

The necessity and merit of interdisciplinary approach, especially in the field of medicine and agriculture have been highlighted by Balaram⁴ and Rajagopal⁵. According to them, interdisciplinary approaches in research were not well defined in the 1980s. However, many years later institutes like the Central Plantation Crops Research Institute (CPCRI) and Indian Council of Agricultural Research (ICAR) have started to adopt them. For example, research on high-density multi-species cropping system involves expertise of scientists from various disciplines such as agronomy, plant breeding, soil-science, microbiology, entomology and plant physiology. Such a diverse approach is not restricted to the field of agriculture or medicine, but can also be applied to solve conservation issues like human-wildlife conflict.

Urbanization and conversion of land for agriculture have drastically reduced natural areas for wildlife and created an ecological imbalance. Competition for space and limited resources brings about human-wildlife conflict. The two key players, humans and wildlife have been studied independently by social and natural scientists, but rarely together until recently. Lack of understanding of the inter-relationships between wildlife and humans has created a lacuna in the field of biodiversity conservation. Campbell^{6,7} has pointed out many possibilities to reduce this lacuna.

Lélé *et al.*⁸ have highlighted four major barriers of interdisciplinary research

between natural and social scientists: (i) presence of value judgements in their work, (ii) following different theories and explanatory models for the same phenomenon, (iii) differences in epistemology, and (iv) involvement of interaction with the society at varying degrees. These barriers hinder the ability of combining the knowledge and experience of scientists from different disciplines to address conservation issues across different levels⁹.

According to McNeill *et al.*¹⁰, interdisciplinary research builds collaborations between researchers from different disciplines for which one needs to be not only knowledgeable in his/her own discipline, but must have respect and willingness to accept inputs from scientists from other fields in order to have a productive output. One has to remember that arguments merely decide 'who is right', while sincere discussions reveal 'what is right'. In today's scenario, we need sincere discussions to resolve the issues like human-wildlife conflict. Natural areas with wildlife need to be protected not just to meet the requirements of the people dependent on them for livelihood, but also to maintain ecological balance and the ecological services they provide¹¹. Such a goal can be achieved only by an interdisciplinary approach in order to address conservation problems from the point of view of the stakeholder, policy and governance¹⁰. Eventually it is a solution which is ecologically sound, economically viable and socially acceptable that

will help us achieve our conservation goals.

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'Envirotoons': an impressive way to environmental awareness

A cartoon has an intrinsic ability to catch everyone's attention and is sometimes more effective than words. The well-studied learning behaviour of humans shows that communication through cartoons is one of the most effective methods to convey a message. This method can be used to discuss even complex scientific concepts with people – whether students in a classroom or lay persons. Although any idea in science can be explained through cartoons, they have particular utility in understanding environmental science because of the interdisciplinary nature and universal significance of the

subject. A cartoon having content related to environmental science can be popularly called an 'envirotoon', which is about much more than just having fun. It can deliver the essence of an environmental phenomenon or concept in an understandable manner.

Today, improvement and maintenance of environmental quality has become one of the prime global objectives of all nations, including India. As an effort to protect our environmental wealth, the subject has been included in almost all the academic syllabi in our country. The prime objective of this attempt is to

make students environmentally conscious. Not just students, now it is time that everybody has to be aware of certain important local and global environmental issues, like anthropogenic impacts on the environment, and the management practices we employ for environmental health improvement. Until people understand the importance of environmental protection and participate in conservation campaigns, the scenario cannot be changed. Making people aware about the environmental impacts of their activities will indirectly help in improving environmental quality. In such efforts, utilization

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of 'envirotoons' may help in explaining environmental sciences to lay persons in general, and students in particular. The use of 'envirotoons' can significantly improve the quality of traditional education system and even of the PowerPoint presentation-oriented new teaching trends in schools, colleges and university departments¹.

India is gifted with numerous great cartoonists and high-quality environmental scientists and academicians. But, to become an 'envirotoonist', one must have a good combination of both these talents. Understanding a scientific concept, capturing the idea, and developing it into an educational and humorous eye-catching cartoon includes a lot of laborious work. Making effective environmental cartoons involves research by itself. Though there are several science cartoonists in India, their number is low and few of them produce cartoons on a regular basis. Pradeep K. Srivastava (Central Drug Research Institute, Lucknow), a

pioneer in developing 'scientoons' (popular name of science cartoons), is working to develop a network of Indian science cartoonists².

One can find numerous cartoons on environmental issues such as climate change and biodiversity conservation, but the creators of many of them might have only a superficial knowledge of environmental concepts. Thus, there is a need to develop logical, unbiased and objective-specific informative 'envirotoons' that can be used to educate people. In addition to other media, internet, which is one of the most frequently used resources of information today, will effectively help in communicating the 'envirotoons' among people. When talking about the platform for 'envirotoons' in India, *Current Science* is credited with providing space for good-quality science cartoons under the section 'Smile with science!'

In my opinion, further work is needed in our country to develop a national-level

peer-reviewed depository for environmental science-based cartoons which can be translated into different languages. Use of such 'envirotoons' will not only develop interest for the subject among students, but enhance the effectiveness of environment awareness and management programmes.

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