There are many approaches to define geochemical background, but the most practical way to define the term would be to describe the natural concentration and variation of an element in a particular natural medium. The background may not be a single value, but a range of values. Whatever be the definition, the question remains as to how to obtain the background value in the present human-influenced environment. As things stand today, there seems to be no unquestioned and commonly agreed method for establishing the background values.

A quick literature survey will reveal that many approaches to assess the background are in vogue. A few of these include: (i) considering world average shale[1] or upper continental crust composition as reference; (ii) concentration of elements in samples from the most pristine parts of the catchment area[2]; (iii) statistical methods[3]; (iv) concentration of elements in international rock[4], soil and water standards and (v) concentration of elements in the sample, chosen from a population of collected samples, which appears to be least affected by human interventions[5]. Since assessment of pollution is as good as the reference material chosen to represent the background, there is need for standardization of assessment of background concentration. It is quite possible that a particular material may appear polluted based on a criterion to assess the background, whereas if we choose another criterion to assess the background, it may prove to be unpolluted. I came across such a situation while carrying out pollution assessment of the floodplain sediments of the river Hindon, a tributary of the river Yamuna. The floodplain sediments appear to be unpolluted if we consider world shale as representing background concentration of elements. But if the sample, chosen from a population of collected samples, which appears to be least affected by human intervention, is considered to reflect the background concentration, the floodplain sediments appear to be polluted considerably.

Therefore, it is of paramount importance to initiate a nation-wide geochemical background survey. Once the geochemical background of soil, water and sediments of a particular region is known, issues concerning medical geology, agriculture, environment and land use would be better understood. This will also help formulate a robust environmental legislation of the country.

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Need to strengthen geoscience education vis-à-vis new Earth Commission in India

India has set up a new Earth Commission and renamed the Union Ministry of Ocean Development as the 'Ministry of Earth Sciences', to incorporate all researches on land, ocean and atmospheric systems[1], with a view to take up an integrated approach of the earth system sciences. The Ministry intends to network institutions, research centres and operational agencies involved in earth sciences, oceanography and remote sensing through a series of programme offices vis-à-vis various structural changes required to address functional flaws. Now the policies will be executed through a newly planned Earth System Organization, similar to Indian Space Research Organization[1].

This should be welcomed as an important and timely step in view of our commitment to achieve full development by 2025. Since India has the world's fastest growing population to feed, its basic priorities are not atomic/chemical warfare but drinking water, energy, food and housing. Fortunately, we have adequate natural resources in the form of minerals and metals, and fuels beside fertile fields, supporting climate with sufficient rain and forests. What else is needed is how to achieve sustainable growth with minimum anthropogenic stress that our 'mammoth population' will exert on regional and global environment. Similarly, we ought to be prepared to face natural disasters like floods, cloudbursts, cyclones, earthquakes and tsunamis. On the other hand, our backwardness has led us to a chaotic picture by and large. This is due to knowledge being confined to a few individuals at the top, whose research does not meet the specific needs of the people[2], or to a minimum knowledge of the earth system, the very 'crucible' where social, industrial and environmental phenomena are taking place. The managers, who exploit natural wealth, are not fully aware of methods (to check environmental impact) that are being practised in the rest of the world under international laws, framed to keep the earth intact. Background of geoscience education and geology makes us service-oriented and realize that sustainable growth could be achieved only by protecting the environment.

Although geoscience education in India began when the British visualized needs of geological organisations in 17th and 18th centuries, it was restricted mostly to explore, exploit and export minerals. Its applications in civil engineering, town-planning, water-resource management, terrain evolution with the help of Geographic Information Systems or Geographic Positioning System have emerged with evolved computation techniques. However, since geology is not taught in schools in India, a large majority of the population remains ignorant of possible dangers and enough attempts are not being made at popularization of this science.

The need of the hour is to promote geoscience education in our region/country by giving a background knowledge of the earth system, to make our youth nature-oriented. For example, in 1999, the Department of Applied Geology, Dr Harisingh Gour University, Sagar, organized

a two-day geological exhibition for students up to 12th standard. The exhibition was extended for three more days! Since then, the university has been receiving more applications in geology at graduate level! Geoscience in general, and principles of geology in particular inculcate a vision that nothing is endurable and our natural surroundings change constantly, evolving at a slow pace[2]. This approach may only be initiated at schools by making fundamentals of geology a compulsory part of science to all future civil servants, engineers, doctors, scientists, farmers, lawyers, etc. A full campaign using information technology, exhibitions, documentary films on natural disasters, setting up of museums of natural history and 'natural excursions' may turn out to be a great success, as it shows positive response in the field to what is being taught in the classroom.

At higher level of education also, geoscience disciplines are best suited to initiate job-oriented 'add-on courses' as being promoted by the University Grants Commission, New Delhi, at graduate level. The efforts made by Dr Harisingh Gour University to start such courses are worth mentioning. The university has proposed 'Soil and water chemistry and environmental awareness'; 'Environmental protection and methods of control'; 'Industrial waste management', etc. to offer Certificate, Junior Diploma and Senior Diploma in Part I, II and III years, respectively to science graduates. During their studies, students may work as consultants, e.g. in the agricultural sector they may help farmers in soil and water analysis to minimize use of chemical fertilizers and pesticides, to give advise on better crop options in different types of soils in different climates, aquaculture, watershed management projects, etc.

For disaster management, the 'nature-oriented' bureaucrats and technocrats may understand importance of terrain evaluation in town-planning, watershed management, highway management, litigations in industrial/environmental management, etc.

It was rightly said, 'Will it take more than a tsunami-sized disaster for the country to initiate some meaningful measures to improve the educational scenario in earth sciences in the country?[3].

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The state-tree of Arunachal Pradesh

Arunachal Pradesh falls under one of the global megadiversity centres, i.e. Eastern Himalaya. It is a botanical paradise. However, the state is losing its glory rapidly due to biotic pressure. Several steps have been taken by the government to conserve the unparalled biodiversity of the state by establishing Biodiversity Reserves, National Parks, Wildlife Sanctuaries, etc. The Supreme Court of India has completely banned the felling of trees in the state. However, there is practically no check on the destruction of the forest by the public themselves. Hence, there is an urgent need to create awareness among the public about the plant wealth of the state, leading to the conservation of biodiversity. Declaration of 'state-flower', 'state-tree', etc. by the government creates an emotional attachment between the people and the plants, due to which people start taking care of these plants.

During studies on the flora of the state, it was noticed that till date, the state tree of Arunachal Pradesh has not been officially declared. My observations indicate that 'Toko Palm' is the most suitable tree species to be declared as the state-tree of Arunachal Pradesh, because almost all parts of this palm are used by the local people. Though it is included in the *Red Data Book of Indian Plants*[1], its leaves are preferred for thatching houses in the region. The tree is practically the 'Kalpvriksha' of Arunachal Pradesh.

An adult toko palm

It is therefore proposed that 'Toko Palm' (*Livistona jenkinsiana*) Arecaceae (Palmae) be declared the state-tree of Arunachal Pradesh.

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