Farmland Shelterbelt Contribute to Green Fortune

Na Lei[1,2,3,4, *], Jing He[1,2,3,4], Yufei Xiong[1,2,3,4], Yanan Li[1,2,3,4]

[1]Shaanxi Provincial Land Engineering Construction Group Co., Ltd., Xi'an 710075, China;

[2]Institute of Land Engineering and Technology, Shaanxi Provincial Land Engineering Construction Group Co., Ltd., Xi'an 710075, China;

[3]Key Laboratory of Degraded and Unused Land Consolidation Engineering, the Ministry of Land and Resources, Xi'an 710075, China;

[4]Shaanxi Provincial Land Consolidation Engineering Technology Research Center Xi'an 710075, China.

* 619648133@qq.com

Abstract: By using Henan Province as an example, it is the first time to perform Farmland shelterbelt contributes to green fortune. The result shows that the increment of Green Fortune of Henan Farmland shelterbelt from 2012 to 2015 is 3.497 billion Yuan, Farmland shelterbelt provides products and services is increased for national economic development.; the increment of the value of the flow is 0.673 billion Yuan, natural capital 0.231 billion Yuan, which accounting for 34.32 % of the former, the value of ecological service function is 4.42 billion Yuan, accounting for65.68 % of the total Green Fortune, that is, the ecological service function value is twice than the natural capital, the ecological service of the farmland shelterbelt make a good benefits.

1. Introduction

Natural capital, also known as green wealth or natural wealth, together with physical capital and human capital, constitutes the three major elements of national wealth [1]. The introduction of green wealth has changed the narrow and one-sidedness of the traditional national economic accounting system, and established a scientific and rational green national accounting system. It is a challenge to the traditional national economic accounting system (SNA) and traditional wealth concept, and is the traditional concept of development. Fundamental changes have gradually become a hot topic in the social and economic fields of all countries in the world. At this stage, green wealth has gradually become an important basis for countries around the world to formulate and implement sustainable development strategies [2].

Farmland shelterbelt is a multi-functional artificial corridor network system composed of trees [3], which enhances the anti-interference ability of farmland ecosystems, improves farmland microclimate, and purifies air, increases biodiversity, carbon sinks and play an important role in guaranteeing crop production and high yield [4]. Farmland shelterbelt has great ecological and economic value and has an important contribution to regional green wealth. However, at this stage, research on farmland shelterbelt at home and abroad mainly focuses on forest belt allocation [5-6], wind and sand fixation [7] and crops [8]. It was less research on the contribution of farmland shelterbelts to regional green wealth and neglected the economic and ecological value of farmland shelterbelt. At present, China attaches great importance to the development of green wealth. In view of this, this study accounts for the contribution of farmland shelterbelts in Henan Province to the province's green wealth, and quantifies its value. It is conducive to people to more accurately understand the economic and ecological value of farmland shelterbelts.

2. Research Areas and Research Methods

2.1 Overview of the Study Area

Henan is located in the middle of the central part of China and the middle and lower reaches of the Yellow River (E110°21′~116°39′, N31°23′~36°22′). The province's land area is 167,000 hm2, accounting for 1.74% of the country's total area. It is located in the transition zone from subtropical to warm temperate zone. It is the most important base for agricultural production in China. It is related to China's food security. Farmland shelterbelt plays an important role in agro-ecology, preventing natural disasters and improving climate, soil, hydrological conditions, create an environment conducive to the growth of crops, ensure stable agricultural production, high yield.

2.2 Research Methods

2.2.1 Calculation Method of Value of Farmland Shelterbelt Forest Land, Forest and Forest Products.

In practice, the price of forest land is determined by the transaction price of the actual use rights of forest land contracting, transfer, lease, etc. the value of forest products is determined by the market value; the forest price is determined as follows:

The age of the forest used the replacement cost method for 1 to 5 years. The specific formula is as follows [9]:

$$En = \sum_{i=1}^{u} c_i (1+p)^{n-i-1} \tag{1}$$

En is the price of forest assets in each year, Yuan; C_i is the amount of investment indicated in the current year's wage and production level in the ith year; P is the rate of return on investment. Calculated by 6%, %; n is the age of the forest, year.

The forest age is calculated by the net income present value method for more than 6 years. The specific formula is as follows:

$$En = \sum_{i=1}^{u} \frac{A_i - C_i}{(1+p)^{i-n+1}} \tag{2}$$

En is the evaluation value of n-year forestry assets, yuan; Ai is the income of the ith-year, yuan; C_i is the cost of the ith year, yuan; u is the economic life, year; p is the discount rate, %.

2.2.2 Calculation Method of Ecological Service Value of Farmland Shelterbelt.

The method of assessing the value of farmland shelterbelt ecosystem uses specifications for assessment of forest ecosystem services in China (LY/T 1721-2008) in this study.

3. Results and Analysis

3.1 Physical Stock and Flow of Farmland Shelterbelts in Henan Province

According to the results of the survey conducted by the State Forestry Administration and Beijing Forestry University on plain forestry in China, the assets of farmland shelterbelts in Henan Province in 2012 and 2015 were obtained (Table 1), including the stocks and flows of forest land and forest assets, and the flow statistics of forest product assets.

Table 1. Physical stocks of farmland shelterbelt assets accounts in Henan

item	Forest area /hm²		Forest stock /m³		Forest product output /m³
	Stock	flow	Stock	flow	flow
2012	212047.79	9695.5	15237639.36	681885.73	321444.7
2015	241039.54	11432.14	18930757.84	1810053.42	415116.06
Amount of change	28991.75	1736.64	3693118.48	1128167.7	93671.36

3.2 Accounting of Forest, Forest and Forest Products

According to the data provided by the Forestry Bureau of Xuchang City, Henan Province, the prices of contracted forest land in Henan Province in 2012 and 2015 were 2445.70 yuan/hm² and 3650.25 yuan/hm² respectively. The plain forestry statistical survey completed by the State Forestry Administration and Beijing Forestry University The value of forest products was 699 million yuan and 1.053 billion yuan respectively. According to the forestry bureau of Xuchang City, Henan Province, the afforestation costs of poplar trees in Henan Province in 2012 and 2015 and the afforestation costs and benefits of different forest age poplars were obtained according to the above method. Forest price of poplars of different ages in Henan Province in 2012 and 2015 (Table 2).

Table 2. Different poplar ages of price accounts in Henan in 2012 and 2015

years	forest age	Forest price / (yuan/hm²)	Forest price / (yuan /m³)	Calculation method
2012	1~5	6740	134.8	Replacement cost method
	6~10	3763.21	40.03	Net income present value method
	11 years or more	11300	79.02	Net income present value method
2015	1~5	7166	143.32	Replacement cost method
	6~10	8807.55	93.7	Net income present value method
	11 years or more	19010.38	132.94	Net income present value method

Aaccording to the calculation of forest price of different forest ages according to Table 2, it can be seen that the forest protection forest price in 2012 and 2015 was 253.85 yuan/m³ and 369.96 yuan/m³ respectively.

According to the physical quantity statistics of forest land, forestry and forest products in Henan Province, and the above calculation of forest land and forest price, the stock value and flow value of forest land, forestry and forest products in Henan Province in 2012 and 2015 are shown in Table 3.

Table 3. Physical stocks of farmland shelterbelt assets accounts in Henan

item	Woodland value	Forest value	Forest product value

	Stock	flow	Stock	flow	flow
2012	5.19	0.24	38.68	1.73	1.68
2015	8.8	0.42	70.04	6.7	3.31
Amount of change	3.61	0.18	31.36	4.97	1.63

3.3 Green Wealth Accounting

According to the contents and methods of the above-mentioned green wealth accounting, the value of forestland resources, the value of forest resources, the value of forest product resources, the increase of crop yield, the conservation of soil, carbon sequestration, air purification, and biodiversity of farmland shelterbelts in Henan Province in 2002 and 2005 were calculated. The content of sexual protection and other eight items, and summed up the total value of green wealth of farmland shelter forests in Henan Province in 2012 and 2015 and the value of each component (Table 4).

Table 4. The green wealth of farmland shelterbelt in Henan

item	2012		2015	
	Stock value	Flow value	Stock value	Flow value
Woodland	5.19	0.24	8.80	0.42
Forest	38.68	1.73	70.04	6.70
Forest product	/	1.68	/	3.31
Crop yield increase	/	0.81	/	1.16
Conservation soil	/	0.98	/	1.29
Carbon sequestration Oxygen supply	/	2.16	/	5.73
Purifying air	/	0.06	/	0.08
Biodiversity	/	0.97	/	1.14
total	43.87	8.63	78.84	19.83

4. Conclusion

(1) The value of farmland shelterbelt stock increased by 3.497 billion yuan from 2012 to 2015, and the value of flow increased by 673 million yuan, fully demonstrating that the products and services provided by farmland shelterbelt are increasing, which is conducive to the development of regional national economy, and has important contribution for green wealth in Henan Province.

(2) Among the various green wealth indicators, the value of direct natural resources of farmland protection forest increased by 231 million-yuan, accounting for 34.32% of total wealth, and the value of farmland shelterbelt ecological service function increased by 442 million-yuan, accounting for 65.68% of total wealth. The value increase is 1.92 times of the direct value increase, indicating that the farmland shelterbelt has great ecological functions and exerts good ecological service benefits, making an important contribution to the local environmental improvement.

(3) The ecological service market should be established as soon as possible, the ecological compensation mechanism should be improved, the scientific management of farmland shelterbelt should be strengthened, the farmland shelterbelt should be transformed from ecological to ecological economy, and the sustainable management and development of farmland shelterbelt should be promoted in Henan Province.

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