International Year of Biodiversity – revisiting curricula for conservation

We have been celebrating 'International Years' on issues of global concern to generate consensus on the significance of these issues and to galvanize action on different scales and levels amongst the nations, regions and communities of the world. But amidst the jest of celebrations, the practical ground realities often remain unheeded. This dilemma is elucidated here in the context of 'Year 2010, the International Year of Biodiversity' which has a specific mandate of fostering awareness, conservation and sustainable use of biodiversity and natural resources. The case in point deals with the curricular practices/traditions of our education system.

Preparing herbaria and animal dissections are important components of various life-science disciplines of our national educational curriculum. This is in practice from secondary schools to graduate and postgraduate levels in colleges and universities, since long. Every year, a large number of students are taken on educational excursions to biodiversity-rich areas, hill stations and places of nature maxima which comprise fragile ecosystems. These students, who are mostly untrained in proper field and herbarium techniques, tend to collect more and more plants of different species and live materials for practicals. And in the process, besides the common plants, they also remove/uproot several rare, endemic and endangered plants of that area which are unknown to them and their teachers or escorts. Further, most of these plants/herbaria remain unidentified and unused, and are thrown away after the practicals and viva-voce exams.

Similarly, in the curriculum of zoology, entomology and other related sciences, a large number of animals are dissected throughout the world. The supply of most such specimens are, perhaps, met from the wild. Supplies from cultured animal houses, if any, are minimal; records of such animal houses and rules for suppliers involved in this trade do not exist at present. All these animals (frog, earthworm, prawn, *Unio*, *Pila*, starfish, *Hardmania*, different types of fish) have their unique positions and particular roles in ecosystems. The ruthless poaching of these species for dissection may gradually reduce their numbers in the respective ecosystems. This, in the long run, may affect the ecosystem balance and incur irreversible damages.

In light of the above, global concern should be focused on the curriculum. The ethics and norms of biodiversity conservation should be strictly adhered to and students/teachers must be properly trained in field/laboratory techniques. Considering the scale of the above activities and their educational importance, the following points are suggested; by adopting them, a small headway can be made towards the achievement of the targets of the International Year of Biodiversity.

- During herbarium excursions, besides collecting, the practice of digital records (pictures), drawing and painting of live plants and flowers should be encouraged. This would make the subject more interactive and help promote better awareness among students towards nature. At the time of practical exams and viva-voce, these digital images, drawing and paintings and tour reports must be accessed in lieu of herbarium records as already suggested[1]. This matter must be considered by universities, the University Grants Commission and policy makers.
- Establishment of miniature botanic gardens should be promoted at college and university levels. These gardens must have representatives of all families, genera and species of the particular area to provide the knowledge of physical vouchers of living plants. They must fulfil the requirements of live plant material for practical work and for better understanding of field and herbarium techniques. Similarly, setting up of small-scale museums containing collections of various plant samples, one set of well-identified herbarium sheets and other learning aids should also be promoted. The concept of virtual herbarium should also be developed amongst students and facilities for surfing various renowned herbaria websites should be provided in department laboratories.
- The dissection work at the school or college levels is not useful for many of the students who drop out or change stream at a later stage in pursuit of a suitable job. Therefore, in the wider interest, it is suggested that this type of destructive laboratory work may be reduced in the curriculum. Instead, other teaching learning materials and teaching learning aids that will help in understanding the complex internal structure of animals, should be explored. The use of good quality charts and models, audio-visual aids, computer programs and animations such as virtual interactive dissection softwares (Science works, V-frog) can be introduced in practical classroom activity. These softwares are based on artificial intelligence or virtual reality technology and contain simulations of the original samples and can help students learn dissection without killing the animal.
- If dissection is necessary at the graduate and postgraduate levels, only those animals should be kept in curricula which are amenable to easy culture. These animal culture farms should be either under direct control of the government or must be monitored by government agencies. It should be ensured that all the demands for dissection be fulfilled from these farms. The poaching of animals from the wild for dissection should be strictly banned.

1. Kholia, B. S., *Ferns and Fern-allies of Sikkim: A Pictorial Handbook Part – I*, Sikkim State Biodiversity Board and Botanical Survey of India, Gangtok, 2010.

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