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Wetland dynamic and ecological compensation of the Yellow River Delta based on RS

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Abstract

This paper selects Landsat-5 TM remote sensing images in 2001 and 2008, field investigation, the department visits and other methods as the date source. Based on these datas, the types of the wetland, changes in wetland area and the value of wetland are obtained. And then, we estimated the loss of market value and ecological function value which caused by reduction of wetland area and the environmental pollution with the methods of market value, ecological value, cost of environmental protection investment and outcome parameters. Therefore, we made the fund allocation of wetland compensation and calculated ecological compensation standards of wetland, provided an important reference for Yellow River Delta′s eco-compensation.

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*Keywords:*Wetland; ecological compensation; RS; compensation standards; Yellow River Delta;

1. Introduction

In recent years, ecological compensation is concerned more and more by domestic and foreign scholars. Many foreign scholars have done a lot of research in the concepts, mechanisms, models and standards of ecological compensation. Cuperus R, Bakermans M M and De Haes H A, et al (2001) believed that ecological compensation is the alternative measure of impaired ecological function or quality [1]. Heimlich, R.E. (2002) and Scherr S J, White A, Kaimowitz D (2004) studied the models of ecological compensation in the areas of America, Mexico and Brazil[2-3]. Alix-Garcia J, Janvry A D and Sadoulet E (2004) studied the forest ecological compensation mechanism in Mexico[4]. Austen E and Hanson A

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(2008) studied the Principles and mechanisms of ecological compensation in Cnanda[5]. Al-Ghais S M and Pearson W H (2008) established a program of ecological compensation in the UAE water area [6]. In China, we began to study the ecological compensation in 1980s. Right now, the study direction is transforming from ecological compensation mechanism of macro-policy to quantitative study with mathematical models. For example, SHI Y S (1999) studied the river ecological compensation mechanism[7]; ZHAO W H and LI H X (1999) proposed the initial idea of forest ecological compensation tax[8]; MAO X Q (2002) investigated the compensation standards[9]; HUA G D and CAI Z J (2004) constructed a model of forest ecological compensation[10]; LIU Y L (2006) established a model of ecological compensation in Xinanjiang upstream area[11]; MAO F (2006) studied the mechanisms and guidelines of ecological compensation[12]; LIU Q (2006) studied the ecological compensation mechanism in Jiangheyuan district[13]; LAI L (2008) studied the methods of ecological compensation[14]. There are some research on the Yellow River Detla Wetland focused on biodiversity, ecosystem function and restoration, ecological water requirements and ecological value. For example, CUI B S (2005) studied on ecological water requirements[15]; XING S J (2005) studied on ecosystem function and restoration[16]; HAN M (2009) studied on ecological value[17].

Despite many scholars have done much research, there still are much work to do about quantitative methods and standards of ecological compensation. The authors believe that the quantitative study of wetland ecological compensation should combined with the regional characteristics of the ecosystem, only in this way can make compensation standards suited to local conditions.

2. The purpose and significance

The Yellow River is the mother of the Chinese nation. The delta wetland located in the Yellow River estuary is the youngest and the most typical delta wetland in the world. Because of its unique indigeneity, growth, vulnerability and extremely high scientific research value, the wetland draws extensive concern from both the domestic and foreign wetland organizations and experts, and is a research focus of global wetland ecology. But the former research of the Yellow River Delta wetland ecological has focused on the evolution of ecological systems, ecosystem health, ecosystem service value, ecosystem restoration etc, the quantitative analysis of ecological compensation is little. The scope of this study takes Ninghai as the apex, with the southeast to the Zhimai estuary, the northwest to the Tuhai River (Taoer River) estuary. The entire fan-shaped area amounts to more than 5400 square kilometers. The geographic coordinate is between longitude 118° 07' - 119° 23' E and latitude 36° 55' - 38° 16' N (Figure 1). The administrative area includes Kenli County, Hekou District, Dongying District, a part of Guangrao and Lijin County, four townships of Zhanhua County and a small part of Wudi County. 93% area of the Yellow River Delta is in Dongying City and 7% area is in Binzhou City, so the scope of this study area is the administrative area in Dongying City.