WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 5, 653-659. Research Article ISSN 2277– 7105

REPPLES OF DISTRUPTION: EXAMININ THE ECOLOICAL IMPACT OF RIVER SAND MINING ON GIRNA RIVER NEAR JALGAON REGION MAHARASHTRA, INDIA

R. B. Borse*

Nagnath Art's, Commerce and Science College, Aundha (Nag.) Dist. Hingoli.

Article Received on
12 January 2024,
Revised on 02 Feb. 2024,
Accepted on 22 Feb. 2024
DOI: 10. 20959/wjpr20245-30226

***Corresponding Author**
R. B. Borse
Nagnath Art's, Commerce and Science College, Aundha (Nag.) Dist. Hingoli.

ABSTRACT

Impacts sand mining is to change the biodiversity, morphology of river as well as habitat of flora and fauna. The density of Chlorophyceae was decrease while population of diatoms increased and electric conductivity of water increase due to concentration of metals in water. Water is one of the most important natural resource for form of life and our planet. Sand have been precious mineral for our society in protecting the environment, it helps in recharging the ground water, Indiscriminate mining of sand may result in the destruction of the entire river system. Like many other minerals sand and sand gravel has become a scare resource for developmental activities. If sand and gravel are extracted unscientifically in quantities higher than the capacity of river to replenish them it lead to many changes.

INTRODUCTION

Sand is a precious mineral for our society in protecting the environment, Sand acts as a sponge which helps in recharging the ground water. Sand is vital for the existence of the rivers. Indiscriminate mining of sand may result in the destruction of the entire river system. Like many other minerals sand has become a precious, due to high demand for constriction and developmental activities. Sand mining is the process of removal of sand and gravel where this practice is creating an environmental issue, social and economic that are not reversible.

Water is one of the most important natural resource for all living organisms. Water is vital for all known forms of life. Rivers have been very useful to men in all parts of the earth since very early times. The Earth's hydrological cycle is the global mechanism that transfers water from the oceans to the surface and from the surface, or subsurface environments, and plants

to the atmosphere that surrounds our planet. (Hill, 2004). The rives of India play an important role in the lives of the Indian people. The river systems provide irrigation, potable water, cheap transportation, electricity, and the livelihoods for a large number of people all over the country.

Like many other minerals sand and sand gravel has become a scare resource in Maharashtra, due to high demand for constriction and developmental activities. Traditional sites for sand mining are rivers. Rivers in India are under immense pressure due to various kinds of human activities among which indiscriminate extraction of sand is the most disastrous one. The situation is rather alarming in certain major rivers including Tapi, Namada, Godawari etc. School of Environmental and Earth Sciences North Maharashtra University Jalgaon was conduct a scientific study of Girna river near Jalgaon District on this aspect of policy decisions on controls of removing sand within the district to be taken with sound information.

MATERIALS AND METHODS

River Girna flows to south-north direction near Jalgaon city. This township covers an area 11,771 sq. km. The inhabiting population of the city is about 3682690 (2001 census). The total length of river Girna is 241 km, and the total length of the Girna river in Jalgaon district is approximately around 174 km. The river Girna at Jalgaon receives many small nallahs carrying city waste. During the monsoon the river is flooded. In dry season however, the river trickles down into minor channels. In order to identify the affect of the sand mining (in river bed and inland) to the groundwater resources, a monitoring study was conducted in open shallow dug wells. Locations of the dug wells were identified with a *GPS*. Dug wells monitoring were conducted using the questionnaire and the collected information on Electrical Conductivity (EC) and Total Dissolved Solids (TDS) were measured using the portable EC/pH. The dug wells which are constructed in the river basins near Bambhori sandy to sandy clay unconfined aquifer. The study was conducted in the 3 different locations. The features considered were the nature of topography, river hydrology and functioning, water quality, stability of the river banks and river bed, erosion, threat to fauna and flora. Physico-chemical parameter was given a rank in relation to the threat and the nature of damage. three locations were visited where sand is been removed.

Algal materials were collected in specimen bottles. Filamentous form were collected with the forceps or by hand. The collections were brought to the laboratory after collection.

RESULT AND DISCUSSION

Sand is an precious mineral for our society in protecting the environment, Sand acts as a sponge which helps in recharging the ground water. Sand is vital for the existence of the rivers. Indiscriminate mining of sand may result in the destruction of the entire river system.

Like many other minerals sand has become a precious, due to high demand for constriction and developmental activities. Sand mining is the process of removal of sand and gravel where this practice is creating an environmental issue, social and economic that are not reversible.

In almost every mineral bearing region like sand mining, soil mining is connected inseparable with land degradation. If sand and gravel are extracted unscientifically in quantities higher than the capacity of river to replenish them it lead to many changes like degradation of land, bank erosion, soil erosion, loss of fertile soil, bank instability collapse, loss of productive structures provided by trees, and transportation network, obstacles to water flow, disturbance of the biodiversity, extinction of species, fish breeding, disturb ecological imbalance and changes topology due to temporary foot paths around mining regions.

Impacts sand mining on river such as creation of new channels, erosion of channel bed and banks, increase in channel slope, and change in channel morphology. These impacts may cause the undercutting and collapse of river banks, the loss of adjacent land and changes in structures, upstream erosion as a result of an increase in channel slope and changes in flow velocity, and downstream erosion due to increased carrying capacity of the stream, downstream changes in patterns of deposition, and changes in channel bed and habitat type.

In the process of sand mining, damage the top layer of river banks and its effect several changes of the physical, chemical and microbiological properties of water (Kundu et al., 1998b). The pollution by sedimentation, site loads, vehicular discharge, solid west dumping by humans, dumps of mine spoil are environmentally very unstable. Such dumps cause destruction of original habitat and land, air pollution, increase in heavy metal concentrations in surroundings, water pollution, visible impairment of water quality, decreases dissolved oxygen concentration by increasing the suspended solid load in the water bodies. Rainwater percolates through these overburden dumps, get mixed with the surface water as well as underground water in the form of leachate causing further water pollution. Restoration of mined areas is essential to restore the ecological balance of

the ecosystem and maintain a self sustain ecosystem where in all essential ecological process take place (Verma, 2003).

This research shows yearly a great volume of sand mining and land from mass erosion are entered to river and transported to the downstream. These yearly cause great losses of agricultural land, uprooted plants, damaged to plant parts such as branches, loss of tree species, disturbance to survival, habitat loss, damage to river bank installation and it is a great problem in water management.

Due to continues removal of sand, ground water table in the vicinity of the river will drop, affecting the moisture content in the soils. Due to the drop in river water levels, quantity and quality of water intakes for drinking water was affected badly specially during the dry season, it also affect on biodiversity and food web of river. Water scarcity have been affecting on livelihoods of people, agriculture and commercial activities and cause decline in water availability for dependent plants and animals. In extreme cases it can cause species decline and extinction. Ashraf, M.A. 2010.

All species require specific abiotic components for its habitat to ensure long-term survival. Many species in rivers are uniquely adapted to the habitat conditions that existed before humans began large-scale alterations. These have caused major habitat disruptions that favored some species over others and caused overall declines in biological diversity and productivity. In most ponds, lake, streams and rivers, habitat quality is strongly linked to the sand, soil and rocks of channel bed and banks. Unstable rive channels are not suitable for most aquatic species. Loss of aquatic habitats (specially for fish), loss of fish species, decrease species diversity due to loss of sensitive species, loss of spawning grounds for aquatic species and river bank dwelling species such as aquatic birds, reptiles, amphibians.

In the Girna river about 35% density of phytoplankton among the different groups of Chlorophyceae species were observed during 2007, while population of Chlorophyceae left only 25% in year 2014. Chlorococcales appeared appreciable quantities during the months of April 2007, when higher water temperature was recorded by 24.1^0c, while after seven year, in 2014 the population of Chlorococcales reduce and many of the species are extinct.

Diagrammatic representation of impact of sand mining on river bank

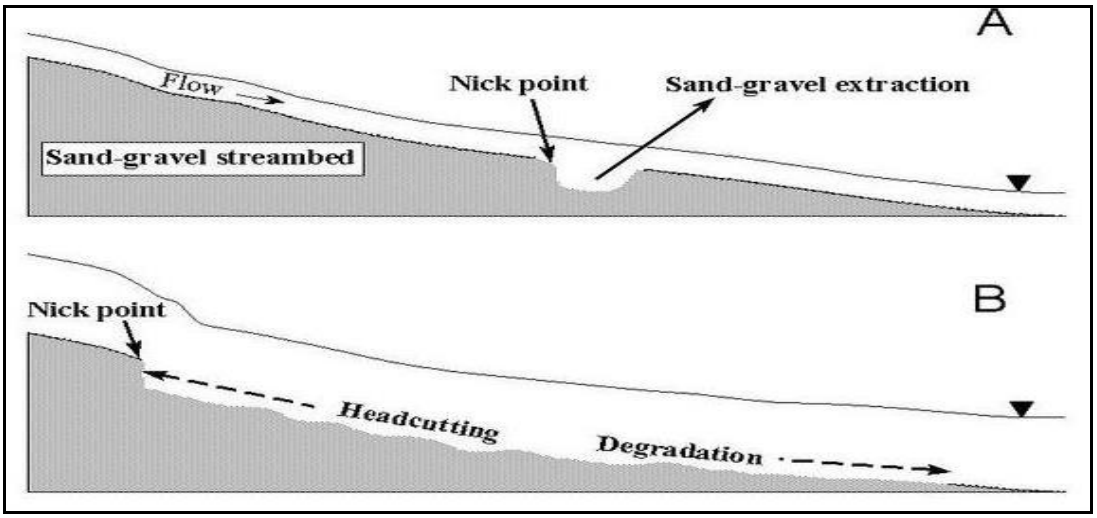

Fig. 1: Diagram of sand-and-gravel river bank showing (A) the nick point that develops with a pit excavation, and (B) the upstream head cutting and downstream bed degradation that develop during high flows.

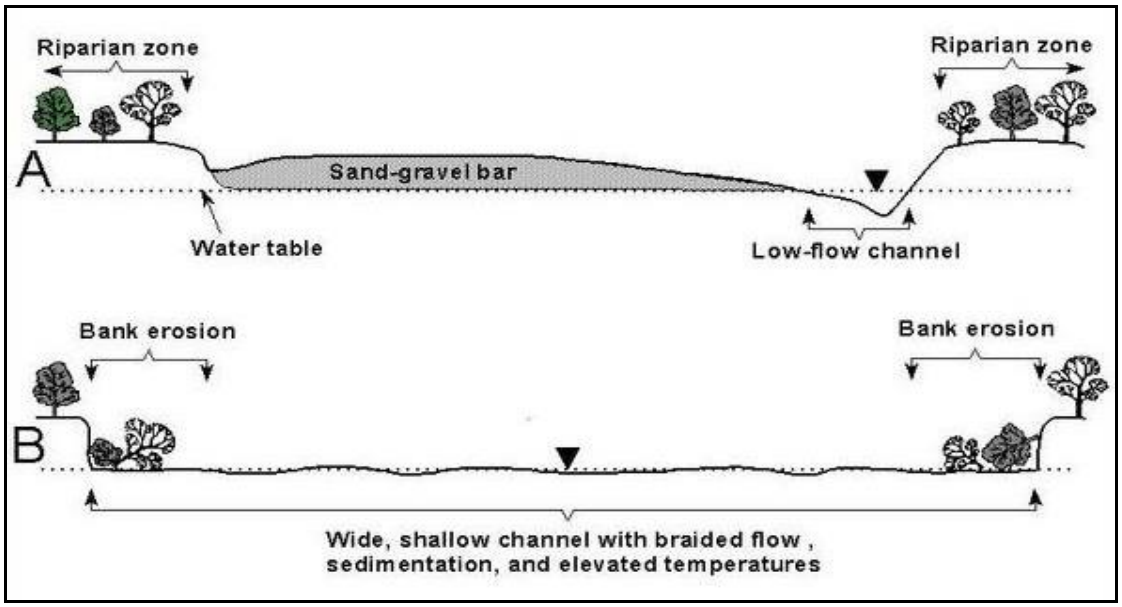

Fig. 2: Diagram of channel cross sections showing (A) a typical sand-gravel bar in relation to the low-flow channel, riparian zone and water table, and (B) the wide shallow channel that results from unrestricted mining and that is characterized by bank erosion, braided flow, sedimentation, and increased water temperatures.

The lowest composition value of diatoms was recorded in September 2007, while diatoms formed the main bulk of phytoplankton population in 2014. This group dominated in percent composition over all groups of algae in the river. This height population of diatoms indicate water pollution as well as salinity and evaporation of water.

Overall electrical conductivity of the samples of the study area is low in year 2007, Conductivity in water varies between 200 to 800 μ/cm is required for optimum plant growth (Beer, 1964). Low electrical conductivity indicates lower concentration of other parameters like bulk density, organic matter, exchangeable caution etc. latest result of study area in 2014 shows higher electrical conductivity, shows higher concentration of other cautions like Ca, Mg. etc.

REFERENCES

1. A.P.H.A. Standard Methods for the Examination of Water and Wastewater (21st Edition), American Public Health Association, Washington DC, USA., 2005.
2. Ashraf, M.A., Maah M.J and Yusoff, I.B., Study of Water Quality and Heavy Metals in Soil & Water of Ex-Mining Area Bestari Jaya, Peninsular Malaysia, 2010.
3. Beer E F., Chemistry of soil. Oxford and IBH Publication, Calcutta, 1964.
4. Borse, R.B., Phycodiversity and Physico-Chemical Characteristics of Girna River Near Jalgaon Region of Maharashtra, India. Ph. D thesis submitted to North Maharashtra University, Jalgaon (India), 2013.
5. Dixit S. S., Smol, D. F., Chales, E. F., Hughes, R. M., Pailsen, S. G. and Gary, B.C. Assessing water quality changes in the lakes of the northeastern United State using sediment diatoms. Candian J. of Fisheries and Aq. Sci., 1999l 56(1): 131-152.
6. Ghose, M.K., Land reclamation and protection of environment from the effect of coal mining operation. Mine- tech, 1989; 10(5): 35- 39.
7. Gurubachan Singh, K. K. Mehta., R.C. Sharma K.L. Chawla., P.K. Joshi., N.P. Yaduvanchi., Technical bulletin on Sand mining or no mining in Agricultural fields in Haryana, 2007.
8. Hill, M. K., Understanding environmental pollution. Cambridge University Press, Cambridge, 2004; 233.
9. Kumawat, D. A. Study on algae from fishponds at Anjale, dist. Jalgaon. Ph. D. Thesis., 2002; 1-238.
10. Kundu N K & Ghose M K., Studies on the existing plant communities in Eastern coalfield areas with a view to reclamation of mined out land. Jr. of Environmental Biology, 1998; 19(1): 83–89.
11. Surender Singh Chauhan. Mining, Development and Environment: A Case Study of Bijolia Mining Area in Rajasthan, India. J Hum Ecol, 2010; 31(1): 65-72.

12. Swer, S. and O. P. Singh., Water quality, availability and aquatic life affected by coal mining in ecologically sensitive areas of Meghalaya. In Proceeding of National Seminar on Inland Water Resources and Environment, Thiruvanathpuram, Kerala, 2004; 102-108.
13. Verma, P. K., Population dynamics and successional changes in restored limestone mines in Mussoorie hills. Ph.D. thesis submitted to Forest Research Institute (Deemed University), Dehradun, 2003.