bance in biological diversity. Moreover, organized market created by some biotechnological companies has gradually replaced the normal agricultural practices (by farmers) which used to be the backbone of our nation. Farmers are persuaded and sometimes forced to purchase these seeds which are expensive compared to the non-GM seeds. However, the productivity is not good. Farmers commit suicide as they become bankrupt! Unfortunately, the Indian Government has only become a mute spectator.

Further, transgenes, especially those conferring resistance to pests, diseases, herbecides and stress may get transferred by cross-pollination to sexually compatible wild weedy species, offering them a selective advantage over cultivated ones. Moreover, repeated transformation of genome and elimination of ancillary sequences are the major issues facing global transgene marketing strategy. Transgenic varieties may lead to proliferation of new viral, fungal and insect strains that have gained resistance to transgenic-resistant plants and, this could have serious impact on biological species. Efforts should be made by Government and Non-Government organizations to inculcate the tissue culture technology at the grass roots level. For this, farmers and local youth should be mobilized for 'organized cultivation' of economically and medicinally important plants. They should be provided adequate facilities and financial assistance which could act as an alternate source of income. Awareness should be generated among the rural people about increasing biodiversity loss. Further, transgenic crops should be produced (if necessary) after considering all repercussions and simultaneously precautionary measures should be implemented. Big companies (along with the Government of India) should not misguide farmers. Otherwise a time will come when the Indian farmer, who is considered as the backbone of this so-called developing nation would disappear!

1. http://www.iucnredlist.org

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Forest destruction in Eastern Himalayas

The Himalayas dominate a vast region in Asia, and have contributed much to shaping the environment of India and its neighbouring countries. In northern Sikkim, areas like Lachen, Lachung, Yumthang, Thangu and Sevo have dense natural forests. The green area is covered with old coniferous trees – *Abies densa* Griffith., *Larix griffithiana* Carr. and *Juniperus* spp. Linn. The bark of old trees are peeled-off by locals for domestic and religious purposes. The wood obtained from tall *A. densa* Griffith. tree is used for making long flag-posts. The denuded mountains with stumps of old conifers and frequent landslides are a common sight in certain areas of Thangu and Yumthang. Increasing terrace cultivation is another major problem affecting extinction of many tree species. Arunachal Pradesh (Tawang, Se-La, Zemmithang, West Kameng, Itanagar) displays conditions that are contradictory to those of Sikkim. Both shifting and terrace cultivations are prominent features of this area. Tribes from Arunachal Pradesh cause damage to trees; they practice shifting cultivation converting green mountain slopes into barren patches of land. In Se-La, like Jaswantgarh, trees are cut down by the Indian army for their defence purposes. In Tawang, plants like *Berginia ciliata* Sternb., *Rhododendron* sps Linn., *Meconopsis* sps Vig. and *Primula* sps Linn. have become rare due to terrace cultivation. In Itanagar, plants like *Dipteris wallichii* (R. Br. ex Hook et Grev.) T. Moore, *Costus speciosus* Smith. and *Strobilanthes* sp. Blume have become rare due to shifting cultivation. Destruction of forests in the Eastern Himalayan region is changing the temperature, enhancing the rate at which Himalayan glaciers melt and consequently threatening the biodiversity.

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Equitable sharing of benefits from marine genetic resources

In an earlier article[1], I had put forth the possibility of setting up an International Marine Bio-prospecting Authority (IMBA). This Authority is necessary because the oceans are to be the Medicine Chest of the New Millennium and many pharma/biotech companies and oceanographic institutions are now eyeing to bio-prospect the oceans in a big way[2,3].

According to the present international law[4], the resources of the high seas are open to all (the international law is silent about marine genetic resources). In practice, it is only the developed countries that are actually bioprospecting the deep seas (the developing countries neither have the resources nor the expertise).

One of the biggest problems of any bio-prospecting effort[5] is that most of the time samples of flora and fauna are collected, turn out to be ones already known. This could be avoided to a large extent if biodiversity maps are freely available to both academia and industry. It might be even desirable that all marine biodiversity maps be deposited with the IMBA, which could put them in public domain. This would serve several purposes – the complex interrelationships in the marine ecosystem would be thoroughly understood in a worldwide scale, and it would be easier to identify organisms with potential therapeutic properties. Information on the marine biodiversity on a worldwide scale is being systematically compiled, one such endeavour is the

'Ocean Biogeographic Information System', which is a good database of marine plant and animal species. The genetic databases of marine bacteria have also been created, for example, the Micro Mar project database in Spain and the MIBC strain database in Japan.

One way to distribute the royalties from the common royalty pool could be as follows: the royalties to be set at 10% of the market price of the drug or any product generated directly or indirectly from any marine organism (industry standard for royalties is between 1 and 7%, the higher royalty is to take care of the absence of any upfront payments). A fixed proportion of the benefits is to be spent on the monitoring expenses of the IMBA, and rest of the benefits to be distributed among the member-nations of the UN.

The sharing could be based on a formula that would take into consideration a combination of the country's GNP, the area of its EEZ, and its population. How the variables are positioned and weighted and which other variables are to be added, could be negotiated among the signatory nations.

The IMBA is also intended to act as a facilitator to transfer techniques of marine bioprospecting and related technologies among nations and help to set up knowledge-intensive industries that use marine biotechnology. Magnanimous support of the developed countries is needed in transfer of technologies and scientific training, to properly access the wealth in the EEZ of the developing countries.

This idea of mutually bioprospecting the EEZ and the associated benefit-sharing scheme could begin with organizations like SAARC, ASEAN, BIMSTEC, etc.

The institutional mechanism that would evolve out of such regional treaties could be extended globally by the UN and include in its purview the high seas. To conclude, any nation, if it has to enter into the new global economy, has to do so with whatever capital it may have. The intellectual capital in the form of a nation's marine genetic resource could as well be one of the vehicles to carry forward the economy of the developing countries in this new millennium.

If there is further delay, matters may get complicated and emotive as those in land-based genetic resources, where multiplicity of both national and international laws try to regulate the access and benefit-sharing.

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Kolleru regains its grandeur

Kolleru, one of the biggest shallow, freshwater lakes in Asia, is located between the alluvial plains of Krishna and Godavari rivers in Andhra Pradesh (AP). The lake serves as a natural flood-balancing reservoir for the two rivers and has sustained the rich native flora and fauna. It is an ideal habitat to nearly 189 local and migratory bird species, including rare and endangered birds like Spot-Billed Pelicans (*Pelecanus philippensis*), Painted Storks (*Mycteria leucocephala*) and Oriental Darter (*Anhinga melanogaster*). Being a wetland of international importance, this area has been declared as a Ramsar site in 2002 and the Government of AP had earlier declared the lake as a wildlife sanctuary in 1999. The lake has four main rivulets, viz. Budameru, Ramileru, Tammileru and Bulusuvagu draining into it. Most of them are blocked either with aquatic plants or eutrophicated by invasive exotic weeds. Apart from these, nine major drains and seven medium drains empty their water into the lake. There is only one outlet called Upputeru, which runs for a distance of 64 km and connects to the Bay of Bengal. The lake was exploited by local people who dug thousands of fish tanks illegally, thus effectively converting the lake into a drain. Extensive encroachment of the lake for intensive agriculture, using chemical fertilizers and pesticides, rotten animal wastes for fish feeding, and flow of municipal sewage and industrial waste into the lake make the water so polluted that it was difficult for both flora and fauna to survive. Most part of the lake was getting eutrophicated due to discharge of nutrient-rich water, high quantity of fertilizers and highly toxic pesticides from fish tanks. Formation of fish tanks fragmented the lake, which lost hydrological contact leading to uncontrolled flooding during periods of heavy inflow of rain water. Heavy dredging drastically changed the natural flow of water into the lake, leading to elimination of aquatic biota.

Now the lake is regaining its splendour after the State Government demolished all illegal fish ponds backed by a standing order from the Supreme Court of India. According to the Asian Waterfowl Census report, an increase in the number of migratory birds has been observed after demolition of fish tanks (Figure 1). Conservative estimates of the organization indicate that for the first time in the current year, over 80,000 birds of about 100 species have flocked to the lake during the migratory season that lasts till March. The local fishermen are now engaged in traditional fishing for sustaining their livelihood. After demolition of the bunds, aquatic plants with proportionate herbaceous flora have come up all over the lake area. This invites a lot of bird species and other animals for selection of