Seismic hazard, active faults and the Alquist-Priolo Act of California

In 1972, the California Legislature passed the ‘Alquist-Priolo Special Studies Zone Act’ to mitigate a special type of seismic hazard that is characteristically associated with surface-rupturing active faults. According to the Act, the State Geologist shall delineate (by 31 December 1973) appropriately wide special studies zones to encompass all potentially and recently active traces of the San Andreas, Calaveras, Hayward and San Jacinto Faults, and such other faults, or segments thereof, as he deems sufficiently active and well-defined, as to constitute a potential hazard to structures from surface faulting or creep. The Act, subsequently modified and re-designated in 1994 as the ‘Alquist-Priolo Earthquake Fault Zoning Act’, notifies (Section 2621.5) that no structure for human occupancy shall be placed across the trace of an active fault. Small structures like single-family dwellings of wooden frame are however exempt. The relevance of the Act in the context of the seismic hazard mitigation efforts in India is discussed below.

Jolted by several devastating earthquakes in the last two decades, India has taken several seismic hazard mitigation initiatives to minimize the possibility of loss of life and property due to future earthquakes. The principal objective of seismic hazard mitigation is to build or strengthen the existing structures for human occupancy, such that those do not suffer life-threatening failure due to earthquakes. Formulating appropriate guidelines for design and construction of earthquake-resistant structures, and adherence to these guidelines can achieve this objective to a large extent. The Bureau of Indian Standards, a Government of India organization, has issued several such guidelines (like IS 1893 (Part 1): 2002, or IS 4326: 1993, etc.).

These guidelines are however ineffective in the trace zones of active faults, where the hazard is of a different type and more severe compared to the off-fault areas, where ground tremor due to earthquake waves is the principal primary hazard. The principles of faulting indicate that heavy structures built across the trace of active faults cannot survive the seismic slip or aseismic creep on the fault. Such structures will collapse because of sudden differential displacement in the foundation. Interseismic creep may also slowly disturb the foundation causing damage that gradually spreads across the structures. The only way to cope with this type of hazard is to prohibit construction of structures for human occupancy or critical industrial activity (like storage of hazardous substances, etc.) across the trace zones of active faults, as legislated in the Alquist-Priolo Act. The width of the zones should be accurately mapped to encompass all the splays and en echelon strands of the active faults. In California, the width of the zones averages about 400 m. No such regulation on construction across active fault traces exists in India. None of the caustive faults of the devastating earthquakes that struck India in the last 200 years breached the ground surface, except the fault of the 1819 Kachchh earthquake. However, this does not eliminate the possibility of seismic surface faulting in India. In fact several surface-rupturing active faults have been mapped in India. In view of the possibility and severity of the hazard associated with seismic surface faulting, it is imperative that the policy planners and scientists in India, taking a cue from the Alquist-Priolo Act, recommend appropriate measures to regulate structures for human occupancy and critical industrial activities on or across active fault trace zones. Side by side, investigations to accurately delineate the trace zones of appropriate width may be started, and a Government notification defining ‘active faults’ may be issued.

2. http://www.bis.org.in/other/quake.htm

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Nallamala Hills, Andhra Pradesh: A biodiversity conservation priority area in southeastern India

The Nallamala Hills (14°26′–16°31′N and 78°30′–80°10′E) – a group of low hill ranges with an average altitude of c. 500 m in the central Eastern Ghats complex, southeastern India is primarily a 7640 km² tropical dry deciduous forest and scrub jungle with tropical moist deciduous forest patches restricted to high rainfall receiving elevated patches. Floristic and faunistic surveys carried out by the state, academicians and other NGOs reveal that this hill range is a biodiversity-rich region and many more taxa are being discovered continually. The Nallamala Hills is recognized as an important bird area and is home to many endemic flora and fauna. Also unique is the phenomenon of gigantism seen among floral elements like the Mardenia tenaxissima, the leaves of which measure up to 32 cm. Among the plants, endemic taxa include Andrographis nallamalayana, Ericaulon lushingtonii, Dictyoptera beddomei, Premna hamiltonii, Euphorbia linearifolia var. nallamalayana, Rostellularia vaibhi var. rupicola, Boswellia ovallfoliata, Chaemnesyce sanguinea, Crotalaria madurensis, Crotalaria paniculata nagauremnokondensis and Albizia sikharanmen. Recent discoveries of
India as a global leader in knowledge economy

The World Bank report (2005) under ‘India and the knowledge economy: Leveraging strengths and opportunities’ argues that, when supported by the right kind of government policy incentives, the country can increase its economic productivity and the well-being of its population by making more effective use of knowledge. Jacob quoting certain reasons is optimistic about India becoming a global leader in knowledge economy by 2010. A similar optimism was expressed by A. P. J. Abdul Kalam, the former President of India. This optimism just means that there is potential. It also means there is an urgent need for India to look into the efforts it needs to put to make this happen. It needs to be realistic and practical to the situation. It is necessary to identify the shortcomings India faces. In this connection the editorials in Current Science are of relevance as in the whole concept of knowledge economy and knowledge society universities and other higher educational institutions play a pivotal role. It is important to see how we can establish strong relationships between universities and the knowledge needs of the post-industrial society, focusing on the increased importance of knowledge generation and organization for the economic and social well-being of the society.

There are several papers published on the major issues faced by the Indian higher education system. Balaram gives an account of how the state-funded universities in India appear to be sinking with politicization (as evident from the controversies that dog the appointment of Vice-Chancellors), negligible importance given to academic performance of the faculty, professors who do no research and do little teaching, fall in scholarly output, mechanization of education with hard steel moulds of syllabuses and examinations and deadly routine of formal teaching, administration that dominates the outlook of our universities, etc. Balaram mentions that we need to urgently reflect on the state of our publicly funded universities as the field of higher education is in the throes of a major transition. In this connection, C. V. Ramas concerns about higher education in his convocation address at the Banaras Hindu University in January 1927 is still relevant today: ‘Our universities are so en-