Assessing the ecological effectiveness of payment for ecosystem services to identify priority areas and vegetation restoration modes: A case study of the Sloping Land Conversion Programme in the Northern Shaanxi Loess Plateau, China

Zhenmin Ding[1] and Shunbo Yao[2]

[1]Northwest A&F University
[2]Northwest Agriculture and Forestry University

June 25, 2020

Abstract

Identifying priority areas and vegetation restoration modes is important for alleviating the conflicting demands for water between the ecosystem and humans based on the ecological effectiveness of payment for ecosystem services (PES) in arid or semi-arid areas. This study uses the treatment effect model to estimate the marginal contribution of Sloping Land Conversion Programme (SLCP) in the Northern Shaanxi Loess Plateau towards greater vegetation cover in the Northern Shaanxi Loess Plateau, including conversion of farmland to forestland (CFF) and conversion of farmland to grassland (CFG). In addition, we build a relative advantage index (RAI) to identify priority areas and vegetation restoration modes based on an assessment of the PES' ecological effectiveness. The RAI can identify priority areas and vegetation restoration modes. Furthermore, the areas with a RAI of more than 1 qualify for afforestation reach 11460 km2, accounting for 14.101% of the Northern Shaanxi Loess Plateau, mainly distributed in the south of the Northern Shaanxi Plateau while others are more suitable for grass-planting. The government should improve PES schemes to guide farmers to choose the appropriate vegetation restoration modes in different areas from a cost-effectiveness perspective.

Hosted file

`Identity.pdf` available at https://authorea.com/users/336808/articles/462499-assessing-the-ecological-effectiveness-of-payment-for-ecosystem-services-to-identify-priority-areas-and-vegetation-restoration-modes-a-case-study-of-the-sloping-land-conversion-programme-in-the-northern-shaanxi-loess-plateau-china

Selection equation for the probability

Main equation for measuring effectiveness of PES

Farmland

Slop

Temp

Precipitation

Modes

CFF

VS

CFG

Vegetation

The RAI for identifying priority areas and vegetation restoration modes

Socioeconomic factors

Natural factors

The first step

The second step

The last step