadhwa (1978) in their path-breaking research on expansion of coal mining under the British *Raj*, where the nexus of landlords, mines, and peasants served the primary metropolitan enclave in Kolkata. Neither the mafia nor big business, these coal cycles deliver coal or coke to small consumers such as domestic houses, shops, particularly food stalls, and local brickfields, and fill small niches in the existing market demand. These markets are different from the large thermal power stations and industrial factories that the coal mines were meant to serve in post-colonial India.

A fundamental reason for delivery of coal by bicycle in western parts of the coalfields had been lack of any regular delivery system to the small local users. In the east, however, up until the 1960s, urban households situated around the existing coalfields (then in Raniganj, West Bengal) or connected by major road/rail, cooked with coal in kitchen outhouses. Small coal dumps were established and licensed within a town, the coal being delivered by truck or rail. When liquid fuels (LPG and kerosene) became routinely available, use of coal in middle class households was phased out in their favour. The coal trade was clearly demand-driven and extended as far as Kolkata or beyond.

However, after nationalization, the price of coal increased almost threefold in the six years that followed (GoI 1996). This made the business of illegal mining more profitable than farming or

other petty trade, and led to a rapid growth of illegal coal mining, which has become a profitable venture since the late 1970s. Raniganj and Jharia are areas that have illegal mining for many years but the delivery of coal by cycles only went out to a radius of 25–30 km or so. The coal cycles also use minor or 'back' roads. Increased demands in the past five years or so have made the cycles more visible in the major roads. Middle classes in this part of the country have switched to LPG cylinders over the past two decades, and those families who have yet to make the fuel transition are the obvious consumers besides the tea shops, small workshops, including and brick kilns. In Hazaribagh area of Jharkhand, on the other hand, formal coal mining is a more recent phenomenon. Here, illegal coal mining has spread only in the past few years. The major driving force behind the rampant spread of illegal mining in this time has been the expansion of large mines themselves. Open-cut mines, leaving their large footprints on the local ecology, have narrowed down the scope of alternative occupations in the colliery tracts of Hazaribagh–Ranchi. The state-owned companies have also failed to set examples of good environmental practices eroding subsistence bases of the local people who took up this opportunity. Finally, the rising populations, increasing urbanization (that again drives the demands), and constant inward-migration to the area have fuelled illegal mining.

The police tend to turn a blind eye to this type of coal distribution, which gives the people involved in the hard labour a slight improvement over their subsistence living standards. This is not supposed to be the case with the much larger diversion of coal involving the coal mafia. Much of this diversion is carried in trucks and is difficult to track and measure.

This coal mafia, however, indeed wields substantial power and influence in the politics of the area and is difficult to combat in a sustaining fashion. What we have described in this paper is, therefore, a rather small part of a huge illegal coal supply cycle and its multiple ramifications. The coal cycle *wallahs* are at the bottom, albeit the most visible parts, of this intricate network of mining, carrying, transporting, and distributing illegally mined coal.

Whether one needs to 'regulate' the illegal coal mines is a question that worries government and mining institutions all over the world, including those in India. There are two primary concerns: first, the potential for environmental damage from such mining, and second, (and consequent to the first) is the need to set up regulatory bodies for their control and supervision. What these debates fail to recognize is the fact that these practices are often decades old and well-entrenched in the local economy and polity. Also, as noted in this paper, local villagers make a subsistence livelihood from this business in absence of other economic opportunities. The mining companies too have omitted to play exemplary roles in the environmental or social governance. Therefore, it would be impractical to try and control such a practice that is by nature fleeting and shadowy and, rather than regulation, the answer may lie in acceptance of their existence as a fact and by giving them legitimacy in various ways. One of these means could be to de-license coal mining in much

of the same manner as it has happened in the other industries in India. Ease of obtaining a license may be aided by creation of village cooperative mines at the local level run jointly by the local owners, or *panchayats*. It would be interesting to see how the institutions of mining develop at the grassroots once the controlling chains of top-down bodies are broken.

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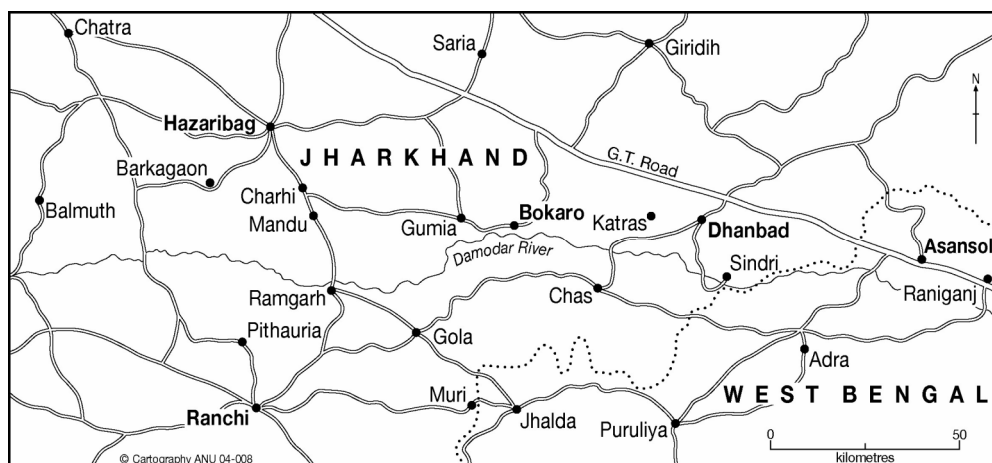
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**Figure 1a** The coal resources of India (adapted from IEA, 2002)



**Figure 1b** The study area



**Figure 2** Typical organization of small-scale illegal coal supply chains

