Hydrol Current Res 2014, 5:4
http://dx.doi.org/10.4172/2157-7587.S1.015

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Hydrology & Meteorology
September 15-16, 2014 Hyderabad International Convention Centre, India

Geo-informatics of upstream-downstream relations in view of climate change and degrading headwater hydrology in Himalaya

Pradeep K Rawat
Kumaun University Nainital, India

Geohydrological and ecological linkages between upstream headwaters and downstream river basins are inadequately recognized worldwide. The headwaters are key source for sustaining the structure, function, productivity, and biocomplexity of downstream ecosystems and supply with a multitude of geo-ecosystem services, including water, sediment, nutrients (e.g., nitrogen and phosphorus), food (e.g., organic matter and invertebrate prey for fishes, salamanders, insectivorous birds). Unfortunately Himalayan headwaters have been experiencing degrading geohydrological process due to high rate of climate change and other associated environmental, anthropogenic dynamics which poses a serious threat to the process of sustainable socioeconomic development in the densely populated downstream river basin in terms of silting of river beds, increased flood events, and decreased non-monsoon water discharge in rivers. The main objective of the study is to monitor geohydrological impacts of climate change in upstream Himalayan headwaters and its consequent response to densely populated downstream Ganga plain ecosystem using modern GIS technology. The Kosi River Basin in Uttarakhand Himalaya has been selected for a case illustration. This reconnaissance study developed and analyzed the meteorological database for last three decades (1983-2013) and estimates that the average temperature and evaporation loss have been rising with the rate of 0.07oc/year and 4.03 mm/year respectively whereas the average rainfall has been decreasing with the rate of 0.60 mm/year throughout the river basin, although these rates increasing with mounting elevations. Consequently the existing micro climatic zones shifting towards higher altitudes and affecting the favorable conditions of the headwater land use pattern and decreased the eco-friendly forest and vegetation cover. The land use degradation and high rate of deforestation in the upstream headwater area leads to accelerate extreme events of land degradation, high runoff, flash floods, river-line floods, soil erosion, denudation, landslides and slope failures during monsoon season whereas extreme drought events during non-monsoon period as dry-up of natural springs and decreasing trends of stream discharge etc. These hydrological problems not only affected rural livelihood and socioeconomic development but also triggering water and food insecurity problems throughout Himalaya and densely populated downstream Ganga plain. Keep in view the headwater and downstream relation a comprehensive integrated framework have been proposed to enhance community resilience to mitigate geohydrological and socioeconomic impacts of climate change in Himalaya and its downstream Ganga plain ecosystem.

geopradeeprawat@yahoo.co.in

Hydrochemistry, ground water geophysics and water supply position in Bin Block, Pithoragarh District, Uttarakhand

Debasish Bagchi
Central Ground Water Board, India

A detailed study was undertaken in Bin block, Pithoragarh district in eastern Kumaun Himalaya to know the groundwater chemistry, groundwater physics and urban water supply position in about 160 km2 area including Pithoragarh town, the district head quarter. Hydrochemical studies included analyzing both the major elements and heavy metals from representative springs and India Mark-II hand pumps. Ten Vertical Electric Soundings (VES) with half electrode separation (AB/2) varying from 150 to 600 m were carried out to know the promising zones of groundwater occurrence. Preliminary quantitative interpretations of VES curves were attempted by using two layer master and auxiliary curves. An attempt was made to analyze the present urban water supply position in and around Pithoragarh township based on the data of state government agencies. Keeping in view the increasing gap of demand versus supply, it is suggested to augment the existing water supply schemes in order to gainfully utilize the surface water and groundwater resources in the study area. It has been estimated that about 83% coverage of a sustainable water supply scheme for every household in the area is achievable by the year 2016. A holistic groundwater management plan needs to be implemented for this hilly terrain with concerted effort from the water user groups, district planners, administrators and the local populace. Participatory groundwater management is the key factor for developing a scientific and holistic policy in Bin block, Pithoragarh district.

debbag@rediffmail.com