them for our own benefit, while the rural development lies in shambles? It is difficult to imagine that our planners are deliberately planning such exports.

As an insider I certainly can claim, after nearly four decades of a research career in basic science related to biology, that we scientists like sharp boundaries of our jurisdictions and protect them zealously, almost instinctively. We lack foresight about what is strategically important to protect us from dominance of the advanced nations in our own soil. We have missed the industrial revolution, the genetic revolution and now with obstructive administration and government controls are sure to miss the BT revolution. Having not developed the sensibility to interact intimately with scientists of different disciplines in the past, agriculturist have to depend on classical techniques or learn the new basics from scratch to protect their domain. We neither inspire team-spirit in the labs, nor do we draw inspiration from the sincere efforts in the rural settings, epitomized in Baba Amte's experiment of turning an arid land into a green land. This happened long before our professional scientists learnt about water management from the Israelis.

We are euphoric about green revolution. We had then imported strains from outside and the farmers used them to bring about a change. Now, in a similar move, we have to import the GE products and adapt these to our land conditions because before we can device them in our labs, these would be ready on the shelves of MNCs in as finely tuned a manner as we would have liked to develop ourselves using the new technologies. But we simply lag behind, though the expertise in all fronts to make such an enterprise successful is available. At least that is what we claim publicly. By blocking the introduction of GMOs from outside, we can only deprive our farmers from exercising their choice to increase productivity with lesser inputs and better adapted to the environment.

How do we charge ourselves with the spirit that will encourage a more enlightened outlook? Perhaps, we should get back to the integrated rural community development based on agriculture, that has been accomplished by the silent work of Amte. You will smell the soil of the country, see the needy people, and probably find the missing anchor of R&D efforts not only in agriculture, but in most of the relevant agro-industries. This will generate a genuine urge to come together, ignoring the rigid barriers we have been maintaining in R&D, to serve ends other than the real needs.

It is gratifying to mention that our visit resulted in identifying several areas where BARC could provide expertise and technologies useful to the activities of Amte in the rural development programmes. The visit resulted in initiating a process of transfer of our existing applied research outputs and expertise with an objective to enhance their productivity and technological competence in related fields. Hopefully, such interactions will encourage our R&D efforts to address a variety of relevant high-tech applied research problems to generate new and useful technologies. It is also not unlikely that even the quality of basic research in relevant fields might improve in the process.

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Surface changes after the 2001 Gujarat earthquake

R. P. Singh *et al.* (*Curr. Sci.*, 2001, **81**, 164–166) have highlighted some interesting and useful information on the physical changes seen around Bhuj as revealed from the IRS-ID LISS-III remote sensing data. In this connection I wish to supplement the following for better perception of the subject.

According to Wadia[1], 'The 1819 earthquake in the Cutch resulted in the subsidence of the western border of the Rann of Cutch under the sea, accompanied with the elevation of a large tract of land. Here some 2000 sq miles of area was suddenly depressed to a depth of 12–15 feet and the whole tract was converted into an inland sea. As an accompaniment of the same movements, another area of 600 sq miles was simultaneously elevated several feet above the plains into a mound, which was appropriately designated by the local people as "Allah Bund" (built by God)'. Wadia further informs that within historic times, the Rann of Cutch was a gulf of the sea, with surrounding coastal towns. The gulf was gradually silted up due to elevation of its floor and eventually converted into a dry saline desert for a part of the year and a shallow swamp for the remaining part.

Similar to the 1819 earthquake, the 2001 earthquake, according to Singh *et al.*, has also brought out changes in the surface features like appearance of palaeo-channels and water bodies in the Rann of Cutch. In my opinion, the palaeo-channels shown in the figure 1 *b* at Kulvida and Khadi by Singh *et al.*, may represent the course of the Neru and other rivers (distributors of the Indus river – now in Pakistan) which were draining into the Rann of Cutch during the geological past. Because of the 2001 earthquake, the floor of the Rann of Cutch suffered upliftment, resulting in the exposure of the palaeo-channels and water bodies. Perhaps, if this region suffers one more upliftment, then the Rann of Cutch may be emptied of its saline waters and the area may again become a fertile land. We can then expect some potable water in this region.

Normally, the salinity of the sea water is uniform at any depth in the sea due to currents, which keep the sea water in a state of agitation. However in the Rann of Cutch, the higher concentration of chlorides (> 13.35 g/l) and

salts (> 4.7 g/l) as reported by Singh *et al.*, may be due to the sudden upliftment of the stagnant marshy bed leading to higher concentration of chlorides and salts. Geologically, there is no basis to expect any potable water in this region at present.

The lineament map of the area as shown in figure 3 *a* and *b* by Singh *et al.*, is very vivid and self-explanatory of the patterns before and after the 2001 earthquake. The lineaments after the earthquake not only cover a wider area but their density is also more, particularly around Bhuj. As suggested by the authors, this lineament map based on the remote sensing data should be used for planning of buildings in the earthquake-prone areas. In this connection it is to be noted that major cities like Bhuj have a large population and several buildings. Hence it will be futile to expect the local residents to evacuate their ancestral homes and business places, in spite of educating them on the 'inbuilt' dangers and chances of expecting one more earthquake in this region.

1. Wadia, D. N., *The Geology of India*, Macmillan and Co., London, 1949, pp. 33–34.

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Heading GSI

The editorial 'Earth science, earthquake and aftershocks' (*Curr. Sci.*, 2001, **80**, 317–318) has nicely explained the status of earth science in the Indian set-up. Geology is taught in more than 50 universities at the master's level and also at two IITs, namely Bombay and Kharagpur. A geological map is the basic and fundamental tool in almost all spheres of life, for example, in town planning, landfill sites, crop management, forestry, environmental appraisal, groundwater resource, construction of road and tunnel and major projects like dam, power plants, etc. Landslide and earthquake studies are impossible without geological maps. The entire country has been mapped on 1 : 50,000 scale by the Geological Survey of India (GSI). It is an outstanding performance by any geological organization. Unfortunately, geoscience was always accorded shabby treatment by fellow disciplines and by the government. On the fiftieth anniversary of the Indian Republic, the Government of India constituted a 38-member committee to formulate a National Science Policy under the chairmanship of A. P. J. Abdul Kalam, Principal Scientific Advisor to the Government of India. Unfortunately, none of the members was from earth science community. The charter of GSI, the 150-year-old organization was codified and approved by the Parliament in 1973. GSI is entrusted with the preparation of geological, geophysical and geochemical maps of the entire country and also to explore and assess the mineral resources and undertake studies and research in all sub-disciplines of earth science, methods and techniques of exploration and sensing. It includes the mobilization of the country's resources of personnel and equipment in the field of geology and coordinating their activities to the best advantage during a national emergency. GSI has a strength of more than two thousand geoscientists (1800 geologists, 400 geophysicists and 300 geochemists). A molecular biology laboratory cannot be headed by an astrophysicist, an economist cannot be the Head of National Physical Laboratory. But even an administrator or a vehicle engineer or a driller or a chemist can head the GSI. This is unfortunate and suicidal for earth science.

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NEWS

Brainstorming for arriving at a consensus on India's S&T Policy–2001. Has the policy reached the finishing line?

The press release of the Ministry of Science and Technology (S&T), dated 10 September 2001 was headlined 'New bold S&T Policy–2001 (STP–2001)'. It comes subsequent to a full-day closeted session of about 60 scientists, technocrats and social scientists, representing 'the who-is-who of India's S&T'. However, the same evening, on the occasion of the Shanti Swarup Bhatnagar Award's ceremony, the Hon'ble Minister for S&T, Human Resource Development and Ocean Development, Murli Manohar Joshi alluded to the 'exhilarating discussions on the "first" draft of STP–2001' in his speech. The country's eminent scientists, it so appears, are still locked in a debate on the 'first draft'. This is a long drawn out time period for revisiting the Technology Policy statement of 1983, a good two decades past, and the Scientific Policy Resolution of 1958, in context of a fast changing global S&T scenario. The Minister further added, 'We hope to announce a new policy soon'.