

**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH
TECHNOLOGY**

**IMPACT OF SAND DREDGING AND SILT EXTRACTION ACTIVITY ON RIVER
AND ITS CHARACTERISTICS : A REVIEW**

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ABSTRACT

The present research work highlights the influences of sand dredging and extensive silt quarrying activity on rivers. The sand dredging activity and its impact on the river processes and other river environment have discussed in the present review paper. It has seen that most of the rivers and their processes are highly degraded and altered due to these activities. In India and almost in the regions of Maharashtra, the ground water is decreasing and such activities also invited the problems of ground water depletion. The study also deals with the relationship between these activities and river ecosystem.

KEYWORDS: River bank erosion, Sand dredging, Silt extraction, Impact on river morphology.

INTRODUCTION

In India population is increased rapidly and pressure occurs on the earth and its available resources. Construction activities are also increasing throughout the country, giving rise to so many serious related problems. Many authors have described the impact of man on natural resources and environmental processes. Gregory and Walling (1973) stated that the present understanding of the human impact upon the processes provides an opportunity to understand future problem and resolve the same by formulating potential methods and techniques [1]. River system and Hydraulic geometry which was first introduced by Leopold and Maddock (1953) , gives the inter-relationship between river discharge, other hydraulic variables such as width, depth, velocity and friction have also altered by natural river processes and man made processes [2], [3]. Sharma (2000) argues that man, equipped with a variety of aids; knowledge and superior knowledge, has demolished the natural resources without understanding the recovering consequences even on his own existence. Therefore he calls upon scientists, climatologists and environmentalists to alarm the modern man against the devastating impact of unscientific and irresponsible exploitation of natural environment and save the life on planet earth [4] [5]. The uninterrupted problems of the human intervention, where human action disturbs river processes and characteristics of channels over river channel maintenance, engineering works , dam construction, sand dredging, silt excavation have been documented in several studies [6], [7], [8], [9], [10]. The human intervention in changing river channel system has been exercised for more than thousands of years, also leads to aggradation and degradation in channels [11], [12], [13]. Hence the author of this paper highlights and documented the major effects and discussions on mining activities and their ill-effect on river systems.

METHODS

The present study deals with the sand dredging activities and silt excavation activities from the river bed and bank. Pioneering research work at International and National level has referred for the present review study. Case study and results that shows the degradation and alteration of the river channels due to sand and silt mining activities have also documented in the present study.

RESULTS AND DISCUSSIONS

Effect of Mining on River System:-

In most of the countries, due increasing pressure of population and demands of construction material, the

resources are utilized at uncontrolled rate. Sand and silt is easily available in the river systems. There is a direct and more benefit to the sand owners, therefore gives the signs of degradation in most of the rivers. Osterkamp also observes the stress forced by human activities on global systems has drawn attention of planners, earth scientists, environmental managers and citizens that changes have occurred since historic time but major transformations of landscapes including fluvial and coastal systems continue to occur in areas of human settlements and mineral extraction. The environmental effects of Urbanization and related activities of mining, quarrying and infrastructure development are principal factors promoting anthropogenic changes in the nature and processes of the earth's surface [14]. In the study of Sapkale, (2008, 2015) Variations in the channel cross sections as well as plan form over a period of about 7 periodic surveys shows the changes in river channel due human interventions rather than by normal processes of adjustment of channel properties to the discharge [9], [15]. It is generally noted that in a region where deforestation takes place, there, the soil erosion becomes a serious problem which also gives rise to deposition of soil and silt in the channel.

Sand is an important mineral for our society in protecting the environment, buffer against strong tidal waves and storm, habitat for crustacean species and marine organisms, used for making concrete, filling roads, building sites, brickmaking, making glass, sandpapers, reclamations, and in our tourism industry in beach attractions. Sand mining is the process of removal of sand and gravel where this practice is becoming an environmental issue as the demand for sand increases in industry and construction. In almost every mineral bearing region, soil mining and land degradation have been inseparably connected [16]. There is very large impact on fisheries of mining. Due to soil erosion many planktons are moving with the soil so many bottom fish are migrating. Due to migration many fish are causes death due to change in habitat. There is a large amount of degradation in river. For degradation oxygen is needed and nitrogen is excelled many aquatic animals are dead due to this process. This causes growth of aquatic weeds on large amount which is harmful for fish. Many prawns, shrimps are also vanished. Due to all this many aquatic species are extinct and endangered. River sand mining causes the destruction of aquatic habitats by bed degradation, lower water levels and channel degradation (Lawal 2011). Due to mining the habitat of aquatic animals is disturbed (i.e. fish and planktons). Environmental impacts such as floodplain degradation, riparian zone damage, dust, noise, collapsing riverbanks and sedimentation were noticed. Environmental degradation is difficult to document through standard methods of environmental monitoring unless the impact is obvious (e.g., stranding of fish and invertebrates) and immediate (e.g., samples taken during gravel removal operations). It has been suggested that alterations in biological communities resulting from extraction of gravel have been caused primarily by alteration of flow patterns due to changes in the shape of the river channel. Rivers flood and shift their courses from time to time, resulting in natural cycles of erosion and deposition of sand and gravel. The river and its banks are home to many fauna and flora species. In this era of rapid land development, however, people have turned to rivers and floodplains as major sources of sand and gravel for construction. Sand and gravel occurs in a variety of natural settings and are common materials used in the construction industries worldwide [17], [18].

Some studies revealed that excavation was not only enormous but it has also encroached large chunk of agricultural lands. As a consequence, this has resulted in altering the geometry of the river channel, also affects on channel changes in section and plan [19], [20]. Sapkale (2008, 2014, 2015) has calculated the river velocity and river discharge in Tarali river of Maharashtra and concluded that silt excavation activities along the bank is the main casue of chaning pattern of river channel and also responsible for the shift of river channel [9], [21] Same problem related to the river degradation have also seen along the Panchganga river of Maharashtra. Therefore some kind of restrictions are imposed on excavations from the agricultural land and river bank [22].

In California, hydraulic mining from 1850 to 1884 delivered a pulse of sediment to the Sacramento river system, causing extensive downstream aggradation and widening [23]. Kondolf has also studied that the removal of sand and gravel from rivers and streams may have extensive negative effects on their biotic communities. The demand for gravel is rising because its importance and role in construction is indispensable. Therefore, the extraction of the two important construction aggregates is bound to have considerable ramifications on the environs of their occurrence. Rivers and their floodplains are an economical source of sand and gravel. These aggregates are required for a variety of purposes, including making concrete, backfill for houses footings, and maintenance of roads and landscaping. Although these aggregates are of paramount importance, previous studies [24], [25].

CONCLUSION

The discussions above advocates that the river channel of India and Maharashtra is under the threat of degradation due to sand mining activities and silt extraction activities. It is also concluded that due to increasing population and the uncontrolled demands of housing infrastructures in the country, such activities will continuously stands to be big environmental problem in future. There is an urgent need to control such sand dredging activities by implementing strict rules and government policies.

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