# BIOLOGICAL ASSESSMENT OF WATER QUALITY IN THE RIVER BAGMATI AND ITS TRIBUTARIES, KATHMANDU VALLEY, NEPAL

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Bagmati is the main river of the valley of Kathmandu, the capital city of Nepal, into which all other streams draining the valley pour their water. The water quality of this river in Kathmandu Valley has swiftly deteriorated due to unplanned urbanisation and industries. The state of the river and adjacent tributaries flowing through the residential and industrial areas is very disappointing. As the population in Kathmandu increased, so did the garbage and the sewage which found their way directly into the Bagmati River. This invited severe health hazards brought on basically by contaminated drinking water followed by a day-to-day crisis of hygenic drinking water. The Bagmati River constitutes the major source of water in Kathmandu. Therefore, preservation of the quality of this river is a very important responsibility for everybody. No systematic water quality monitoring network has yet been developed in Nepal. The search for a suitable, cheap, and effective method of water-quality assessment is, therefore, very necessary. Bagmati River in Kathmandu Valley has been chosen as a model for adopting water quality management, especially to monitor the water quality of the heavily polluted sites.

The application of the saprobic method in the rapid field assessment of organic pollution is described in this paper. The importance of abiotic and biotic factors in deciding the saprobic state of a river is highlighted. The trophic interactions among the producers, consumers, and decomposers in

an aquatic ecosystem are taken into account. Besides macroinvertebrates, the indicator species concept, based on the observation of algae, diatoms, and macrophytes, is also considered. The phenomena occurring on a river site, such as the formation of iron sulphides beneath the stones, presence of iron ochre, generation of froth on the water surface, hydrogen sulphide gas in sediments etc, are looked into more deeply.

The water quality of the Bagmati River in Kathmandu is presented in coloured maps and is categorised into seven saprobic levels or water quality classes. The saprobic levels are best defined and described as *Oligosaprobic* (Water Quality Class: I, colour: blue), *Oligosaprobic to Beta-Mesosaprobic* (Water Quality Class: I-II, colour: blue-green), *Beta-Mesosaprobic* (Water Quality Class: II, colour: green), *Beta-Mesosaprobic to Alpha-Mesosaprobic* (Water Quality Class: I-III, colour: green-yellow), *Alpha-Mesosaprobic* (Water Quality Class: III, colour: yellow), *Alpha-Mesosaprobic to Polysaprobic* (Water Quality Class: III-IV, colour: yellow-red) and *Polysaprobic* (Water Quality Class: IV, colour: red).

The saprobic system of water quality assessment is extensively used in Central Europe, mainly Germany and Austria, and has been adopted by the neighbouring east European countries too. The significance and limitations of this method, based on the experiences shared on Austrian as well as Nepalese rivers, are discussed. This system has been briefly compared with other biological systems in the Nepalese context and suggestions are made for a better and more effective water management tool.