

## Social protests block engineering developments

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During the last few years, India has been witnessing an unusual development. The country is trying to make progress, which needs the availability of uninterrupted electrical power. This may be obtained from different types of sources such as hydel, thermal, nuclear, tidal or fossil fuel power stations. However, during the last two decades, it has been observed that establishment of any new power project or any mega industrial project is vehemently opposed by local people. Such protests are casting a perpetual shadow on the power situation of India. At the same time, these people also want uninterrupted electrical power supply. In case of partial failure of power, people are ready to organize another protest rally and cause destruction.

Such protests against mega projects started with the Narmada Project, mainly in Gujarat and partially in Madhya Pradesh and Maharashtra. It took about eighteen years to decide the dispute among three states and after several legal battles in various courts, including the Supreme Court, construction work commenced. It was then opposed by a social organization, Narmada Bachav Samiti. Concurrently, the Samiti had found another vulnerable target in Tehri Dam (Uttarakhand), under the banner of Tehri Bachav Samiti. The construction of dams was opposed on several non-scientific, non-engineering and false convictions. For example, the construction of dams would generate large magnitude earthquakes, which would destroy the dams and result in huge floods at the cost of loss of lives and property. In highly seismic areas like the Himalayas, whether a dam exists or not, occurrence of large magnitude earthquakes is a natural process. However, it should not be forgotten that the advances in earthquake engineering have provided useful findings. It has been observed based on actual data that ground acceleration, which is the main damaging factor, follows a mathematical rule. Whatever be the level of acceleration generated at the epicentral region, in most cases, it has been observed that it gets reduced to a value of less than 0.01 g near a distance of about 30 km. With the present advances in earthquake

engineering and aseismic design, a dam or any significant structure could be designed to withstand the above acceleration level. Tehri Dam is situated at a distance of about 40 km from the Main Himalayan Fault. Even if a large magnitude earthquake (magnitude > 7.5) occurs, the level of acceleration at the Tehri Dam would be in the range 7–10% g and there may be no damage to the body of the dam. If at all there is any damage, it would be minor. It would be worthwhile to recollect the remarks of the hydraulic engineer, K. L. Rao. Immediately after the 6.5 magnitude Koyna earthquake of 10 December 1967, Rao visited Koyna Dam in the capacity of Union Minister of Irrigation. He was asked whether the construction of the dam was responsible for the occurrence of the Koyna earthquake. Rao observed, '... Can a fly sitting on an elephant disturb the elephant? Surely not. Same is the case with reservoir and earthquake...'

Another objection is about submergence of forest land. This would adversely affect wildlife. And most important (from the protesters' view) it will spoil the environment. During the last 50 years or so, we have constructed a number of large dams and reservoirs such as Bhakra, Hirakud, Nagarjunasagar, Ujani, etc. The protesters have rarely any engineer or scientist pleading for their demands. Most of the times, a local *neta* (leader), sociologist or economist is usually seen to lead the protest.

The opposition to the Narmada project delayed the commissioning of construction. But once it started, work progressed at a remarkable speed and the arid, semi-arid and dry regions of Kutch have enough water and power. In other parts of Gujarat, the effect of surplus water and electricity is seen in abundance in a large number of industrial units. Another project which has come up despite opposition is the Tehri Dam. It provides power not only to Uttarakhand, but to the northern grid.

Prior to 1975 or so, a number of large projects have come up in different sectors: Bhilai, Rourkela, Bokaro, etc. in the steel sector and a number of large dams such as Bhakra, Hirakud, Nagarjunasagar, etc.

in the water and irrigation sector. There are other sectors, such as nuclear power, space, steel, heavy industries, ship building and shipping, railways, etc. All these projects are helping in industrial growth.

With this background it would be worthwhile to examine the current situation across the country. The POSCO project in Orissa on mining, steel plant and construction of a new port at the mouth of River Jatadhari are being opposed. The proposed Jaitapur Atomic Power Plant near Ratnagiri in Konkan region, Maharashtra, is being vehemently opposed. The Polavaram Dam project in Andhra Pradesh is also being opposed by the people and the State Governments of Orissa and Chhattisgarh. Protestors in Himachal Pradesh want the height of Kol Dam to be reduced by 3–4 m from the proposed height of 163 m. At present, Assam is witnessing strong protests to the Subansiri Dam. The protest is not limited to industries, but to infrastructure facilities also. Pune city is a fast developing urban conglomerate. The airport is owned by Air Force and is not adequate to accommodate the present air traffic load. Three sites have been identified for a new airport. But in all three locations protests/rallies have already begun against the airport. Similarly, the new airport site at Navi Mumbai has been strongly protested, but has now been cleared by the Ministry of Environment and Forests with a rider. The Airports Authority of India should develop mangroves in an area of about six hundred hectares in the area. But this needs to be examined from a safety point view. First, the growth and development of mangroves need a dynamic water system like an estuarine area, where sweet and saltwater alternately interact in the form of waves. Alternatively, there are saltwater mangroves, but these need water from sea tides with fluctuations in water levels. Further, the mangrove area would be a store house for crabs, some fishes and other small marine insects. Different types of birds would fly over the area in search of food. Details about the location of the mangrove area and airport runway are not available. But if both are located within a short distance, then it could pose

a danger of bird-hit to the aeroplanes. This aspect needs to be examined before taking a final decision on mangroves near the airport.

It can thus be seen that the present developmental activity is passing through a skewed phase. On the one hand, we want progress and industrial development, which requires power. On the other hand, all new projects coming up in various parts of country are being opposed.

Uranium, a radioactive material, is required in atomic power plants. It is available in the NE region near Shillong. The Government wants to start mining of radioactive material in Meghalaya, which is also being opposed.

It is requested that some leading sociologists, economists and social scientists examine the present situation from a social angle; and technocrats, engineers and scientists examine it from a scientific

point of view, and that they come up with some viable and practical approach for need-based development. This will help in sufficient power being available in the country.

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