SANDEE

Working Paper No. 118–17

Characterization of Gold Mining Institutions in the Nilgiri-Wayanad Region of India: A Historical-Institutional Perspective

Amalendu Jyotishi
Sashi Sivramkrishna
Kuntala Lahiri-Dutt

ECONOMICS & THE ENVIRONMENT

South Asian Network for Development and Environmental Economics (SANDEE) PO Box 8975,
EPC 1056, Kathmandu, Nepal.
Tel: 977-1-5003222 Fax: 977-1-5003299

SANDEE research reports are electronic preprints output from research projects supported by the South Asian Network for Development and Environmental Economics. The papers are circulated for discussion and comments. A summary of the findings of SANDEE reports are also available as SANDEE Policy Briefs.

Amalendu Jyotishi, Sashi Sivramkrishna, Kuntala Lahiri-Dutt

Characterization of Gold Mining Institutions in the Nilgiri-Wayanad Region of India: A Historical-Institutional Perspective

Keywords
Institutions
Historical
Governance
Property rights
Gold mining
Nilgiri-Wayanad
India

SANDEE Working Paper No. 118–17

Characterization of Gold Mining Institutions in the Nilgiri-Wayanad Region of India: A Historical-Institutional Perspective

Amalendu Jyotishi

Professor, Department of Management,
Amrita Vishwa Vidaypeetham (University),
Kasavanahalli (off Sarjapur Road), Carmelram (PO),
Bengaluru - 560 035.

Sashi Sivramkrishna

Professor of Economics, NMIMS,
Bengaluru, India.

Kuntala Lahiri-Dutt

Senior Fellow, Resource Environment and Development Program,
Crawford School of Public Policy, ANU College of Asia and the Pacific,
Australian National University, ACT 0200, Australia.

April 2017

South Asian Network for Development and Environmental Economics (SANDEE)
PO Box 8975, EPC 1056, Kathmandu, Nepal

SANDEE Working Paper No. 118–17

The South Asian Network for Development and Environmental Economics

The South Asian Network for Development and Environmental Economics (SANDEE) is a regional network that brings together analysts from different countries in South Asia to address environment-development problems. SANDEE's activities include research support, training, and information dissemination. Please see www.sandeeonline.org for further information about SANDEE.

SANDEE is financially supported by the International Development Research Center (IDRC), The Swedish International Development Cooperation Agency (SIDA), the World Bank and the Norwegian Agency for Development Cooperation (NORAD). The opinions expressed in this paper are the author's and do not necessarily represent those of SANDEE's donors.

This Working Paper series of electronic preprints based on research funded by SANDEE and supported with technical assistance from network members, SANDEE staff and advisors

Faculty Advisor
Jean Marie Baland

Staff Advisor
Mani Nepal

Comments should be sent to

Amalendu Jyotishi
Email: amalendu.jyotishi@gmail.com

Contents

Abstract

This paper explores the complex development of gold mining in the Nilgiri-Wayanad region of Southern India, demonstrating how entwined histories disrupt simple taxonomic structures of ‘formality’ and ‘informality.’ Drawing on the long history of gold mining in the region that dates back to the 1830’s, this paper presents a counter-example to the conventional view that institutions develop in a trajectory of informality to formality. To do this, the article identifies three distinct phases of development in the gold mining industry of this region that mark and encompass shifts in governance of the area, global economic trends and commercial investment, property rights, government funding, influx of repatriate communities, and other social issues in the local economy. We conclude based on this analysis that institutions in the region have evolved from formal–artisanal to formal-industrial and then to informal small-scale.

Keywords

Institutions, Historical, Governance, Property rights, Gold mining, Nilgiri-Wayanad, India.

Characterization of Gold Mining Institutions in the Nilgiri-Wayanad Region of India: A Historical-Institutional Perspective

1. Introduction

This paper explores categories of 'formal' and 'informal' as they are applied to gold mining, both historically and in the contemporary era. Such a temporal perspective conceals the many difficulties and ambiguities that could arise with a simplistic application of notions of formality to diverse forms and institutions of gold mining through time. We, therefore, propose that the selected definition must be context-specific and subjective depending on the specific concerns that are being raised about gold mining. This definitional complexity has important implications for policy, which sees formalization as a solution to informal (gold) mining.

We draw these conclusions from an in-depth study of gold mining in the Nilgiri-Wayanad region of southern India between the early nineteenth century and the present. Using data from a single place, we build a case that challenges conventional expectations that institutions evolve from informal to formal and emphasize, additionally, the role of external rather than internal factors in precipitating such institutional changes. Given the particular institutional evolutionary path traced by gold mining in the Nilgiri-Wayanad, it is pertinent to reflect on these changes in order to elicit implications for the future of these institutions and the livelihoods of miners who work within this realm.

2. Informal, Artisanal or Small-scale: Making a Case for Property Rights in Understanding Institutional Change in Gold Mining

Debates about the formality and informality of mining institutions are important because of the politics that lie behind these taxonomic assumptions (Lahiri-Dutt, 2004). Yet, mining that is often small in scale, bordering on illegal, using artisanal technology along with entrepreneurial labour, which is often an expansion of peasantry, is difficult to slot into the category of either formal or informal. The term widely used for this kind of mining is "artisanal or small-scale mining" (ASM), a category created by the Mines, Minerals and Sustainable Development report (IIED/WBCSD, 2000) by combining two pre-existing terms: 'artisanal' (United Nations, 1999) and 'small-scale', popularised by the International Labour Organisation (ILO, 1999). ASM, like other attempts to categorize mining as either 'formal' or 'informal,' loses explanatory potential by focusing on a single aspect at the expense of others. By emphasizing one aspect of the mining activity such as artisanal (traditional, non-mechanised technology) *or* small-scale (economies of scale) *or* informal (focusing on the rules and norms governing the mining activity), these definitions neglect the ways these features not only co-exist but also change their relation to each other over time.

When considering mining in a single region from a historical perspective, it becomes important to allow for greater flexibility in these definitions to incorporate changes in the nature of mining activities as well as the institutions governing them. One of the major shortcomings of categorical definitional practices is the assumption of 'staticness' of operations or practice of mining. However, adopting a historical view, one can detect considerable changes in the form and the institutions governing mining activities even in a single region.

Table 1 constructs a definition of formal and informal based on multiple characteristics. In a strict sense, perhaps the most critical distinguishing feature between formal and informal mining is the non-legal nature of the latter, i.e., an activity based on customary law where the statutory law finds it illegal, or there is a legal void. This highlights the role of governance in the classifications of formality and informality. The other important differences between formal and informal likewise occur at the level of governance. Not only are records not kept and monitoring not undertaken of informal activities by the state but also tax collection is not possible.

Columns 1 to 4 of Table 1 clearly show the complexity entailed in categorically defining formal or informal activities based on size, technology, economic rationale and/or economic structure. While it is possible on some occasions to categorize a small-scale or artisanal unit as formal, on another occasion, a similar unit could easily be categorized as “informal”. Nonetheless, it would be more likely fora large-scale, capital-intensive and technologically modern mining enterprise to be categorized as “formal” rather than “informal”.

Table 1: Heterogeneous characteristics of defining 'Formal' and 'Informal' mining

	Size	Technology	Economic rationale	Economic structure	Legality/ Institutional structure	Tax	State monitoring/ records
Formal	Large/ medium/ small	Mechanised/ modern/ capital-intensive/ traditional/ artisanal/ labour-intensive	Profit	Corporate /family/ cooperative	Licensed/ statutory	Yes	Yes
Informal	Medium/ small	Rudimentary/ traditional/ artisanal/ labour-intensive/ low level of mechanization	Profit/ livelihood/ Windfall	Individual/ family/ cooperative	Licensed/ non-legal/ customary/ illegal	No	No

While Table 1 allows for a static categorization or characterization of mining at a given point in time, it does not adequately explain transitions in institutional change from one category to another, i.e. from formal to informal or (perhaps) vice-versa.

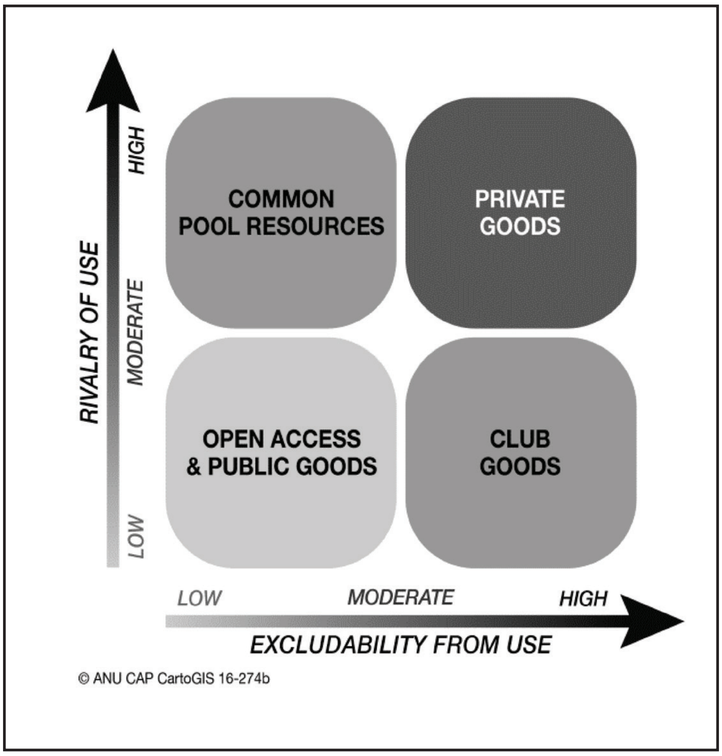
In the context of mining, the establishment (and protection) of property rights through formal or informal means is important because of its crucial economic function: i.e., presiding over, and arbitrating among, competing claims of “ownership” regarding both the mine from which the gold is extracted as well as the gold that is extracted from it. Property rights over mines can be accorded formally through state agencies and/or through informal regulating agencies that include local customs and local political authorities. Historical property rights can be identified from range of forms from documents to oral histories. While property rights can be relatively easy to identify at specific points of time, it is more difficult to understand how and why these institutions evolve and change over time, specifically over long periods. This empirical study of gold mining in the Nilgiri-Wayanad region helps us address several of the questions that arise when considering institutional transitions over the 'longue durée'. Moreover, the addition of the property rights dimension compliments ASM as well as informal mining literature in both spatial and temporal terms.

Institutions are “the rules of the games in a society or, more formally, the humanly devised constraints that shape human interaction” (North, 1990, p.3).The conventional view on the emergence and evolution of institutions in economics is from informal to formal, which happens through repeated interaction between individuals, groups and organizations. In due course, norms and behaviors are established through various processes such as collective action (Ostrom, 2005) in response to uncertainty, risk and other transaction costs (Williamson, 1981, 2000) or through clearly defined property rights (Coase, 1937, 1959; Libecap, 1978, 1989; Barzel, 1997; Demsetz, 1967).

The literature on institutional economics also implicitly argues that internal factors play a more critical role than external factors in the evolution of institutions. The resistance to change, or what is identified as 'path dependency'[1], is an internal factor, which shapes institutional continuity. Another implicit contention of this literature is that institutions become more efficient over time through repeated interactions by minimizing transaction costs or setting the rules of the game through well-defined property rights (North 1993, Pp.11-23), which consists of rights to use, earning income, and/or transfer of rights over a good or resource. Well-defined or enforceable property rights then play an important role in the efficient allocation of resources. The more widely property rights are recognized, the more efficient will be its functioning although full recognition comes when the norm is endorsed by the state as legally binding.[2]

Using the standard classification of economic goods based on the property rights attributes of 'rivalry' and 'excludability' and by delineating the relative strengths of these attributes, four major types of institutional structures can be identified: private, commons, club, and open access (see Figure 1).

Figure 1: Excludability and rivalry principles of property rights



This simple classification, though it provides an understanding of the different types of institutions based on different combinations of these attributes, does not explicitly separate formal and informal institutions. However, as institutions with high excludability are often based on formal structures whereas institutions operating with low excludability are guided by informal norms, we can argue that a movement from a low to a high degree of rivalry

[1] 'Path dependency' can be defined as a decision-making process that not only is dependent on present but also on past circumstances and hence acting as a constraint on the efficient allocation of resources (Liebowitz and Margolis,2000).

[2] 'Property rights' should be distinguished from 'rights' since the latter has a broader connotation explored variedly across disciplines. Although the notion of property rights may be subjectively and differentially understood across disciplines, we choose an economic definition of property rights as a means to understand institutions and institutional change.

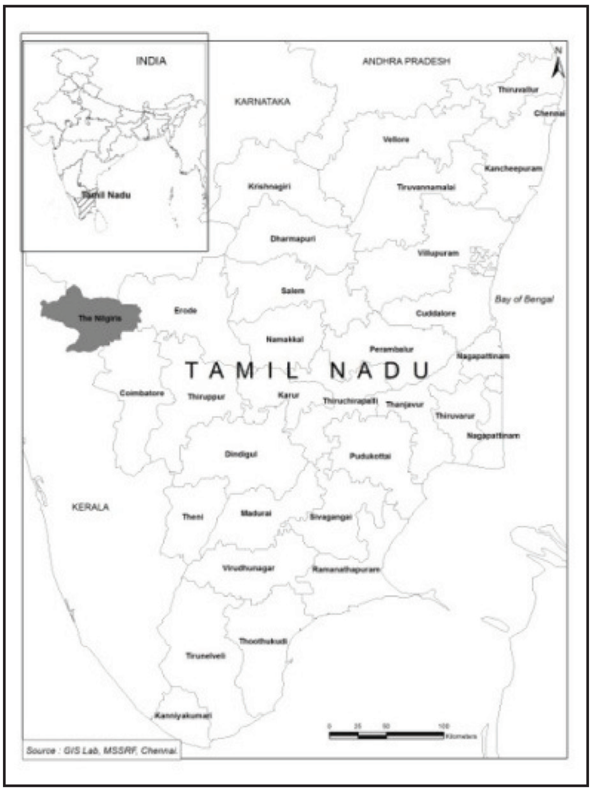
and excludability will entail a transition of the institutional process to more formal and structured institutions. Thus, low rivalry and excludability often lead to informal arrangements with regard to institutions. Furthermore, while ‘efficiency’ in the resource use parameter is paramount with regard to the degree of excludability, ‘equity’ in the resource distribution parameter is paramount in relation to the degree of rivalry.

With respect to institutional transitions, another key challenge has been not only to find an appropriate setting but also to locate a single site where multiple phases have played out over time. This enables one to delineate empirically any resulting hypothesis, not just quantitatively but qualitatively. It is here that gold mining in the Nilgiri-Wayanad region of southern India provides an interesting context for the study of institutional evolution for two reasons. Firstly, the fundamental nature and purpose of the activity has remained unchanged over centuries. Secondly, though there have been technological changes from manual to mechanical, it has had no major impact on the final product per se. Despite the unchanging nature of the operation and final product, the institutions involved in the practices and their relationship to structures of governance have undergone extensive changes over the last two centuries.

3. Phases in Gold Mining in Nilgiri-Wayanad

The Nilgiri-Wayanad (see Figure 2) region lies at the southern end of the Western Ghats, in the western part of Tamil Nadu bordering the states of Karnataka and Kerala. During the 19th and 20th centuries, this area was governed by a complex network of actors that included the East India Company, local princes and *zamindars*, the British colonial administration and, from 1947, the state of India. For a large part of history, the Rajah *(zamindar)* of Nilambur (which was a vassal state of the Calicut princely state) was the ruler of the region. Therefore, all land transactions in the region for agriculture, mining and plantations were conducted by the *zamindar* of Nilambur. Between the early 1800 sand early 1900s, the Nilambur *zamindars* leased land to private entities for coffee and tea plantations and for gold mining.

Figure 2: Map of the study site



Source: GIS Lab, MSSRF, Chennai,
Note: Map is not to scale

Despite the dearth of sources on the extent and magnitude of informal gold mining, we have collected sources on informal gold mining from a combination of historical documents (Jennings, 1881; Francis, 1908), contemporary studies (Deb *et al*., 2008) and data sets as well as through extensive discussions with a local historian in order to build a narrative of gold mining in the Nilgiri-Wayanad region over the last two hundred years. In the following section, we divide this history into three phases and offer an analysis of these phases, the division determined by the predominant institutional structure that governed gold mining activities in the region during the particular period.

4. Institutional Changes Over Two Centuries of Gold Mining in the Nilgiri-Wayanad Region

4.1 Phase I: Up to 1860s

In the *Journal of a Route of the Neelghurries from Calicut* (1830), one of the earliest colonial records on the region, Thomas Barber, an official in the East India Company, noted the low returns on gold mining and the payment of a tax by miners in this region:

Each patty pays a tax to government of 3 rupees per month, which my informers added, absorbed about two-thirds of the net profits; and from the wretched appearance of the person employed in working the patties, it is evident they are miserably paid. (p. 314)

This remark shows that although artisanal in technology, gold mining in this period was formal in the sense that reasonably good records of the activity were being maintained while taxes were being collected. As far as the institutional framework is concerned, what particularly interests us here is the presence of a formal tax structure implemented by the Rajah (*zamindar*) of Nilamburbuilt on the 'excludability' principle applicable to those who do not pay the tax.

In 1875, Dr. W. King of the Geological Survey was appointed by the British colonial administration to survey the 'country'. He reported that gold mining in this region was carried out by two communities, the *paniya*[3] and the *kuruba*[4] (referred to as *Pannirs* and *Korumbars* by King) each possessing their own specific domain of labour in gold mining. "*The Pannirs wash for it in the alluvium, surface soils, and river sands. The Korumbars dug down to and excavated the quartz leaders" (King, 1875)*. This lends credence to our hypothesis of "excludability", given that specific communities, namely, *paniya* and *kuruba*, were involved in the mining of gold.

Apart from a tax payable to the "owner" of the land, there is no evidence of there being any rivalry between the two communities, or members within the communities, pertaining to gold mining. However, there are indications that one community (*paniya*) was employed as labour, not as independent miners. They earned no more than a quarter of a rupee per day, thereby engaging in mining only during the lean season when employment was sparse in the coffee gardens. There is also mention in Val. Ball (1869: 33) that the *paniya* were "*driven by land-owners to search for gold, the land not being so well adapted for agricultural work*". In comparison, the *kuruba* seem to be more independent although they may have been forced to share their profits with the Rajahs. While there is mention of the *kuruba* sometimes finding large amounts of gold, it is possible that they had given up this work by 1875 because,as King (1875) records, the pits "*would be too deep for their style of work, water being the great obstacle likely to be met with*" (p. 42).

---

[3] The paniya, also known as paniyar and paniyan, are an ethnic group primarily inhabiting the Wayanad region. The paniya have historically worked as serfs in the agricultural sector.

[4] Traditionally, the kurumba or kuruba, largely resident in the Nilgiri region of Tamil Nadu, have subsisted as hunters and gatherers. There are different groups within this tribe known as alu-kurumba, betta-kurumba, jenu-kurumba, kuruba, muduga, mulla-kurumba, palu-kurumba, andurali-kurumba.

These historical sources enable us to conclude that there was formal recognition of artisanal forms of mining as well as select castes and tribes engaged in gold mining activities. Based on this assessment of archival records, we could categorize gold mining in Phase I as formal although the technology was artisanal and caste/tribe-based, thus supporting our argument that features like entrepreneurial labour and rudimentary technology are not sufficient conditions to make an activity informal.

4.2 Phase II: From 1870s to 1890s

In his study of the relevance of the gold standard to India, Sivramkrishna (2015) posits that the International Monetary Conference of 1867 was the first forum to propagate a move towards a common international currency. Gold, which had become relatively abundant by then because of its discoveries and consequently, gold rushes in America and Australia, was to be the basis of this international currency. An increase in the supply of gold was the way to counter the danger of a shortage in gold raising its price and leading to deflation. This, in turn, led to intensification in the search for gold across the world. India and, more specifically, the Nilgiri-Wayanad region came to be drawn into an international rush for gold in the context of these changes in the global monetary system. The desperation of this search for gold proved a sufficient trigger to induce the British colonial administration to explore the possibility of setting up industrial-scale gold-mining operations in the Wayanad region in the 1870s. In order to do that, it was important that they get access to land. The extract below from King's 1875 *Preliminary Notes on the Gold Fields of South East Wayanad* clearly exemplifies this important concern:

Now that gold mining is likely to become an industry, a new set of land interests are being developed. The Rajahs, of course, retain their right to all minerals and can sell these as they like. The Government of Madras has not yet, I believe, decided as to how they are to act in the matter, except that applications for land for gold-mining and for agricultural purposes on which quartz reefs are supposed to exist, are being reserved for consideration until the question of mining is settled.

In the meantime, the Rajah of Nellamborhas (according to their prospectus) leased a block of 15 acres of land near Dayvallah to the projectors of the Alpha Gold Company for twelve years at an annual rent of Rs.225. Since then it is reported that the Rajah in recent applications demands 10 per cent on the out turn of any gold mining which may be carried on; and it is very probable that he may change this rate. Nearly all the land in the Nambaly code Amsham is owned by the Rajah of Nellambor. Equally, as with the revenue derived from estates on Rajah's lands, it may be found advisable that the gold from these reefs should pay a royalty to Government. (King 1875: 45)

This rather lengthy quote makes several points clear: the growing concern of industrialists regarding the ownership of land by local feudatories; the extraction of high lease rents; and the role played by the British Government in Madras in settling these issues.

During this period, the investment that flowed into Wayanad was enormous. Forty-one companies with a paid-up capital of more than £5 million were set up while domestic companies invested some £250,000 and similarly began mining operations in Wayanad. Writing in the *Nilgiri District Gazetteer of Madras Presidency* in 1908, Francis reflects on this period and suggests that the mood was upbeat and the message was that "*the whole mountain is worth putting through the stamps*" (Francis 1908: 17). Most of the capital invested went into procuring land through mining leases where land prices varied between £70 and £2500 per acre. However, by the early 1880s, the edifice of gold mining in the region collapsed since the concentration of gold was too low to make large-scale mining feasible. Consequently, most of the companies had to shut down with investors losing large sums of money. Tremors from the bust even rattled the London stock market.

Despite the total collapse outlined above, Phase II can be characterised as one marked by intense capital investment, employment of wage labour, and the setting up of modern public limited companies listed on the stock markets (Francis 1908). This short-lived formal corporatization phase seemed to be merely speculation-driven although gold mining remained formal while the technology employed had changed from artisanal to modern, which included a higher degree of capital-intensive mechanization as well as the use of wage labour.

4.3 Phase III: From the 1980s onward

The contemporary phase of gold mining in this region coincides with the resettlement of Tamil repatriates from Sri Lankan plantations because of a pact, known as the Shastri–Bandaranaike pact, between the Indian Prime Minister Lal Bahadur Shastri and his Sri Lankan counterpart, Sirimavo Bandaranaike (Pillai, 2012).

Our observations during recent field visits show that a large number of informal gold miners belongs to this Sri Lankan repatriate community. To provide employment to the settlers, the Government of Tamil Nadu created TANTEA, a tea plantation company to absorb the repatriates who were used to a similar work environment in Sri Lanka. TANTEA plantations established between 1968 and 1980 comprised roughly 2,500 ha, created by the clear felling of forests (Menon 2014). The state also provided financial incentives to private estates to absorb repatriates (ibid). However, the time lag between the arrival of repatriates and their absorption into plantations was one of the prime causes of the spill over into informal mining activities by members of this community. In addition to the time lag in absorbing the workforce, the downfall in the tea market also played a critical role in the proliferation of 'informal gold mining' where, too, no formal records have been kept and no taxes collected. The technology employed in these mines is rudimentary while the economic structure is more cooperative and family-based. Apart from Sri Lankan repatriates, the *paniya* form the majority of gold miners in the Gudalur taluka. Few members from the *kuruba* tribe now mine for gold.

The interaction with miners, crushers and others during the time of our field visits between 2014 and 2016 provided us with some insights into the current practice of gold mining. Though the study is largely explorative and qualitative, we used a formal survey schedule to collect information on various issues pertaining to the gold mining process, livelihood, conflicts and group activities. However, given the illegality associated with gold mining, not every miner was open to discussions on the issue. We also collected data from non-miners as a control group in order to understand whether any differences exist between the miners and non-miners with regard to socio-economic indicators. In all, we collected data from 124 miners and 60 non-miners. Table 2 provides the basic characteristics of the respondents.

Table2: Cross-tabulation of descriptive statistics of miners vs. non-miners

Variables	Respondents		Total
	Non-miners	Miners	
Place			
• Devala	18 (9.8)	105 (57.1)	123 (66.8)
• Pandalur	29 (15.8)	3 (1.6)	32 (17.4)
• Others	13 (7.1)	16 (8.7)	29 (15.8)
Age Group			
• 15 – 24	2 (1.1)	2 (1.1)	4 (2.2)
• 25 – 34	8 (4.3)	29 (15.8)	37 (20.1)
• 35 – 44	10 (5.4)	51 (27.7)	61 (33.1)
• 45 – 54	21 (11.4)	25 (13.6)	46 (25)
• 55 – 64	15 (8.1)	13 (7.1)	28 (15.2)
• 65 & Above	4 (2.2)	4 (2.2)	8 (4.3)
Education			
• Illiterate	28 (15.2)	29 (15.8)	57 (31)
• Barely literate	19 (10.3)	36 (19.6)	55 (29.9)
• Primary school	10 (5.4)	42 (22.8)	52 (28.3)
• Secondary school &above	3 (1.6)	17 (9.2)	20 (10.9)

Note: Figures in parentheses are percentages of the total.

Our analysis of contemporary gold mining is three-fold, viz., i) dependency on mining for livelihood, ii) the transition in mining activities historically from an artisanal to a non-artisanal space, and iii) the boom in mining activities on legally disputed land suggesting the open access characteristics of property rights.

5. Dependency on Mining for Livelihood

It is evident that proportionately more local inhabitants (*especially paniya*) take up mining as a seasonal activity in comparison with Sri Lankan repatriates (Table 3). In contrast, the repatriates carry out “mining” even during the rainy season although usually panning as it becomes risky to venture into tunnels for mining during this season.

Table 3: Nature of dependency on mining among gold miners and average income

	Seasonality of mining				Average weekly income from gold mining (INR)	
Community	Seasonal	%	Throughout the year	%	Average income (std. dev.)	Range
Local inhabitants	42	72%	16	28%	1403 (850.82)	250-5000
Sri Lankan repatriates	42	63%	25	37%	4140 (1288.30)	1500-10000

The Sri Lankan repatriates earn substantially higher incomes from mining as compared to the local inhabitants (Table 3). This may be because the spouses of ‘local miners’ too work and earn for the family, which is not the case among the Sri Lankan repatriate miners (Table 4).

Table 4: Marital and wife's wage earning status among the miners and non-miners

	Community	Mean age	Married		If wife is a wage earner	
			Yes	%	Yes	%
Miners	Local inhabitants	23	47	81%	32	55%
	Sri Lankan repatriate	25	64	96%	0	0%
Non-miners	Local inhabitants	44	27	90%	25	83%
	Sri Lankan repatriate	50	28	93%	26	87%

In Pandalur, we found mines located within private tea estates while in Devala most of the mines were inside reserved forests. In the case of Nadugani, on the other hand, gold mining was prevalent in a mix of both. We visited several tunnels where mining activity currently occurs which can be from 500m to 3000m in length. We found some tunnels to be horizontal throughout whereas some were vertical over a considerable length before becoming horizontal. The tunnels are laced with several types of quartz stones with tinges of gold mixed with varieties of other materials (especially mica). Miners collect the stones by digging with shovels, chisels and hammers in the tunnel, often accompanied by blasting using low-intensity explosives. In any given day, a miner collects about 10kg of such stones from which they would be able to extract less than a gram of gold. One young miner from the repatriate community stated that their “target was to make 500 rupees in a day”. In terms of today’s values, this translates into a fifth of a gram of gold (excluding other expenses of extracting, crushing and panning).

6. Artisanal to Informal Transition

As discussed earlier, the early documented phase of mining activity in the first half of the 19th century was formal but artisanal. The tax on panning trays also suggests the artisanal nature of the mining activity until the capital-intensive industrial structure of mining came into place in the last decades of 19th century. However, the current form of mining technology in the region cannot be termed "purely" artisanal. The presence of modern technology like crushing mills and improvised tools as well as blasting agents inside the mines indicates the adoption of non-traditional methods of production. Once they crush the stones, the miners pan it using mercury to facilitate the collection of gold particles. They sell these gold particles to jewellers or local finance companies in the region.

Since the informal miners today have a better knowledge of market prices than before, the price at which the gold is sold moves with changes in market price although the rates are still lower than the prevailing market price.

It is possible to consider contemporary mining then as “non-artisanal” in the sense that most of the current miners are not continuing the occupations of their parents or grandparents. Even amongst the local inhabitants, only about 28 percent of the miners reported that their father's occupation had also been mining and, even in their case, it had not been the occupation of their grandfathers (See Table 5).

Table 5: Father's and grandfather's occupation of miners

Father's occupation										
Community	Coolie	%	Estate	%	Others	%	Farmer	%	Mining	%
Local inhabitants	28	48%	8	14%	6	10%	0	0%	16	28%
Sri Lankan repatriate	64	96%	0	0%	0	0%	0	0%	3	4%
Grandfather's occupation										
Community	Coolie	%	Estate	%	Others	%	Farmer	%	Mining	%
Local inhabitants	47	81%	5	9%	6	10%	0	0%	0	0%
Sri Lankan repatriate	64	96%	0	0%	0	0%	1	0%	2	3%

With regard to its legal status, present-day mining activity is unequivocally illegal in terms of the statutory law of the land. The practice of naming some of the stone crushing mills "rice mills" points to the illegality of gold mining. From these indicators, it is possible to characterise transitions in gold mining in the region as a move from artisanal to small scale and formal to informal over the period explored, i.e., circa 1830s to the present.

We now turn our attention to the property rights characteristic of the land on which mining is carried on, which is one of the prime factors for the boom in informal gold mining in the region.

7. Disputed Land as Open Access[5] Mining Ground

Much of the lands on which the Sri Lankan repatriates mine for gold continue to be disputed territories known as *Janmam* land or Section 17 land (Menon, 2014). These lands were all part of planting ventures initiated by British planters during the mid to late 19th century. Nilambur Kovilagam and Nelliyalam Rajah created the leases for the lands, which were leased to both individual planters and plantation companies. As of 2004, there were 90 leases created through 143 lease documents covering some 50,300 acres of land. Of these, plantations in Cherumulli, Devala, Gudalur, Padanthurai and O'Valley are all under the Nilambur Kovilagam. Due to widespread litigation, these lands suffer from a lack of governance and regulation enforcement by appropriate authorities. Hence, it is not surprising that most Sri Lankan repatriates utilize these lands for gold mining purposes. Thus, the disputed *Janmam* land is the new ‘open-access’ ground for gold mining activity although, in recent years, the Forest Department has been intensifying its attempts to stake a claim to these lands by means of patrolling, fencing and digging elephant trenches. In comparison, a majority of *paniya* continue to mine in traditional forest and estate land.

Table 6, which contains information gathered fromour survey, shows differences between the lands on which mining is carried out by different communities of the region.It also shows that Sri Lankan repatriates who were late entrants into gold mining are largely confined to the disputed Section 17 land.

[5] The usage of the term 'open access' is derived from property rights characteristics based on the economic principles of non-excludability and non-rivalry. However, non-economic agency, power relations and other institutions play a role in accessibility to a resource, which, in our context, is the land on which gold is mined.

Table 6: Type of land and nature of mining among the gold miners

	Type of land						Mining in groups/individuals			
Community	Estate land	%	Forest land	%	Section 17	%	Group	%	Individual	%
Local inhabitants	7	12	39	67	12	21	54	93	4	7
Sri Lankan repatriate	0	0	0	0	67	100	45	67	22	33

8. Synthesizing the Phases: The Governance Structure Over the Centuries

From the available records and documents for the early colonial period, we identified a formal tax structure (in the form of a tray tax) which the local Rajahs and *zamindars* used in order to provide rights to the gold miners until the 1860s. This tax structure is a clear form of exclusion since those who did not pay the tax were not given the right to mine gold. Moreover, the imposition of tray taxes meant that the exclusion was also applicable to alluvial panning in riverbeds. In addition, like most other occupations in India, there were specific castes and tribes that engaged in gold mining. Putting these features of mining together, we interpreted one element in the then existing property rights regime as 'excludability'.

The wide dispersion of rather small quantities of gold across a region, as well as the lack of capital, meant that any individual interested in the occupation could engage in gold mining. Constraints, if any, were not due to scarcity in mining areas but rather driven by the social realities of the period that restricted mobility in occupation among certain caste groups and tribes. We therefore also impute an element of 'non-rivalry' amongst the miners as long as they are able to pay the stipulated fee to the feudatory. The characteristics of 'excludability' and 'non-rivalry' are the essence of 'club' goods, which can therefore be considered as the dominant form of property rights in the first half of the nineteenth century. There are also several instances of large tracts of land directly occupied by feudatories or Rajahs (kings) who mined gold using 'slave labour' at very low wage rates. In these cases, it becomes more appropriate to characterize the property rights regime as 'private goods'. Phase I then carries the hues of both club goods as well as private goods. More importantly, we are able to establish that gold mining in the early colonial period was not an 'open access/public good' (non-excludability, non-rivalry) or a 'common pool' (non-excludability, rivalry) resource.

Gold mining during the Wayanad gold rush (Phase II), in comparison, was clearly a private good exhibiting elements of both excludability and rivalry amongst miners. The period was also marked by intense speculation for short-term gain that stemmed from the geo-political and economic order of the time. Thus, gold mining in this phase witnessed the intensive deployment of capital and wage labour.

It would not be wrong to say that Phase III of mining was an "open access" phase due to the expansion of the activities on disputed Janmam or Section 17 land. However, over time, it is slowly acquiring the shape of a commons, as creation of new mining areas is now strictly restricted with the Forest Department *acquiring defacto* claim over forested lands. With mining activity restricted to defined and already opened areas, rivalry in natural resource exploitation is likely. This may be one reason for the decline in the number of *kuruba* involved in mining unlike in the first two phases when their involvement was heavy.

This study spanning a period of two centuries establishes that change cannot be attributed to only internal factors like availability of gold in the region, disruptive changes in technology, or efficiency of the factors of production. Rather, external circumstances can also play a critical role in shaping and reshaping institutions, such as the decline of bimetallism and the rise of a monometallic gold standard in the 1870s. Thus, two critical factors have played a role in the decline and growth of gold mining and the evolution, albeit non-linear, of distinct institutional structures in the region. First, the decline in gold demand as countries moved away from a gold standard in the early part of the twentieth century. Second, the arrival and settlement of Sri Lankan repatriates in the region in the latter half of the twentieth century, without many alternative avenues for livelihood.

Table 7 summarizes the threephases of gold mining in the Nilgiri-Wayanad region by integratingan artisanal and small-scale mining (ASM) and an informal mining-based analysis with a property rights-based analysis, in particular, the principles of 'excludability' and 'rivalry'.

Table 7: Institutions of gold mining over the past two centuries

Phase	Excludability	Rivalry	Legal status and scale	Communities
Early colonial phase (up to 1860s)	Yes (with tax structure)	Minimal	Formal-artisanal	*kuruba, paniya, mapillah* (engaged as labour), landlords and feudatories
Corporatization phase (1870s to 1900)	Yes	Yes	Formal-industrial	Privatization of property with corporate mining initiatives
Sri Lankan repatriate phase (1980s onward)	Minimal	Several instances	Informal-small scale	Interestingly, *kuruba* are not all that much involved in the activity at present while the *paniya* continue to do so. In addition, Sri Lankan repatriates are engaged in mining in significant numbers

9. Conclusion

This paper shows that a number of factors worked together to create a situation in which informal mining came to prevail in the Pandalur, Nadugani, and Devala regions. Mining activity in the region dates back to the 1830s and, according to available documented history, back then, it was formal-artisanal while contemporary mining, which is informal and small-scale, is largely shaped by the unique history of the local context. Hence, currently, a large proportion of informal miners belong to the Sri Lankan repatriate communities though there is a smaller percentage of the native population too involved in this informal-artisanal gold mining activity.

The historical, social, legal and economic aspects considered together show the complexity associated with mining that transited from a formal to an informal process. However, a few important aspects that come out clearly from this explorative study are worth noting. One, the prevalence of informal gold mining in India is very much a fact even at present. Second, people who engage in this mining activity are poor and belong to vulnerable social groups, with informal mining contributing substantially to their livelihood. Third, the long history of gold mining shows a transition in the type of institution—a transition shaped not only by forces internal to the economy but by political and economic forces that are external and global, both of which have played a critical role in shaping the institutions.

Our analysis based on a property rights framework shows that institutional transition over the centuries has moved from 'excludability' to 'non-excludability' and, at the same time, from a 'well-defined' to an 'ill-defined' property rights structure. Incorporating the existing parlance of ASM and informal mining, we show that the institutions have moved from a formal to an informal structure and, in the case of technology, from artisanal to non-artisanal. The scale of the economy remains small barring the speculative phase of the last two decades of the 19^{th} century. It is the historical-institutional perspective on gold mining in the Nilgiri-Wayanad region that has enabled us to elicit these nuances.

Acknowledgements

We acknowledge with gratitude the insightful comments of the reviewer of the Economic and Political Weekly that helped us to bring the paper to its current shape. We acknowledge too the financial and technical support from the South Asian Network for Development and Environmental Economics (SANDEE). In addition, SANDEE provided academic support from experts through regular meetings and interactions. Our special thanks to Professor Jean Marie Baland for reading through the drafts and helping us at different stages of this work and Professor Carmen Wickramagamage meticulously copy-editing the draft paper. The study also benefited from financial support from the Australian Research Council through the Australian National University, Canberra, from its ARC LP 'Going for Gold'. The fieldwork support, especially, from Ms. Manswini Karthik and the respondents is duly acknowledged.

References

Baber, T.H. (1830),'Journal of a route of the Neelghurries from Calicut', *The Asiatic Journal and Monthly Register of British and Foreign India, China, and Australasia* **3** (New Series, Sept–Dec. 1830): 310–316.

Barzel, Yoram (1997), Economic Analysis of Property Rights, 2nd Edition. Cambridge: Cambridge University Press.

Bergein, (1834), 'Gold mines of Malabar', *The Mechanics' Magazine, Museum, Register, Journal, and Gazette* **20** (October 5, 1833 – March 29, 1834): 123–124.

Available at: https://books.google.co.in/books?id=_A4FAAAAQAAJ[accessed on 22nd January 2017]

Coase, R.H. (1937), '*The nature of the firm*', *Economica* **4**(16): 386–405.

Coase, R.H. (1959), 'The Federal Communications Commission', *Journal of Law and Economics* **2**(October): 1–40.

Deb, M., G. Tiwari, and K. Lahiri-Dutt (2008), 'Artisanal and small-scale mining in India: Selected studies and an overview of the issues', *International Journal of Mining, Reclamation and Environment* **22**(3): 194–209.

Demsetz, H. (1967), 'Towards a theory of property rights', *The American Economic Review* **57** (2):347–359.

Francis, W. (1908), *Madras District Gazetteers: The Nilgiris*, Madras: Government Press.

International Institute of Environment and Development (IIED) and World Business Council for Sustainable Development (WBCSD) (2002), Breaking New Ground: Mining, Minerals and Sustainable Development, London: Earthscan Publications, Ltd.

International Labour Organization (ILO) (1999), Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines, Geneva: International Labour Organisation.

Jennings, S. (1881), My Visit to the Goldfields in the South-East Wynaad, London: Chapman and Hall Limited.

King, W. (1875), 'Preliminary notes on the gold fields of South East Wayanad, Madras Presidency', *Records of the Geological Survey of India* Vol. VIII, London: Trubner & Co., 29–45.

Lahiri-Dutt, Kunatala (2004), 'Informality in mineral resource management in Asia: Raising questions relating to community economies and sustainable development', *Natural Resource Forum* **28**: 123-132.

Libecap, G.D. (1978), 'Economic variables and the development of the law: The case of Western mineral rights', *The Journal of Economic History* **38**(2): 338–362.

Libecap, G.D. (1989), 'Distributional issues in contracting for property rights', *Journal of Institutional and Theoretical Economics* **145**(1): 6–24.

Liebowitz, S. and S. Margolis (September 2000), in Bouckaert, Boudewijn and De Geest, Gerrit (eds.), *Encyclopaedia of Law and Economics, Volume I, The History and Methodology of Law and Economics, Cheltenham, Edward Elgar,* 981–998.

Literary World (1881), 'A visit to the goldfields (Review of the book), Volume XXIV (New Series, From July to December, 1881), London: James Clarke and Co., 186–188.

Menon, A. (2014), 'The Godavarman judgment: Erasing the plurality of land use in Gudalur, Nilagiri',in M. Bavinck and A. Jyotishi (eds.), Conflict, Negotiations and Natural Resource Management: A Legal Pluralism Perspective from India, London: Routledge, 33–50.

North, D.C. (1990), Institutions, Institutional Change and Economic Performance, New York: Cambridge University Press.

North, D.C. (1993), Institutions and Credible Commitment, *Journal of Institutional* and *Theoretical Economics (JITE)/ Zeitschrift Für Die Gesamte Staatswissenschaft* **149**(1): 11-23.

Available at: http://www.jstor.org/stable/40751576 [accessed on 22nd January 2017]

Ostrom, E. (2005), Understanding Institutional Diversity,Princeton: Princeton University Press.

Pillai, R.S. (2012), 'Indo–Sri Lankan Pact of 1964 and the problem of statelessness: A critique', *Afro-Asian Journal of Social Sciences* **3**(1): 1–14.

Available at: http://www.onlineresearchjournals.com/aajoss/art/82.pdf[accessed on 22nd January 2017]

Sivramkrishna, S. (2015), In Search of Stability: Economics of Money, History of the Rupee, New Delhi: Manohar.

United Nations Development Programme (UNDP) (1999), Artisanal Mining and Sustainable Livelihoods, New York, NY: United Nations Development Programme (UNDP).

Val. Ball (1869), On the occurrence of gold in the District of Singhbhum', *Records of the Geological Survey of India* **2** (Pt. 1): 11–14.

Williamson, O.E. (1981),'The economics of organization: The transaction cost approach', *The American Journal of Sociology* **87**(3): 548–577.

Williamson, O.E. (2000), 'The new institutional economics: Taking stock, looking ahead', *Journal of Economic Literature* **38** (3): 595–613.

SANDEE

P.O. Box 8975, E.P.C 1056, Lalitpur, Nepal

Street address: c/o ICIMOD, Khumaltar, Lalitpur, Nepal

Tel: 977 1 5003222, **Fax:** 977 1 5003299, **Email:** info@sandeeonline.org, **Web:** www.sandeeonline.org

SANDEE Sponsors

ICIMOD IDRC CRDI Norad SWEDEN