Socio-Economic and Environmental Impact of Gem Mining Industry In Sri Lanka: A Case Study of Hunuwala Village In Ratnapura District

H M S Priyanath,
Department of Social Sciences, Sabaragamuwa University of Sri Lanka

Abstract

The gem mining industry (GMI) is one of Sri Lanka's major sources of income and employment. However, it also has considerable socio-economic and environmental (SEE) consequences affecting gem miners and the general public as well. This paper discusses the present SEE impact of the GMI, based on primary data gathered from a field survey undertaken at a gem mining village - Hunuwala in the Ratnapura district. The decline of agricultural production, rising income inequality, seasonal unemployment of gem mining laborers as well as a decline of education, health and living standards were identified. In addition, water pollution, soil erosion and the destruction of areconut trees are the major environmental problems. In order to develop the GMI, it is recommended that both labourers and mine owners are made aware of the adverse consequences of these activities and that the applicable rules and regulations are observed strictly.

Introduction

Sri Lanka produces all the varieties of gems found in the world except for diamond and turquoise. Varieties of corundum, and chrysoberyl found in Sri Lanka are precious gems while all others such as Spinal, Topaz, Beryl, Zircon, Garnet, Quartz, Tourmaline and feldspars are semi-precious. Eighty five percent (85%) of Sri Lanka's gems are found in the Ratnapura district where eighty percent (80%) of all mines in Sri Lanka are located. Gem mining in Sri Lanka are classified as Tunnel Mining, Open pit deep Mining, Open Pit Shallow Mining and Riverbed Mining. Tunnel mining, used to obtain gem bearing gravel (GBG) deposited more than 10 meters below the surface, while the other types of mines use to take GBG deposited less than 10 meters deep. All the mining use traditional techniques and methods.

According to historical sources our gemstones have mainly been purchased by India and the Middle East, since the first century A.D. and they were a significant export commodity during the colonial period (Economic Review, 1977: 3-8). However, the gem industry in Sri Lanka was rather informal and unsystematic until the establishment of the State Gem Corporation (SGC) in 1971. Since then, smuggling has been controlled, gem exports were increased, and skills improved, licenses for mining were issued and state owned land for mining has been allocated. After the introduction of open economic policy in 1977, the involvement of gem dealers from Thailand, the introduction of heat treatment of *Geuda* (a variety of precious gem) and improved opportunities for the private sector to export gems resulted in further development of the GMI. Consequently, foreign exchange earnings from gem exports have increased considerably. While the income from gem exports increased from Rs. 2933 million in 1990 to Rs. 4772 million in 1996, the percentage of total export decreased from 3.6 to 2.1 during the same period, due to a significant increase in industrial exports especially garments. Furthermore, GMI is significant in generating employment. In 1987, Karunathilaka estimated that 1,74000 people were directly employed in the gem industry (1989: 132). However, benefits generated by GMI were only enjoyed by a few mines owners and laborers. They create SEE consequences that are incurred by the wider society.

Main focus of this paper is to analyze the SEE impact of GMI in detail. Primary data for the analyzes were gathered from a field survey undertaken at a gem mining village, Hunuwala in the Ratnapura district and data were collected from a sample of 20 mines, observing pits,

interviewing owners, labourers, gem dealers, land owners, and also officers of the general public. In addition, secondary sources of GMI were studied.

Hunuwala village is located 128 km from Colombo between Pelmadulla and Balangoda on Badulla Road. It has an elevation of 500 to 700 feet above mean sea level. The land area comprises 649 acres, of which 65 percent are under rubber and owned by a private management company. Twenty four percent (24%) is privately owned land located near and around the main road and the river as well as the rest are comprised with river reservation, forest, and grasslands. Thirty two (32) acres are under paddy and 121 acres comprises home gardens. In 1996,.the population of the study area was 1821 (906 male and 915 female). The estimated labour force is 956, of which 31 percent are employed in the rubber estate, 22 percent are farmers 23 percent are unemployed, 8 percent are employed in other jobs and 16 percent are employed in the GMI.

Hunuwala village has a long historical background of gem mining. Ancient gem mining tools and instruments have been found. The GMI in the village developed sharply during the recent decade due to the finding of a lot of *Geuda*. All types of gem mining in Ratnapura district occur in the study area. Today nearly 40 gem pits employing 204 peoples, is in operation. They comprise 3 tunnel pits, 6 open pit shallow and 10-river bed mining. There are 11 licensed pits and 39 unlicensed. Licensed gem mining are organized by a few entrepreneurs while unlicensed mines are informally organized by illegal gem miners. However, villagers enjoy some direct and indirect benefits due to GMI. After 1990, they have built 12 new houses, repaired 23 houses, purchased durable consumer goods and properties. Despite, these benefits, SEE costs were widely generated by the GMI. The decline of agricultural production was the major impact of GMI because most gem mines are located in agricultural lands (08 paddy fields, 06 home gardens and 16-rubber estates). Income inequality between owners and labourers, seasonal unemployment and the decline of health and living standards have been the significant problems. Environmental impact such as water pollution, soil erosion in agricultural lands and riverbanks and the destruction of arecanut trees can be observed. The following section discusses the SEE impact of GMI in detail.

a) Decline of Agricultural Production

Paddy harvest in selected paddy fields in the study area has decreased by 29 percent in the Yala season (from March to August in 1997). One major reason for the decrease of the paddy harvest was the GMI. Thirty percent (30%) of the total mines was scattered in paddy fields and 31 percent of the paddy fields have been destroyed due to GMI. Reservation of a large extent of paddy fields for gem mining in future, was the main reason. Though only 20 perches is required per mine to reserve legally, in most cases the mines cover a much wider area. In addition, reserved lands were used only for gem mining and not used for paddy production. Most mines in the paddy fields reserved more than 40 purchase for a mine. This reason is common to the other agricultural lands as well. Unclosed abandon gem pits and a large amount of pile of clay, sand and stones of abandoned gem mines in agricultural lands were the other reason for the decline in agricultural production. Fertility of the soil in agricultural land decrease due to composite sand and stones of gem pits along with soil erosion. This reason is also caused adversely for the decline of agricultural production.

Illegal gem mines led to the destruction of rubber estates as in the area of study, GBA have been found to be deposited all over such land. Estate officers mentioned that the illegal gem miners have destroyed many a rubber trees, consequently 150 to 200 of rubber trees have been destroyed annually. 2000 rubber trees were destroyed during the period between 1990 and 1996 due to illegal gem pits.

b) Income Inequality

GMI causes for the income inequality between the mine owners and the labourers and also among the villagers. Table 01 shows that more than 25 percent of total gem income goes to the owners while less than 3 percent goes for the labourers indicating a vast income disparity between them. Traditional share system used for the distribution of gem income is the major reason for this. Gem mines are organized using a traditional share system by the gem dealers, landowners or license holders. Gem income is distributed among the shareholders according to their value, because all the shares do not have a similar value. The most valuable share is the share of water pump machine while shares of land and license are the other valuable shares. The shares of expenses, labourers and managers are the less value shares. The traditional process of the gem income distribution is as follows. Firstly, 8 percent is allocated for the taxes secondly, 10 percent of the balance goes for the share of water pump machine, thirdly 20 percent of the balance is allocated for the share of land and 10 percent of the balance is paid for the share of the license. Finally after deducting the cost it is equally distributed among the shares of expenses, labourers and the manger. As a result, license holders and owners of water pumps and land earn a relatively high income while mine labourers possesses a relatively low income. In addition, illegal gem mines use no such share system and they equally divided gem income into two. One portion is equally shared by the shareholders of expenses while the mines' labourers similarly share the other portion. As a result, illegal gem miners earn more gem income than the labourers' of licensed gem mines. (See table 01).

Unfair dealing at the gem auctions is also a cause for the inequality in income. For instance, the gem dealers together with mine owners purchased gemstones at a very low pre-decided price in the gem auctions. They sell such gems at a very high price after the auction and they equally share the profit. Mine owners escape the tax payment, and other shares by selling gems confidentially and distributing a small proportion among the labourers. As a result, owners earn much more income than the labourers. Labourers do not tend to go against the unfairness, because they assist the labourers by providing financial and other assistance at emergencies. For instance; illegal gem miners sometimes are caught and arrested by the police. Mine owners intervene and get them released. If a released labourer find gems, he sells them at a low price to owners who help them. Owners sell these gems at a higher price and this is also another reason for the income inequality.

Owners invest their additional income in plantations or in some other business ventures and they make a profit. This is also one reason for income inequality. Income inequality increases due to the uncertainty of gem income. In most gem mines, gems could not be found regularly. Labourer are given Rs. 75/= per week as pocket money. This is the only income for some labourers. Though the owner do not earn income from gem pits they do not have to face any difficulties since they have other sources of income. On the other hand, if miners do not find gems they tend to take loans from dealers or owners. Ultimate result is the increase of the income inequality since labourers have to settle debts whenever they find gems.

Table 01: distribution of Gem Income between Owners and Labourers in selected mining

Mining	Total gem income	No.of labor	No.of expence sharers	Total cost for mining	Gem income gained by owners										Gem Income per labour	
					Share of water pump Mechine		Share of land		Share of License		Share of Expences		Total Income per Owner	As a % of total Income	Total income	As a % of Total Income
	Rs			Rs	No	Rs	No	Rs	No	Rs	No	Rs	Rs		Rs.	
A	125200	10	12	23500	01	115184	-	-	01	82932	5	144579	342695	27.4	34669	2.8
B	887000	08	12	19000	01	81604	1/4	36721.8	01	58754.8	4	84607	261688	29.5	25382	2.9
C	821000	10	12	25000	01	75532	1/8	16994.9	01	54383.4	4	74312.5	221223	26.9	22294	2.7
D	460000	06	08	12500	-	-	-	-	01	30430	5	84937.5	115368	25.0	22650	4.9
E	176000	04	05	4500	-	-	-	-	-	-	5	85750	85750	48.7	21438	12.2

c) Seasonal Unemployment

A considerable extent of seasonal unemployment could be identified among the labourers in the gem pits. Data in table 02 shows that the labourers in the gem mines did not have to work for a number of dates during the period from 1st January to 31st August in 1997. According to the data, most labourers of unlicensed or illegal gem pits are unemployed i e. 33.5% of total working days. Unemployment among the labourers of gem pits could be at a very high rate compared with the other employees like a schoolteacher of a government school or a labourer in a private garment factory.

Table 02: Seasonal Unemployment among the Laborers of Gem Pits

Category of Employment	No: of unemployed days	as a % of Total working days
1. Labourer in licensed gem mining.	60	26.4
2. Labourer in unlicensed gem mining.	76	33.5
3. Teacher in government school	16	8.0
4. Worker in private garment factory	08	4.0

Source: Field Survey 1997.

(Total working days defined as 227 working days after deducting 16 of official holidays during the period between 1st January and 31st August in 1997.)

There are many reasons for the seasonal unemployment among the mine labourers. Managerial weaknesses of mine owners are a major reason. After finishing work at the gem mine, labourers wait so many days without work until the activities and functions of the mine starts again. Sometimes gem miners of paddy fields may have to wait till the harvest is completed in order to shift the mine to the another place. As a result of that labourers are unemployed for long periods.

Owners sometimes stop mining work during the festival season like New Year and Christmas. Labourers are unemployed for 1 or 2 months during such seasons. On the other hand, some owners fail to renew their license on or before the due date. In that case, labourers are unemployed until the license is renewed. One of the other reasons for seasonal unemployment is that the labourers themselves are unemployed until they find a new mine or shift from one mine to the another.

Natural reasons like rain and flood also contridutes adversely to the seasonal unemployment among the mine labourers. Labourers of illegal gem mines are mostly unemployed seasonally due to police investigations.

d) **Decline of Education.**

Most of the labourers of the GMI do not have sufficient education. Eighty five percent of the labourers have attended school up to or below grade 10 and the remaining 15 percent have attended classes beyond grade 10. On the other hand, 55 percent of the labourers are below 30 years of age. Gem mining has caused for the decline of the education level of younger generation in the study area. They are attracted by gem mining interrupting their education. If schoolchildren join gem mining during the school vacation, they are attracted by gem mining industry and continuously do it without attending school further. Some parents also encourage children into gem mining since they can easily earn an additional income.

The other reason for the decline of educational level is the consequences of attraction towards the luxury lives of gem dealers. If experienced mine labourers earn large income they become gem dealers. Most of these dealers invest their additional income only in GMI. They are not aware of the other sources of businesses and they spend more money to lead a luxury life. As a result, most of the gem dealers become bankrupt due to the irregularity of gem industry. Most of the dealers are not aware of the financial management since they do not have sufficient education.

e) Decline of Health

Gem mining directly causes the decline of health of both gem miners and the general public. Unclosed gem pits bring about a rapid expansion of mosquitoes. It is one of the major issues faced by the villagers. Sixty percent (60%) of the villagers uses mosquito nets or coils. Some villagers mentioned that the problem of mosquitoes had been sharply aggravated since 1980s. Furthermore, unclosed gem pits are a threat to both villages and animals. It was reported that a child and some buffaloes had fallen into an empty gem pit. In addition, muddy water in river causes a decline in the health of the villagers. Thirty (30%) percent of the population in the area uses water from the river. Water is always polluted due to the gem pits located in and around the river.

Working inside gem pits is a very dangerous and risky task. Mine labourers always face unexpected accidents due to the sudden collapse of walls in the pits. Use of poor techniques and poor quality materials increases accidents in the gem mining industry. Some miners use poor quality materials such as poor quality rubber wood, arecanut trees, etc, in order to reduce capital cost. Furthermore, some miners do not have the proper technical knowledge required in gem mining.

As a result, many accidents occur in the industry. Further, miners are not aware of first aid and none of the mines have first aid boxes. Most miners do not know how to react or face in the event of an emergency. Thus, many reasons are found regarding the decline of health of the people in this industry.

f) Decline of the Living Standards

Decline of the living standards of labourers is the most significant consequence of GMI. It is not a continuous income source and its income is very uncertain. Some labourers have not earned any income during the period from 1st January to 31st August in 1997. Some of them does not even have any other income source or properties and a knowledge or skill for doing self-employment or another job. Because, they have experience only in the working of gem mining. Living standards of such labourers is very low. They live on loans from gem dealers or any other sources. Though most labourers as well as dealers earn

gem income they spend most of the income within a very short period without managing their finances carefully. They fail to take maximum benefits from these income. Most labourers and dealers tend to consume durable and luxury consumer goods and they try to lead a luxury life. But after spending all the income that they have earned their living standard declines to the previous level. Furthermore, labourers or dealers invest their income only in gem pits or to buy gem stones. Most of them does not even know to invest their income in another business. Living standards of them decline due to the uncertainty of gem income. Some dealers continuously do gem mining selling their properties, and businesses. This reason is also a cause for the decline in their living standards since they fail to earn gem income.

g) Water Pollution

Water pollution is the main environmental consequence of GMI. Unlicensed river bed mining directly pollutes water in the river and streams in the study area. Unlicensed river bed mining goes on throughout the whole day. Consequently, water in the river and streams are completely polluted with mud. A constant release of muddy water from open pit and tunnel mining is another way of polluting the water in the river. In addition, washing the GBG of unlicensed open pit shallows into the river is the another method of water pollution.

Polluted water in the river and streams cause so many difficulties for the villagers. Some people use water for the fulfillment of their basic water needs like drinking, washing and bathing. The main problem that the villagers face is that they cannot find fresh water for drinking. Despite, a few wells in the study area, some wells do not have sufficient drinking water. According to the point of view of the villagers, water level in the wells has reduced because miners pump underground water out.

h) Soil Erosion

Most gem pits are located near and around the river. Erosion of riverbanks generally takes place during the rainy season, because some mining is done on the riverbanks. Riverbed mining directly causes the erosion of the riverbank destroying the larger of bushes and plants. In addition, GBG is washed in the river and this practice is a good example for soil erosion. Erosion of home gardens also takes place due to open pit shallow mining. Gem bearing gravel of open pit shallow is dug unsystematically and soil is easily eroded due to light rain.

i) Destruction of Arecanut trees

Destruction of arecanut trees is one of the other environmental impacts of GMI. Arecanut trees are mostly used for the tunnel mining, open pit deep and river bed mining. Around 4 to 8 of arecanut trees are used for a gem pit per one session and 2 to 4 for river bed mining. Seventy eight of arecanut trees have been used for gem mining in the study area during the period January to August 1997 and out of this 45 arecanut trees has been purchased from the study area itself. Today arecanut trees are very rare and also expensive. They are destroyed rapidly due to the GMI.

Conclusions

Though the GMI in Sri Lanka generate income and employment it has many SEE impact. Therefore, this paper studied such impact in a selected gem-mining village Hunuwala in the Ratnapura district. Decline of agricultural production, income inequality, seasonal unemployment, decline of health, education and living standards, water pollution, soil erosion, destruction of arecanut trees have been the significant adverse effects of GMI. The situation has been further aggravated due to the unawareness and the negligence of

mine owners and labourers and the inapplicability of current rules and regulations are the major reasons. In order to develop the GMI overcoming SEE impact, labourers and mine owners should be aware to control such impact as much as possible. The available rules and regulations need to be observed strictly at regional levels by responsible authorities. The authority should provide advisory services regularly for the miners to overcome the SEE impact, help to value gem stones accurately and sell them at a high price preventing unfairness in the gem auctions. It is also necessary to introduce modern techniques and protection methods to reduce accidents in the gem mines. In addition, it is needed to introduce a rather fair system to ensure a fair distribution of the gem income in providing a similar value to all the shares in order to reduce income inequality between mine owners and labourers. Since gem income is unascertained, mine owners and labourers required to be encouraged to invest gem income not only in GMI but also in other ventures. Furthermore, in order to increase agricultural production, adequate reservation of agricultural land has to be ensured for gem mining in future. Assistance to landowners to prepare the destroyed lands and bring them back to the previous level is essential. Controlling the work of illegal gem mines will reduce water pollution, land erosion and destruction of agricultural lands. Gem mine owners should award the work in the gem mines according to a well defined plan to reduce seasonal unemployment of the mine labourers.

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