

Lemna sp. Such floating vegetation hinders the mixing process of reservoirs along with suppressing plankton productivity by insufficient light penetration.

Generally, phosphorus occurs as the limiting nutrient in such freshwater ecosystems. When there is sustained input of phosphorus in such water bodies in the form of town sewage, such systems shift from the oligotrophic to the eutrophic condition. The water quality and clarity decline under such conditions of sustained injection of the limiting nutrient. Though sewage contains phosphorus in plenty, ammonia is also more likely to occur in high concentration in such waste waters due to cessation of nitrification caused by the anaerobic condition. Polyphosphates present in detergents and soaps have been reported to be responsible for global level phosphorus enrichment during

the past 50 years. Among the different plant nutrients (nitrogen, phosphorus, potassium and silicon), phosphorus is known to have a marked geochemical role. Though all the chemical categories of sedimentary phosphorus can be recycled, appreciable loss of phosphorus occurs in hardwater systems by the process of apatite formation. While considering the aspect of fish culture practice in such senescent systems, it becomes necessary to eliminate surplus phosphorus which encourages growth of weeds and macrovegetation. In many such lakes, aluminium and ferrous salts can be introduced to precipitate excess phosphate as insoluble phosphates of iron and aluminium. Such attempts have already been made in USA. Dredging of such systems and permitting entry of processed water alone can further improve the water quality of

such water bodies. After making such improvements in the ecological characteristics of the freshwater systems, there is scope for fish culture practices. Restoring the health of any ecosystem is known to be beneficial to mankind in several ways. Hence administrators and scientists should bestow attention to such rejuvenation practices to improve water quality and promote fisheries.

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An idea for Indian education

Recently, I described¹ some of the long-existing mistakes that the US government has made in the administration of funds for scientific research, so that India might avoid making the same mistakes and avoid suffering the same negative consequences. Those mistakes are corrupting American science and making it second-rate. They have also adversely impacted American education, which has declined in parallel with American science, as described below. In addition, I present an idea that may be considered in planning the renovation of India's education infrastructure.

There is a widespread perception in America – real or imagined – that if one contradicts work supported by the National Science Foundation (NSF), or the National Aeronautics and Space Administration (NASA), for example, one risks loss of direct funding from such agencies. From extensive Science Citation Index Extended® searches, I have noted that important contradictions, published in some of the world's most prestigious peer-reviewed journals, have been systematically ignored by those with support from NSF and NASA, thus slowing down the progress of US science and wasting millions of taxpayer-funded research dollars. But how does this relate to education?

Many of the organizations that serve to directly influence teachers obtain support for education projects from agencies such as NSF or NASA. Can one really expect those organizations to encourage science

teachers to teach students to challenge scientific ideas, when many of these scientific ideas are supported by these same funding agencies? There is clearly a conflict of interest. Young people are often being taught 'science facts', which may not be facts at all, instead of being taught to question popular perceptions about their world. The lesson: Science funding agencies should fund science, and *not* fund education projects. Similarly, science funding agencies should *not* fund science television or news programmes, as these may invariably lead to a skewed presentation.

Teaching is not only hard work, but it is also an activity that demands imagination, creativity and flexibility. As America's education has declined, her teachers have progressively lost autonomy. Yet the core wealth of any education system lies within those who teach. In a sense, there is a parallel to what has been happening with scientific communication, and in that parallel lies the root of a suggestion that may be of some benefit for India's education renaissance.

Anonymous system of reviewing, used by the scientific press, has slowed and impeded transfer of scientific communication. Anonymous, unaccountable peer-reviews, a methodology once thought to select the best, has all too often become a system used by some to delay and sometimes to suppress competitors' reports. But now, recent experience has shown a better way, a system that obviates the bottleneck. This system is the Internet-based author

self-archive, arXiv, supported by NSF and by the US Department of Energy, making it possible for physicists to communicate their reports worldwide in usually less than 48 h (<http://www.arXiv.org>). In a slightly modified form, this scheme may be adopted for current plans in Indian education.

My suggestion is that one should consider setting up an arXiv-like self-authoring archive for teachers. There, teachers would be able to post their best lesson plans, ideas for classroom demonstrations, descriptions of laboratory experiments, and other teacher-to-teacher communications. And teachers everywhere would be able access that information. It would become a valuable teacher resource. To encourage the use of this system, and to reward teachers, postings in various areas could be judged with the best entries receiving monetary awards, as well as national recognition.

1. Herndon, J. M., *Curr. Sci.*, 2005, **88**, 1714.

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