

Bill are action-oriented and time-bound, and are not subject to similar reviews.

Recommendations

For the Bill to achieve its objective of maintaining India's forest cover and preserving biodiversity in protected areas, the Bill needs to expand its scope to include consolidation of existing forest areas in the country and to set specific guidelines on compensatory afforestation activities tailored to ground realities in the state. The Bill, at the moment, mandates the use of the Fund for multiple activities, including activities under the Green India Mission, which may serve to dilute the primary objective, that of compensating for the lost forestlands. In addition, the development of adequate safeguards is crucial to ensure that any diversion of forestland for non-forest purposes causes minimal harm to forest cover and biodiversity.

Since the Bill empowers State Forest Department personnel to carry out activities envisaged under the Bill, there exists significant scope of capacity building of local officials and communication of best practices across states, subject to local realities. Periodic review meetings

among the national and state CAMPAs may also help bridge knowledge gaps and provide for consistent outcomes among states.

Looking forward, the Bill represents a landmark legislation in forest policy and governance in India due to the corpus that is now under the control of the national and state CAMPAs. Efficient utilization of these funds is crucial to maintaining the integrity of India's forest cover in the coming years, protecting fragile habitat in Protected Areas and bringing fair compensation schemes for local stakeholders.

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MEETING REPORT

Microalgal research and climate change*

The focus of a recent workshop on microalgal research was to provide a comprehensive understanding on the significance of microalgae as an efficient bioindicator of the marine environment and their role as a potential resource for alternative fuel production, carbon sequestration and bioremediation. The workshop attracted over 120 participants from various parts of Tamil Nadu.

T. Subramoniam (Sathyabama University, Chennai) while highlighting the theme of the workshop, said that microalgae are critical to ocean biogeochemical cycles. They take up, transform and recycle elements needed by other organisms. He added that microalgae, with their high-value biological derivatives, such as biofuels, cosmetics, pharmaceuticals, nutrition and food additives, can revolutionize research in algal biotechnology. He also spoke about the activities at the Centre for Climate Change Studies, Sathyabama University. The Centre has been founded with the principal objective of studying the impact of climate change arising from global warming on marine ecosystems. Recently, it has initiated work on carbon sequestration by microalgae using ex-

perimental microcosm studies. In addition, the Centre has undertaken a DST project on the effect of climate change on the physiology and adaptability of marine microalgae using mesocosm facility.

B. Meena Kumari (National Biodiversity Authority (NBA) of India, Chennai) who inaugurated the workshop, highlighted the various activities of NBA. She also spoke about detailed awareness on the various Acts regarding climate change and the deliverables in 2015 United Nations Climate Change Conference (COP 21) and 1997 Kyoto Protocol.

G. K. Suraishkumar (IIT Madras, Chennai) in his keynote address, discussed the adverse role of fossil fuel in global warming and climate change. He provided an overview on the role of

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microalgae as a carbon-neutral, alternative source for liquid fuel production. In addition, he explained in detail, the parameters that could improve biomass production and lipid content in microalgae.

Rajesh Kumar Sharma (Bhaba Atomic Research Centre (Facilities), Kalpakkam) explicated the role of microalgae, especially cyanobacteria, for bioremediation of wastewater and xenobiotics. He explained about phototrophic aerobic granules composting bacteria and microalgae, and their significance and advantages in bioremediation.

N. Thajudin (Bharthidasan University, Tiruchirapalli) spoke about the various pigments in microalgae (cyanobacteria) like chlorophyll *a* and phycobiliproteins (phycocyanin and phycoerythrin), and their potential as a resource in varied areas such as mariculture, food, feed, fuel, fertilizer, medicine, industry and combating pollution.

Senthil Chinnasamy (Aban Infrastructure Pvt Ltd, Chennai) spoke about the

potential of algae in generating biofuels and carbon sequestration. He mentioned that algae are considered as impending biomass feedstock sources for the production of advanced third-generation biofuels as their biomass production potential is significantly higher than any terrestrial plants. He also cited many ongoing field and case studies and explained the various opportunities and challenges in commercialization of algae oil.

V. P. Venugopalan (Bhaba Atomic Research Centre (Facilities)) emphasized the continuous abstraction and discharge of large quantities of sea water in power-generating plants and the environmental risk to microscopic organisms entrained into the incoming water as well as benthic organisms residing at the outfall site, which are subjected to a number of physical and chemical stress factors that include elevated temperature, cooling water treatment chemicals and mechanical impact on soft body parts.

S. Beema Shafreen (Sathyabama University) spoke about the applications of microalgal pigments for cosmetics, pharmaceuticals and nutraceuticals. She also added that phycocyanin and phycoerythrin obtained from microalgae have anti-biofilm effect against *Streptococcus pyogenes*, a pathogen capable of causing pharyngitis in humans.

Vinitha Ebenezer (Sathyabama University) discussed the role of microalgae as a model for environmental stress assessment studies, as these organisms are sensitive to the changing environmental conditions. They are easy to culture and maintain in the laboratory. She also emphasized the various end-points that can be used in environmental stress assessment.

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