



# Adopting Bioeconomy with Forest Ecosystem Services for Sustainable Development

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## Editorial

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## Editorial

Since the human activities got globally interconnected, the relationship between human and natural systems has become more complex. It is a fact that human civilizations and globally integrated economy constantly rely on Ecosystem Services (ES) and related support. ES are the benefits that humans obtain from ecosystems. ES are increasingly being included in explicit policy aims and can be a useful tool for influencing decisions regarding a country's resource usage and crucial management. Since economics are needed to evaluate the role of any natural resource for sustainable future, the perspective of bioeconomy gains importance. According to European Commission (EC), bioeconomy is an economy that "encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products, and bioenergy". The natural resources of India, particularly forests, are getting speedily depleted, hampering their ability to continue the provision of ES and livelihoods. Forest based bioeconomy can be defined as "the economic activities involving forests and forest ecosystem services, such as biomass-based value chains and the economic use of various types of forest ecosystem services (FES)" [1]. The present industrial activities are responsible for significant environmental and climatic imbalance. That is why there is a need to draw our attention on bioeconomy for a significant solution. This comprises all sectors and systems that rely on the functions and principles of biological resources like animals, plants, micro-organisms, detritus and organic waste. It includes all types of ecosystems and their services, not only the primary production sectors (agriculture, forestry, fisheries and aquaculture), but also, the economic

and industrial sectors that use organic materials and processes to produce food, feed, bio-based products, energy and services [2].

The FES based bioeconomy is not only restricted to wooden products, but also the significant services and other amenities for people's well-being provided by forests [3]. The obtained FES are classified in four categories; provisioning, regulating and cultural and supporting services. The product benefits obtained from forest ecosystem (food, fodder, fresh water, construction materials and firewood, fiber biochemical and genetic resources) are included in provisioning ES whereas indirect benefits obtained by the regulation of ecosystem processes (climate change, water regulation, pollination, carbon sequestration etc.) fall under regulating services. Cultural services point to the non-material benefits obtained from the forest which contribute to human well-being, social and cultural functions (spiritual, aesthetic, religious, and recreational values). Supporting services (nutrient and water cycling, soil formation and retention, and photosynthesis etc.) are those necessary for the production of all other ES [4-6].

Various case studies in India reveal that dependence on wide variety of Non-timber forest products (NTFPs) (e.g.- fruits, flowers, roots, mushroom, fuelwood, construction materials, grass, fodder, resin, wild vegetables etc.) in the protected tropical deciduous forest areas cater to local livelihoods. The results of the studies imply that in most of the rural areas, only wood forest products are thought to have a high economic value whereas fuelwood is the most preferred NTFP as a source of energy. However, it is proposed that by adopting the bioeconomy, we should take care of other NTFPs and FES for our country's economic progress. By encouraging the importance of wood and other NTFPs to the local livelihoods, beginning with raising awareness, we

shall move forward towards fulfilment of SDGs (sustainable development goals). This can only be done successfully by understanding the forest-based sector's strength as a renewable energy resource and the relevance of FES for health ecosystem and people's well-being.

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