



Productivity of biomass and bioenergy in tropical ecosystem through integrated bio-cycle management

Cahyono Agus

Universitas Gadjah Mada, Indonesia

Abstract

High net primary production in tropical ecosystems is supported more by rapid biogeochemical cycles than their weathered low fertility soils, due to high temperatures, rainfall, humidity, and light intensity during the year. Although tropical ecosystem has high biomass productivity, the economic value is low. The new paradigm from extraction to natural resource empowerment will provide a challenge in the shift from a red and green economy to a smart blue economy concept with a global sustainable development for the future. Energy is an important requirement for economic development, specifically to improve conditions that affect all aspects of human welfare. Environmental and genetic engineering for the development of organic materials through biomass, biogas, biofuel, bio-reactor, algae fuel, bio-hydrogen, and other bioenergy can increase their productivity for renewable energy. The Integrated Bio-cycle Management (IBM) is a close-to-nature ecosystem used for ecological landscape management of land (soil, minerals, water, air, and microclimate) and biological resources (flora, fauna, humans) for higher added value in the environment, economy, socio-culture, and human health. The cycles of energy, organic matter and carbon, water, nutrients, production, crops, and monetary resources is managed through 9R (reuse, reduce, recycle, refill, replace, repair, replant, rebuild, and reward) management. Global warming that indicated by increasing of air temperature, greenhouse gas, sea surface, ocean temperature and sea level would affect biogeochemical cycles, especially their bio-productivity in tropical ecosystem. Development of organic materials as sources of renewable energy through integrated bio-cycle management is important for sustainable development in tropical ecosystems with better bio-technology by genetic improvement, environmental manipulation, purification, packing, and compression.

Biography

Cahyono Agus was born in Yogyakarta on March 10, 1965. He is a professor at Universitas Gadjah Mada (UGM) Yogyakarta Indonesia. He earned doctorate degree from the Tokyo University of Agriculture & Technology, Tokyo, Japan, in 2003. He served as head of the UGM University Farm (2008–2015), Chairman of the Tamansiswa Alumni Board (2016–2022), a member of Majelis Luhur Persatuan Tamansiswa and the Education Board of Yogyakarta. He is an active reviewer for research, community development, scientific publications, and institutional development in Higher Education, Indonesia. He has published many scientific works in international seminars and journals and has been awarded several honors and copyrights from various agencies.

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