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## Problems in Payment for Ecosystem Services and Discussion on the Ecological Worker Mechanism: Postprint

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### Abstract

The theory of Payment for Ecosystem Services (PES) originates from neoclassical welfare economics, implicitly assuming the pricing of ecosystem services and that markets will automatically evolve buyers and sellers of ecosystem services. Due to the absence of real markets for ecosystem services, this assumption proves ineffective, necessitating a re-examination of the basic theoretical assumptions of welfare economics underlying most PES projects and the innovation of new ecological compensation approaches. Meanwhile, adhering to the principles of benefiting the people through ecology, serving the people through ecology, and centering on the people through ecology constitutes the core connotation of the development concept that “lucid waters and lush mountains are invaluable assets,” offering a vivid interpretation of people-centered environmental protection and economic development. Particularly for important ecologically fragile areas, the implementation of ecological conservation projects should pay greater attention to the development of local inhabitants within the region. By reviewing the theoretical evolution of PES and summarizing typical PES case practices both domestically and internationally, this study analyzes the disconnect between theoretical assumptions and practical implementation in PES, and finds that the social networks and employment opportunities created through PES project implementation have generated new income-generating opportunities for local participants. On this basis, by guiding local inhabitants to participate in ecological conservation and restoration, the formation of a well-coordinated and synergistic ecological worker mechanism that integrates ecological conservation, economic development, and livelihood improvement is explored.

## Full Text

# Theoretical and Practical Problems in Payments for Ecosystem Services and Discussion on the Mechanism of Eco-workers

## 1 Introduction

### 1.1 The Theoretical Foundation and Evolution of PES

The theoretical roots of Payments for Ecosystem Services (PES) lie in neoclassical welfare economics, which implies that once the pricing of environmental services is established, the market will automatically modify the behavior of buyers and sellers of these services. However, this assumption is difficult to accomplish in practice and requires re-examination of the basic assumptions of welfare economics theory in most PES projects. PES, also known as Payments for Ecological Benefits (PEB), represents a market-based ecological compensation mechanism designed to internalize environmental externalities through economic incentives.

The core challenge in PES implementation stems from information asymmetry and the Principal-Agent Problem (PAP). In this context, the government or beneficiaries act as principals, while ecosystem service providers (often local communities or individual landowners) serve as agents. The PAP arises because agents may possess private information about their conservation actions and costs, making it difficult for principals to monitor compliance and ensure effective outcomes. This information asymmetry can lead to moral hazard and adverse selection, undermining the efficiency of PES programs.

## 2 PES Theory and Practice

### 2.1 International and Domestic PES Practices

International experiences with ecological compensation demonstrate diverse approaches to PES implementation. These programs vary significantly in their design, payment structures, and institutional arrangements depending on local ecological conditions and socioeconomic contexts.

In China, PES practices have evolved through various policy initiatives and pilot programs, reflecting the country's unique institutional landscape and conservation priorities. Chinese ecological compensation mechanisms incorporate both market-based approaches and government-led interventions, often blending economic incentives with regulatory frameworks.

The implementation of PES programs reveals several common challenges across different contexts. First, accurately measuring and valuing ecosystem services remains technically complex, requiring robust ecological monitoring and economic valuation methods. Second, establishing appropriate payment levels that reflect both the opportunity costs of conservation and the societal benefits of

ecosystem services presents ongoing difficulties. Third, ensuring long-term sustainability and avoiding perverse incentives requires careful program design and adaptive management.

### **Abstract**

The theoretical root of payments for environmental services (PES) lies in neo-classical welfare economics, which implies that once the pricing of environmental services is set, the market will automatically modify the assumptions of buyers and sellers of environmental services. However, this assumption is difficult to accomplish and requires re-examination of the basic assumptions of welfare economics theory in most projects involving PES. This paper reviews the evolution of the PES theory and summarizes typical PES case practices at home and abroad. Further, the problems of PES in theory and practice are discussed. It is found that some government initiatives that are implemented via the social network complementary to PES practices through various forms provided by PES (i.e., physical, technical, and cash) help local participants create new revenue opportunities. This PES implementation promotes the formation of coordination linkage, benign mechanisms of ecological protection, economic development, and improvement of people' s livelihoods.

**Keywords:** payments for ecosystem services; eco-worker mechanism; ecological compensation mechanism; Nation park

*Note: Figure translations are in progress. See original paper for figures.*

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