WATER QUALITY IN MAJOR LAND USE SYSTEMS OF WESTERN GHATS IN KOTTAYAM AND IDUKKI DISTRICTS OF KERALA

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A study was conducted during the period 2015-2017 to assess the water quality in rubber, tea and cardamom dominated watersheds in the Western Ghats of Kottayam and Idukki districts in Kerala state. Watersheds were delineated using survey of India topographic maps, satellite images and field information. Watershed dominated by rubber plantations (30.3 km^2) was delineated at Poonjar area which is on the western slope of the Western Ghats, in Kottayam district. Watersheds of tea (20.5 km^2) and cardamom plantations (18.6 km^2) were delineated at Vandipperiyar and Udumbanchola areas, respectively in Idukki district. Sampling sites were identified depending on watershed area and accessibility after detailed field investigations to ensure distribution. Water samples were collected during post-monsoon season of 2015, pre and post-monsoon seasons of 2016 and pre-monsoon season of 2017, and analyzed for important physico-chemical parameters following standard protocols. The study showed that total dissolved solids, total hardness and electrical conductivity were significantly higher in groundwater and surface water in watersheds of tea and cardamom compared to that in rubber watershed. Significantly higher contents of minerals and nitrate were also observed in samples from watersheds of tea and cardamom compared to rubber. The results indicate higher run off and leaching of nutrients from tea and cardamom plantations consequent to the higher agricultural inputs in the cultivation of these crops in steeper slopes in the upper reaches of the Ghats. Though the effect of agro-management practices was reflected in the physico-chemical properties of ground water and surface water, all these parameters, except pH of groundwater in tea watershed, were within the limits specified for drinking water. Heavy metals (Pb, Cd and Cr) exceeded the permissible limits of drinking water in some samples in the three watersheds while Cu was within the limits. Bacteriological analysis confirmed the presence of fecal coliform bacteria in groundwater and surface water samples of all the three watersheds. Analysis of water samples for pesticide residues showed that organo-chlorines, organo-phosphates and pyrithroides were below detection limit in all the three watersheds. Dissolved oxygen content of surface water was significantly higher in samples from rubber watershed compared to tea and cardamom, indicating better health of water resources in the rubber system.

Key words : Cardamom, Land use, Rubber, Tea, Water quality

INTRODUCTION

Water quality is the most important component of environmental quality because of its importance in maintaining the health of human and aquatic ecosystems. Water quality is affected by a wide range of natural and human influences. Many studies around the world indicated that land use has

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