

Free access to topographical maps: Coping with natural hazards, assessing development potential and monitoring environmental changes

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Appreciating that topographical maps embody a wealth of geomorphological and geographical information in a capsule form, and acknowledging that the making of geological maps is essential for the assessment and management of natural resources, planning for development, and hazard-coping endeavours, these maps should be freely available to all scientific workers. There should be no restriction on the use and publication of contour maps showing precise delineation of geomorphological–geological boundaries, the locations of deposits or reserves of natural assets, the sites of development activities, and the zones identified as prone to natural hazards.

Keywords in transparency

The keywords in the policy of transparency in managing the affairs of a nation are dissemination, communication and precision. A topographical map embodies a wealth of geomorphic and geographic information in a capsule form. It is an extremely effective and very versatile vehicle of communication of knowledge on the land, its resources, its environment and its injuries and scars. Putting restriction on easy and ready use of maps by the public at large is therefore a repudiation of the policy of transparency in practices.

The three principal reasons the earthscientists give for de-restricting the Survey of India maps of the whole country are: (1) precision mapping and academic credit, (2) natural hazard-zoning exercises, and (3) assessment of environmental health and development potential.

Credits for academic pursuits

The Indian earthscientists lost an extraordinary and unique opportunity of projecting their pioneering efforts and frontier-area works of tremendous import and consequence on the collision of the continents of Asia and India. The Ladakh Himalaya is one among the very few regions where the junction of the collided continents is

discernible in all its vividness and splendour. The topographical maps were not available to the academics and researchers of non-government organizations, and the maps prepared by the government agencies failed to secure official approval for publication in the form and format conforming to the international standard. The geologists and environmental scientists, who base their works on exploration and depiction of findings on topographical maps, are not allowed to show the contour-lines, elevation points, significant landmarks and geographical coordinates. Prohibited from reproducing in any form of the topographic maps and shorn of the advantages of precise delineation and depiction of their works, the Indian earthscientists have found themselves disconcertingly disadvantaged internationally. The society at large is also deprived of the knowledge of precise locations of the finds and the indepth understanding of the land.

The maps that contain international boundaries require authentication from Survey of India – a process that takes ordinarily 2 to 3 years or even more. In quite many cases it took twenty to thirty years for the printing of the geological maps for the want of official clearance. Thus the Indian geologists have been left behind on the wayside, their works gone unrecognized and their contributions denied the credits they would have otherwise got. We are therefore nowhere today, despite the fact that there is only one Himalaya and the larger part of that Himalaya lies in our land. Needless to state, the restriction on free use of maps is not only a travesty of the common sense but also a lamentable disincentive for pursuing frontier-area research by the Indian scientists.

Natural hazard-zoning exercises

Earthquakes, landslides and avalanches occur very frequently and often devastatingly in the Himalayan domain. Hazards of oceanic cyclones, storm surges and landslides are the regularly occurring phenomena in our coastal belts. And the topographical maps of the larger part of the Himalaya and the coastal belts come under the restricted category, and therefore unavailable to the

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general public including the academics and the voluntary organizations who carry out hazard management measures and relief works.

The preparation of hazard-zoning maps on the basis of geological setting and geomorphological layout with landform features, and of the records of past occurrence of hazards, requires locating on the contour maps extremely precisely the areas of past occurrence and the extent of the areas showing signs of instability or the signals of impending hazardous events. These maps also show areas likely to be struck by future events or potential threats, and spell out estimates of the degree of risks involved and the impacts of manifestations. The contour maps on the scale 1:10,000 or larger, form the basis of planning evacuation and rehabilitation of the threatened population. Unless the maps are of the scale 1:10,000 or larger and show contour lines and crucial features, these measures cannot be carried out systematically. Such maps have to be printed in large numbers and distributed widely.

Assessing development potential

The Himalayan domain is not only rich in its floral and mineral resources, but also in the asset of water that flows down the myriads of rivers and lies frozen in the form of ice and snow. In order to ensure a predictable and plentiful supply of these resources in the manner that causes minimum damage to the environment and to the society, precise delineation of deposits/reserves as well as of the areas likely to be affected adversely by their exploitation, must be identified clearly and precisely on the large-scale maps.

Likewise, in order to provide insight into the ground conditions, such as stability and capability of bearing loads and stresses in connection with identification of most appropriate locations for dams, bridges, utility structures, road, etc., large-scale contour maps are required. These maps also show areas of anticipated changes that are likely to threaten the selected sites.

In all such exercises not only the earthscientists and engineers of the government agencies, but also of the academic and research institutions should participate both collaboratively and competitively. Needless to state, such maps should be a public property.

Recommendations

In view of the free availability of satellite imageries having resolution as high as 6 m or even 2.5 m which are capable of conveying more information than the ordinary topographical maps, the denial to the Indians the unrestricted use of toposheets is an exercise in futility. It is therefore recommended that:

1. Topographical maps should be made available to all scientific workers without imposing undue restriction. The Survey of India be made to derestrict topographic maps of the coastal belts and the areas bordering international frontiers, and to relent on the need for authentication of the international boundaries – which need not be shown at all – and on its insistence on prior approval for publication of geological, botanical, hazard-zoning maps.
2. In case a formal indenting is considered necessary, the procedure for it be made less cumbersome, and less time-consuming. Countersignature of the Head of the Institution be considered an adequate testimony to the bonfide of the indenter.
3. Acknowledging that the making of the geological maps is essential for the assessment and management of natural resources including water, the planning of development for the welfare and for the hazard-coping endeavours, the Survey of India and other government agencies should launch a continuing, full-scale programme of mapping the geology, the soil and the water sources, the natural environment, the hazard-prone areas and the development potentials by taking resort to sophisticated techniques of analysis and the new concepts of earthscience. These maps should be easily available to the public at large.