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厦门大学

硕士学位论文

填海造地的海洋生态补偿研究

Study on Marine Eco-compensation of Reclaiming Land from Sea

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摘 要

填海造地是沿海城市缓解土地供需矛盾、扩大社会生存和发展空间的一种重要途径。相当长一段时间以来，决策者和开发者往往只关注眼前的经济效益，而忽略填海造地对海洋生态系统的负面影响和长远效应，使沿海地区的填海造地活动愈演愈烈，给海岸带生态系统带来了越来越大的压力。生态补偿是解决社会经济发展中资源耗竭与生态破坏的一种经济刺激手段，可在协调经济发展与生态平衡方面发挥作用。在填海造地中引入生态补偿机制，有望减少受经济利益驱动的盲目填海行为，协调经济发展与海洋生态保护之间的关系，合理配置有限的海洋资源。目前，无论在学术层面还是实际应用中，生态补偿多集中在陆域、河湖等生态系统，少有海洋生态补偿的相关报道，填海造地的海洋生态补偿研究更为罕见。因而，本文的研究具有明显的学术价值和重要的现实意义。

本文运用生态经济学、环境经济学、海洋学等多学科的相关理论和方法，采用国内外文献查阅、相关资料收集、理论分析、模型构建与现场调查相结合的手段，从利益相关方、补偿标准核算和补偿方式三方面对填海造地的海洋生态补偿进行较全面的研究，构建了填海造地海洋生态补偿的实施框架，并应用于案例研究。本论文的主要成果如下：

（1）界定了生态补偿、海洋生态补偿的定义，并运用生态环境价值论、公共物品理论、外部性理论和可持续发展理论，通过填海造地对海洋生态环境及利益相关者的影响分析，阐明了实行填海造地海洋生态补偿的必要性。通过探讨生态补偿的目的和补偿金的性质、剖析海洋生态补偿金与海域使用金的区别，揭示了填海造地海洋生态补偿的内涵。

（2）分析了填海造地海洋生态补偿的利益相关方，着重探讨了补偿对象的确定，即基于填海造地对生态系统服务的负面影响，根据人们获取各项服务的渠道以及相应服务进入的产业链或消费链，分析利益受损群体，确定补偿对象；提出可用于填海造地的海洋生态补偿标准的三种核算方法，并建立相应的计算模型，对各方法的优缺点及特征进行较详细的比较和总结；提出应根据海岸带生态系统子服务的特点，结合填海后的土地利用情况及利益受损群体，确定实施补偿的方式。在以上三方面分析的基础上，构建了填海造地海洋生态补偿的实施框架。

（3）将建立的填海造地生态补偿的实施框架应用于案例研究，选择厦门大

嶝海域的三个填海造地区块作为研究对象。基于研究区概况（资源、生态、环境等），识别了填海区的主要生态类型及其提供的各类服务，并分析了填海造地方案的负面影响，进而对各类服务的损失进行货币化评估，结果显示，生态系统服务的损失为 4834.22 万元/a，单位面积损失为 4.96 元/m^2·a。分析了生态补偿的利益相关方，认为补偿主体可能为土地需求方或地方政府，养殖户、港航部门为较明确的补偿对象，其余补偿对象涉及面较广，可由地方政府作为其利益代表，接受相应的补偿；根据生态系统服务损失的估算结果，选取不同的贴现率 2%和 4.5%进行生态补偿标准的核算，结果为 248 元/m^2 和 110 元/m^2，分别占大嶝岛现行地价的 6.7%和 3.0%，处于可接受的水平。在补偿方式上，认为对较明确的补偿对象（养殖户和港航部门）可依据宜养滩涂和浅海、港航资源服务的损失占总损失的比例实行资金补偿，并可考虑对养殖户进行就业补偿，同时，在条件允许的情况下，可结合资源补偿，即将人工培育的文昌鱼苗种放流到保护区内，增加文昌鱼的资源量。

关键词：填海造地；生态补偿；生态系统服务；利益相关方；补偿标准

Abstract

Reclaiming land from sea has become an important way to expand the production and living space and to make up for the shortage of land in coastal areas. For a long time, the decision-makers and developers have only paid attention to the short-term economic benefits, neglecting the adverse and long-term impacts of sea reclamation on the marine ecosystem. As a result, more and more sea is being reclaimed and the marine ecosystem is under increasing pressure.

Eco-compensation is an economic incentive instrument to coordinate economic development with ecological protection. Introducing eco-compensation into sea reclamation will help to allocate the limited coastal resources rationally and to reduce the reclamation activities induced only by economic benefits, and then accelerate the harmonious development of economy and ecology in coastal areas. Thus far, the academic researches and practical applications of eco-compensation have focused on terrestrial and freshwater ecosystems, but marine eco-compensation studies are rare, and the study on marine eco-compensation of sea reclamation is rarer. Therefore, this thesis may provide significance of theory and practice.

Based on the relevant theories and methods of ecological economics, environmental economics, environmental assessment and oceanography, combining document and material collection, theoretical analysis, estimation model construction and field investigation, the thesis has done a systematic research on marine eco-compensation of sea reclamation. The achievements are as follows.

(1) The thesis defines ecological compensation and marine eco-compensation, and analyzes the impacts of sea reclamation on marine ecological environment and stakeholders based on the theories of ecological environment value, public goods, externality and sustainable development, and then illustrates the necessity of introducing marine eco-compensation into sea reclamation. Additionally, the thesis discusses the objectives of eco-compensation and the characteristics of compensation fee, and the differences between marine eco-compensation fee and sea area usage charge. As a result, the connotation of marine eco-compensation of sea reclamation is

revealed.

(2) The thesis discusses the stakeholders of marine eco-compensation of sea reclamation, and focuses on the compensation receivers by analyzing the adverse impacts of sea reclamation on ecosystem services and the groups who suffer losses. It proposes three measurement methods for marine eco-compensation amount, and establishes the corresponding estimation models. Additionally, it compares the differences among the three methods. It suggests compensation approaches should be chosen according to the actual situation, including the damaged coastal ecosystem sub-services, and the groups who suffer losses, etc. Based on all above, an implementation framework for marine eco-compensation of sea reclamation is put forward.

(3) The framework above is applied into the case study of Dadeng sea area in Xiamen. According to the general situation of natural resources, ecology and environment in the study area, the thesis identifies the main ecosystem types and their services, analyzes the adverse impacts of the reclamation, and then estimates the corresponding losses. The results show that the losses to ecosystems is about 48.3 million/a, and the annual loss per unit area is 4.96 yuan/m^2·a. The thesis analyzes the stakeholders involved in eco-compensation, and determines that the compensator is the land demanders or the local government. It thinks that local seafood culturists and the waterway system management department are explicit compensation receivers; for other implicit stakeholders involved, the local government should accept the corresponding compensation on their behalf. According to the annual loss per unit area, the thesis calculates the compensation amount with 2% or 4.5% discounting, and the results are 248 yuan/m^2 and 110 yuan/m^2, accounting for 6.7% and 3.0% of the current land price in Dadeng Island respectively. For compensation approaches, the thesis proposes the explicit compensation receivers can be compensated with funds according to the corresponding portion of losses. The seafood culturists can be also compensated with jobs. If possible, the resource compensation can be taken into consideration. For the case, the cultured *brachiostoma belcheri* fries can be introduced into the protected area.

Keywords: sea reclamation; eco-compensation; ecosystem services; stakeholders; compensation amount

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