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Evaluation on Service Value of Wetland Ecosystem in Xiamen City

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Wetlands,locate at transitionalzone of water areaand land,provide many environmental functions maintainingecological balance and regional stability.Wetlands are the most productive ecosystems in the world,andprovide many important services to human society.Furthermorewetland is also the ecologically sensitive and adaptive systems.Costanza,R.,an ecologistof the United States,attempted to put a price on global ecosystem.He estimated the current economic value of 17 ecological services for 16 biomes,giving the annual value of global ecosystem services,which accounted to US\$ 33×10¹²,of which,ocean ecosystem,consisting mostly of bay,estuary,seaweed,coral reef,tidal flat and mangrove,suppliesUS\$ 20.9×10¹²,which is 63 percent of the total value.These data presented obviously importance of ecological functionof coastal wetland.Xiamen city,with various wetland and abundantbio-diversity,lies in the southeast coast of china.According to the regulationof investigationon wetland resource and the definition of wetland in Ramsar Convention on Wetlands(<http://www.ramsar.org>),9 categories of ecological system were divided,which included shallow sea,estuary,river,silt beach,sand beach,breed,mangrove,Brine pan,pond and reservoir.The natural wetlands,whose area is more than 256 km²,include shallow sea,estuary,mangrove,sand beach,tidal flat and river.Among those wetlands,dominating coastal wetlands which consist of shallow sea,tidal flat,sand beach and mangrove,and natural wetland are respectivelyaccount for 90% and 65% of areas of all wetland.In this contribution,the services of wetland ecosystem are evaluated in order to estimatethe importanceof wetland ecosystem to regional development of Xiamen city.These studies are beneficial to providing scientific basis for making policies on wetlands conservation and management,andensuring the sustainable development of wetland resources.The area data of different wetland types are extracted from Landsat Thematic Mapper(TM) image measured in March 2003.Some statistical data are derived from the Statistical Yearbook of Xiamen(Xiamen Municipal StatisticalBureau,2003).This paper pay more attention to the 7 services functions of wetland ecosystem,which include those services of water purification,water conservancy,culture and scientific research,wild species habitat,erosion control and organic matter production.Theeconomic theory and methods are used to evaluate the value of wetland ecosystem's services,and GIS technologies arealso applied to data processing,statistical analysisand compiling the spatial distribution map of services value of wetland ecosystem.The results indicate that the total value of wetland ecosystem is about 135.54×10⁸ Yuan(Chinese RMB) in 2003,which equal to 17.8 percent of the gross domestic product(GDP) in Xiamen city(760×10⁸ Yuan).According to values of these seven kinds of services,the value decrease from water purification to tourism,wetland production,Erosion control,culture and scientific research,wild species habitat and water conservancy.Among all these services values,value of purification,tourism,wetland production and erosion control are contributed to 95.7%.Water purification value is 66.46×10⁸ Yuan ,and the value of tourism,wetland production,Erosion control,culture and scientific research,wild species habitat and water conservancy are respectively34.14×10⁸ Yuan,16.82×10⁸ Yuan,15.83×10⁸ Yuan,2.59×10⁸ Yuan,1.96×10⁸ Yuan,1.22×10⁸ Yuan.Variation between different ecosystem services'contribution is obvious among these nine wetland ecosystems .Specifically,the shallow sea and tidal flat ecosystem play the most important role in the ecosystem services.Shallow sea contributed 47.59% of the total value;thesecond is tidal flat with 37.97% of all values.The service value of mangrove,estuary,river,sand beach,breed,brine pan,pond and reservoir are(0.07×10⁸ Yuan,1.18×10⁸ Yuan,2.46×10⁸ Yuan,0.13×10⁸ Yuan,14.31×10⁸ Yuan,1.19×10⁸ Yuan,respectively.The service of natural wetland is far higher than artificialwetland.The spatial distribution of wetland ecosystem services of unit area showed Mangrove is more than Silt beach,Shallow sea and Estuary,River,Sand beach,Breed,Pond,Reservoir and Brine pan.Wetland,especially natural wetland ecosystem plays an important role in sustainable development and protection of land resource in Xiamen city.In the process of urbanizationand exploitation,natural wetlands around city are continuouslytransformed into farming,industry,port and residentialarea etc,which lead to loss and degradation of wetlands.Consequently wetland ecosystem services are greatly discounted.The assessment of wetland ecosystem service provides us a new concept of conservation,and development of wetlands.Primary evaluation of the wetland ecosystem services is favored to cognizing the value of wetland resources.Rationally developing natural wetland and protecting wetland ecological environment are beneficial to not only the sustainable utilization of wetland ecological service, but also the sustainable development of regional economy and society in Xiamen city.In this paper,estimating service of wetlands ecosystem is preliminary study;and more detailed methods of assessment should be applied to study of wetlands'ecosystem service in the future.

【Key Words】 : **wetland service function of ecosystem evaluation Xiamen**

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