

Abstract

SESSION 2:

Accelerating Actions for
Sustainable Development and
Climate Change

WORKSHOP 3:

Valuation of Coastal
Ecosystem Services and
Benefits and Coastal Use
Zoning: Tools for Better
Planning and Implementation

Biophysical Approach in Ecosystem Service Valuation: Spatial Emergy Valuation

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Marine spatial planning (MSP) is considered an important management tool for marine ecosystem and resources in Korea. Its strength lies in the integration of spatial information on health and multiple uses of marine ecosystem and resources. This will provide invaluable inputs to policy establishment and decision making on marine and coastal issues. Even though there have been some researches that have estimated economic or biophysical values of marine ecosystem services in Korea, no attempts have been made yet to integrate ecosystem service valuation into the MSP framework. This study carried out a preliminary application of spatial ecosystem service valuation. Gyeonggi Bay that is located on the western coast of Korea was selected as a study area because many competing uses over the past decades have resulted in the deterioration of the bay ecosystem. The emergy methodology that is a biophysical approach in the valuation of ecosystem services was used to construct value maps for selected ecosystem services of the bay. It uses available energy as the common currency to compare different components and processes of ecosystems on the same basis. Environmental characteristics and management needs of the bay were used to select spatial resolution, spatial emergy mapping procedure, and data and information required for the valuation. Emergy maps for environmental inputs to the Gyeonggi Bay ecosystem were constructed to understand the characteristics of environmental support for the bay. A value map for stored resources in the bay was constructed using biomass data of benthic invertebrates as an example. Fishery production and marine sand extraction that are two conflicting uses of the bay ecosystem were selected to construct value maps of ecosystem services to illustrate how spatial value maps could be used in spatial decision making in marine ecosystems.



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About Daeseok Kang:

Dr. Daeseok Kang is a faculty member of the Department of Ecological Engineering at the Pukyong National University in Busan, Korea. He teaches and does researches in the fields of systems ecology, ecosystem modeling, environmental accounting, ecological economics, and environmental policy. His current research focus is on management strategies and valuation of ecosystem services of marine and coastal ecosystem of Korea. He has served on various advisory committees for government ministries at the national and local levels and the Presidential Committee on Sustainable Development.