SUMMARY AND CONCLUSION
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The present investigation pertains to the study of impact of industrial and domestic discharges on the Bhadra river eco-system at Bhadravati, Karnataka State, India. The investigation aims at the study of three main columns of the river viz., water, sediments and plants. These three components were screened for the heavy metal concentrations, in addition to certain physico-chemical parameters. An attempt was made to identify the polluting source and the importance of aquatic plants to monitor the quality of environment.

Five sampling stations were selected on the river for investigation, covering the unpolluted upstream (SSI) and polluted downstream sampling stations (SSII to SSV). Seventeen Physico-chemical parameters were analysed on monthly basis to assess the river water quality. Main emphasis has been laid on six heavy metals, Cadmium, Copper, Lead, Zinc, Manganese and Nickel were estimated in water, sediment and plant samples to study its concentration and pattern of distribution in the three columns of the river.

Sediments act as Sinks for heavy metals. Certain Physico-chemical factors of sediments which influences heavy metals adsorption to clay and organic materials and its precipitation in the form of carbonates and sulphates were also estimated in the sediments. Sediments form the reservoir of heavy metals.
River plants were screened for its heavy metal concentration in the context of species, unpolluted and polluted sampling stations. The plants studied include Ipomoea aquatica Forsk., Jussiaea suffruticosa L., Typha angustifolia Sibth., Cyperus rotundus L. and Polygonum glabrum Willd.

Results are presented in the form of tables and graphs. Data collected on various Physico-chemical factors indicate that the river has been deteriorated at down stream due to the continuous discharge of paper mill and steel mill effluents in addition to the domestic waste pollution. Heavy metals such as Cadmium, Lead, Manganese exceeds the limit set by WHO (1984) and higher desirable limit set by ISI (1984). However, concentration of manganese and zinc are within maximum permissible limits.

Copper and Zinc are well within the limit set by WHO and ISI. However, no standard limit is available for Nickel. Higher levels of heavy metals in down stream stations when compared to unpolluted stations were ascribed to the industrial and domestic pollution.

Data reveals that sediments were found to contain higher levels of heavy metals in comparison to their levels in water and plants. Therefore, evaluation of heavy metals concentration in the river sediments could be effectively used to monitor the anthropogenic input in addition to lithological source in the light of quality of
river environment since the sediments are considered as possible reservoirs of heavy metals. Amongst the heavy metals in sediments and plants manganese occupies the first place in terms of its abundance followed by lead in sediments and zinc in plants. Concentration of cadmium found to be minimum in both sediments and plants. However, in water manganese place is shifted to second place and copper being the minimum.

It is clear from our data on the heavy metal concentrations of Bhadra river plants, that preferential distribution pattern of heavy metals found to vary with the species. Amongst the plants, *Typha angustifolia* Sibth. found to contain higher amounts of Lead, Nickel and Manganese. *Cyperus rotundus* L. accounts for Cadmium and Copper. *Jussica suffruticosa* L. found to contain higher amounts of Zinc. Therefore, it is concluded that these species could be effectively used to monitor the quality of river environment in terms of metal concentration.