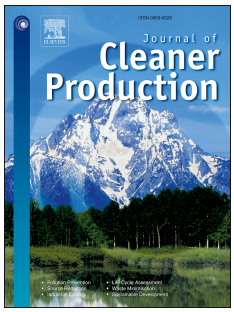
Accepted Manuscript



Exploring the factors influencing ecological land change for China's Beijing-Tianjin-Hebei Region using big data

Hualin Xie, Yafen He, Xue Xie

PII: S0959-6526(16)30132-9

DOI: 10.1016/j.jclepro.2016.03.064

Reference: JCLP 6913

To appear in: *Journal of Cleaner Production*

Received Date: 13 October 2015

Revised Date: 21 March 2016

Accepted Date: 22 March 2016

Please cite this article as: Xie H, He Y, Xie X, Exploring the factors influencing ecological land change for China's Beijing-Tianjin-Hebei Region using big data, *Journal of Cleaner Production* (2016), doi: 10.1016/j.jclepro.2016.03.064.

Exploring the factors influencing ecological land change for China's Beijing-Tianjin-Hebei Region using big data

Hualin Xie[1, 2] *, Yafen He[1] and Xue Xie[1]

1. Co−innovation center for institutional construction for Jiangxi eco−civilization, Jiangxi University of Finance and Economics, Nanchang 330032, China
2. Research center of land management, Jiangxi University of Finance and Economics, Nanchang 330032, China

Abstract: With the advent of big data, such data regarding the harmonious relationship of "people-land-time" have also gradually entered into the fields of natural resource management. Ecological land is one of the important natural resources and is fundamental to maintaining ecological security. Ecological land change can lead to a series of eco-environmental problems, including water shortages, soil erosion, increased drought intensity, ecosystem damage, and biodiversity loss. Based on relevant sets of big data, including spatial land data, soil data, DEM, climatic data, and socio-economic data, this study explores the factors influencing ecological land change during the period of 2000-2005 in China's Beijing-Tianjin-Hebei Region. The results show that the factors influencing different types of ecological land change have substantial differences. For forest land coverage change, Slope type, Soil organic matter (SOM) content, Farmer's population percentage, and Landform type are the most important independent variables. However, for grassland change, altitude, distance to the primary road and GDP per capita are the most important spatial determinants. Regarding the wetland change, farmer's population percentage, GDP per capita and altitude are the most important factors influencing wetland changes. This study indicates that natural and social-economic factors can affect ecological land change in China's Beijing-Tianjin-Hebei Region.

Keywords: ecological land; big data; logistic regression model; land resource management

1. Introduction

Ecological land is an important carrier of natural resources, is the basis for the development of forestry production, and is the fundamental factor for enhancing ecological protection and achieving sustainable economic development and protection (Bozetka, 2012; DiGiano et al., 2013; Xie et al., 2015). With increased global environmental change and human disturbance, ecological land has been seriously affected by a decreasing number of species, forest volume decline and other issues (Song et al., 2015). In addition, global environmental change further leads to water shortages, soil erosion and drought, intensifying ecosystem damage and biodiversity loss (Wang et al., 2015); these issues have caused widespread concern in the academic community. Protecting ecological land, improving currently damaged ecological zones, and returning naturally ecological land are important issues for enhancing and balancing regionally ecological conditions (Xie et al., 2014a). These