Impact of Gem Mining on a River in Sri Lanka

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Sri Lanka, an island in the Indian ocean

A treasure island with an ancient history of gemstone mining and processing

Gem industry in the country has a very long and colorful history

Marco Polo wrote of his visit in 1292; “I want you to understand that the island of Ceylon (Sri Lanka after 1972) is, for its size, the finest island in the world, and from its streams comes rubies, sapphires, topazes, amethyst and garnet”
Approximately 90% of Sri Lanka’s commercial gems are found in alluvial deposits

Mining is conducted at relatively shallow depths of less than 20 meters

Mines are mostly located in the shown areas of the island, centered around the town of Ratnapura (this name means town of gems)
Gem stones are encountered either in “surface streams” or in “ancient streams” that are reached by digging downward from 7 to 30 meters

Most of the ancient streams lay beneath cultivated fields

Gem mining methods

Gem mines generally fall into two categories;

(a) pit mines, and
(b) riverbed mines
Pit Mines

If gem deposits are located near the surface, shallow circular pits are dug.

Depth of a shallow pit can be only a few metres.

Deep mine pits are rectangular in shape and may have a depth of well or shaft over 50 metres.

In deep mines gem deposits are also excavated horizontally creating tunnels to extend from 6 to 9 metres or occasionally even more away from the shaft.
Pit Mines
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The gravel collected from mines is brought to the surface and then washed and examined in the search for gems.
Large Scale Gem Mines

Use backhoes to excavate pits as deep as 7-10 metres
Riverbed mines

Mamoties with handles about 10 metres long are used to stir up and collect sediments from the riverbed
A dam across the river is built to collect the sediment
Large Scale Riverbed Mining

Gems are also mined from riverbed material by using (gravel) suction pumps for extraction of riverbed gravel for gems

This removal of gravel causes much harm to riverbank stability (control over such operations is very minimum)

The Kalu Ganga being a major river has been issued with licences for gem mining But, there are several hundred illicit miners resorting to manual dredging and mechanical dredging (using suction pumps)
Impacts of Gem Mining

A major environmental health concern has been the spread of malarial vectors and biological agents of other tropical diseases as a result of stagnant water in abandoned mining pits.
The destruction of agricultural land for mining has been a major concern in many areas. Historically these areas were mined and subsequently returned to agricultural activity. This is certainly possible with careful management of mining operations. However, the remediation efforts taken after mining has been very limited.
Extensive gem mining in the river has lead to the collapse of river banks.

Banks of the river are damaged due to excavation.

Excavated soil is deposited in a haphazard manner, thereby increasing siltation in the river.
Gem miners dumped earth, sand, rubble and garbage into the river without least concerned about its environmental damage.

River gets muddy due to dewatering of gem pits.
There are indirect injuries and environmental impacts

Major landslide and flooding are caused by mining as well as deforestation

Mining, particularly gem mining, has been responsible for serious problems of soil erosion and river siltation

Erosion and downstream silting due to mining has caused floods
Impacts of gem mining in the Ratnapura district

- soil erosion
- sedimentation
- water pollution
- removal of vegetation cover
- flooding
- risk and/or damage to wild life
- reduction of irrigation efficiency
- health problems such as malaria
- reduction of potential of agricultural lands
- cracking walls of houses and man made structures
Small and large scale illegal mining is fairly widespread in rivers despite regulatory measures

License holders usually neglect the license rules to get high profit

Supervision of mining activities is very low due to corruption in law enforcement agencies and lack of officers

A large number of illegal mines leave mine spoils resulting in damage to nearby paddy fields, crops, rivers and streams
Regulatory measures

Too many pits in one place should be banned

Use fines and security deposits effectively to rehabilitate abandoned gem pits

Avoid issuing licenses to defaulters

Prevent illegal gem mining by issuing licenses efficiently

Proper management and monitoring must be maintained
Gem mining activities in Sri Lanka is increasing according to the growing demands. However, a great concern is on whether the large-scale mining methods are environmentally sustainable or not. Indigenous gem mining method has been proven to be sustainable through time. Local gem miners have been practicing indigenous methods for 2000 years and until now, no major adverse impacts have been reported.
Supplies from indigenous gem mining balance the demand

Large-scale gem mining will result in over-supply and will lead to inevitable decrease in market price

Transformation from small-scale to large-scale gem mining has apparently caused negative effects on the environment and livelihood of local gem miners
Thank You