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Fast-growing trees planting and its relationship with the grain production in Hebei province

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Key words: Fast-growing trees; planting; grain production; Hebei province

Abstract: The fast-growing and high-yielding timber plantation base construction engineering initiated in 2002, and it's the sixth largest forest project in China. Did the project have influence to the grain production in the past ten years? And how much the influence is? Based on this problem, the study selects Hebei province as the research area, which is around Beijing-Tianjin, and the geographical position is particularly important. It analyzes Hebei's fast-growing trees planting area, grain sown area and yield from land using angle. Research shows that fast-growing trees planting's time and space difference is very wide in Hebei and each city, but its influence is very small for the grain sown area, and has no effect on total grain yield. Because Fast-growing trees can improve ecological environment and bring huge economic benefits, it can continue to be planted in Hebei's suitable area in the future. The fast-growing trees planting should occupy less cultivated land as far as possible, and reduce the influence to grain production.

1 Introduction

The fast-growing and high-yielding timber plantation base construction engineering is the sixth largest forestry project in China. The project distribute 18 provinces to the east 400 mm rainfall line in China, choose the area which is superior natural condition, good site condition and gradual terrain. And it plans to establish nearly 200 million mu of fast-growing and high-yielding timber plantation base by three stage from 2001 to 2015. However, the area is also the superior grain production area, it is attention by all parties that fast-growing and high-yielding timber plantation and grain food compete the land [1]. Especially in North China Plain located in the eastern region of China, poplar planting area appeared the rapid expansion trend. Because this is one of our major grain producing areas. The expansion of poplar planting area maybe occupy cultivated land resources, and threaten grain supply [2]. It is called "poplar expansion and cropland shrinkage" phenomenon that poplar forest land occupy cultivated land [3]. The phenomenon reflects the forest–grain's conflict in land use.

Hebei province is located around Beijing-Tianjin, and it's one of the most important districts on national ecological construction. Zhangjiakou-Chengde, Taihang Mountain and Heilonggang watershed are the typical ecological vulnerable region. Because of the special geographical position and the condition, Hebei forestry development should not only maintain the whole provincial ecological security, promote the countryside industrial structure adjustment, promote the farmers' income, but also prevent sand source, protect water source, improve people's production and living environment for Beijing-Tianjin [4].Did the implementation of fast-growing trees engineering have influence on grain production? How much the influence is? Aim at the problem, the paper takes Hebei province as an example, basing on the fast-growing trees planting area and grain production data, it researches in fast-growing trees planting and grain production from 2000 to 2010, analyzes the relationship between them, and hopes to provide policy reference to fast-growing trees engineering construction.

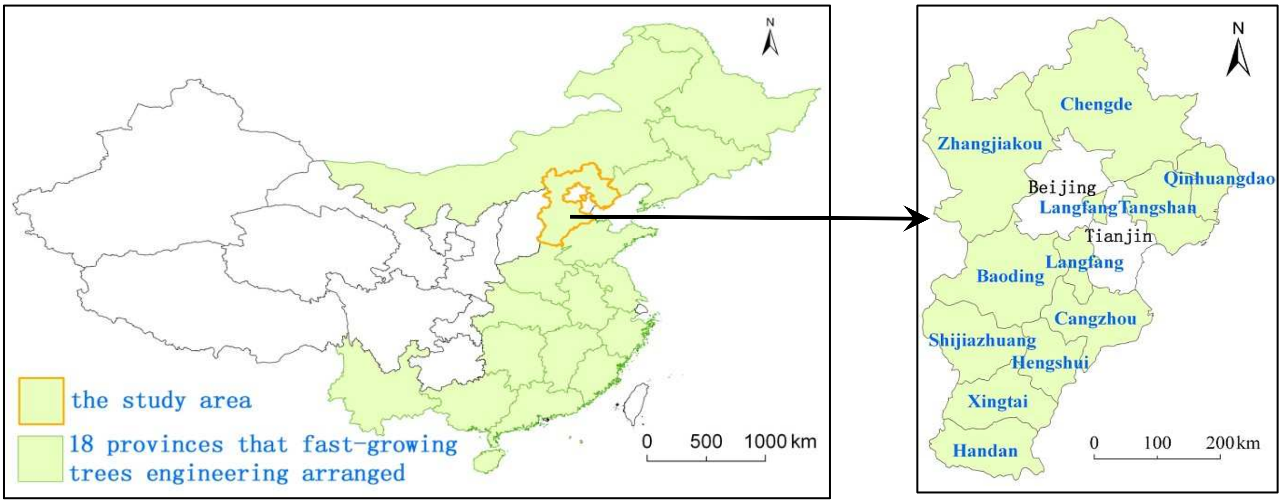

Fig.1 Location of the study area

2 Study area

Hebei province is referred to as“Ji”, locates in North China Plain, and crosses the Inner Mongolia Plateau, lies between latitudes 36°01’ and 42°37’N and stretches between longitudes 113°04’ and 119°53’E. And its landform is complicated, plateaus, mountains, hills, plains and basin types are complete. The whole province encircles the capital Beijing and north important commercial port Tianjin, and it faces Bohai Sea on the east. Hebei province belongs to temperate continental monsoon climate, with mean annual temperature in 4-13℃, mean annual rainfall in 400-800mm. Hebei provincial total area is 188,800 km^2, the total cultivated land area is 63,200 km^2, accounted for 33.5% of the total land area. And the forestry area is 41,800 km^2, forest coverage rate is 22%. It has jurisdiction over Shijiazhuang, Tangshan, Handan, Baoding, Cangzhou, Xingtai, Langfang, Chengde, Hengshui, Qinhuangdao and Zhangjiakou, a total of 11 cities, and the provincial capital is Shijiazhuang (Fig.1).

3 Fast-growing trees planting situation in Hebei province

3.1 Hebei province

Fast-growing trees planting area interannual variability was enormous in Hebei province, mainly in 2001-2005, annual planting area were all more than 9,000 hm^2. Among them the figure was 28,522 hm^2 in 2003, reached the highest value. The main reason was that China put forward to fast-growing and high-yielding timber plantation base construction project in 2002, around 2002 were fast-growing trees planting peak, after 2005 the fast-growing trees planting scale fell obviously (Fig.2).

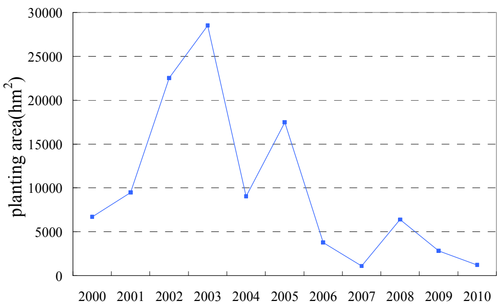

Fig.2 Fast-growing trees planting area in Hebei province

3.2 Each cities in Hebei province

Fast-growing trees planting time distribution was extremely uneven in each cities of Hebei province, the difference was very big. From 2000 to 2010, among the 11 cities of Heibei province, the largest three cities of planting area were respectively Hengshui, Langfang and Handan, the area were respectively 44,661 hm^2, 30,426 hm^2 and 10,612 hm^2， their figures were all more than 10,000 hm^2. The smallest three cities of planting area were respectively Zhangjiakou, Cangzhou and Qinhuangdao, the area were respectively 0, 333 hm^2 and 732 hm^2, Zhangjiakou didn't plant, Cangzhou and Qinhuangdao planted fast-growing trees for only one and three years respectively. Each cities fast-growing trees planting imbalance may be due to the difference of various land and climate condition and other reasons.

Fast-growing trees interannual planting also varied greatly in each cities of Hebei province. Such as Hengshui, although it planted every year during 10 years, but there were only 69 hm^2 in 2000, and it reached 13,341 hm^2 in 2003, 2 years differed 192 times. In Qinhuangdao, fast-growing trees planting area was 400 hm^2 in 2001, and the area was only 2 hm^2 in 2006, 2 years differed 199 times. Fast-growing trees planting interannual differences may be related to annual policy and engineering tasks in each cities.

4 Analysis of fast-growing trees planting on the impact of grain production in Hebei Province

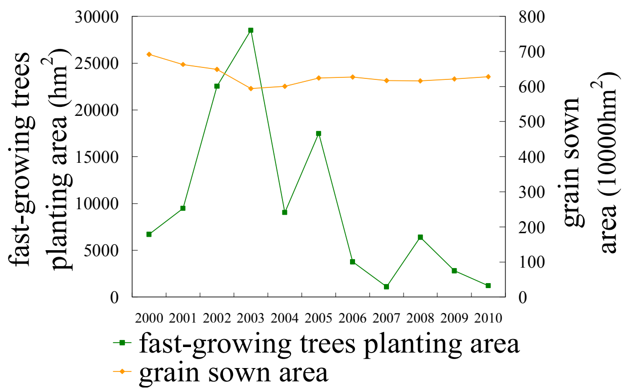

Fig.3 Fast-growing trees planting and grain sown area in Hebei province

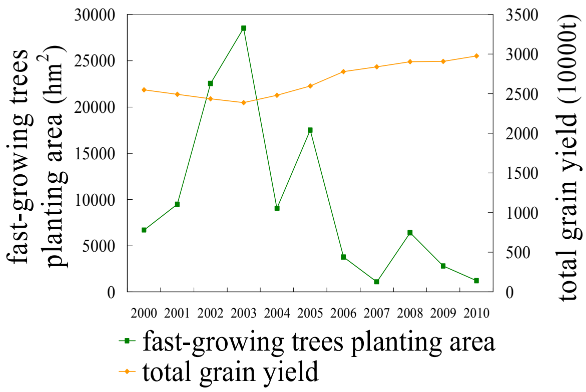

Fig.4 Fast-growing trees planting and total grain yield in Hebei province

With the rapid increase of fast-growing trees planting area, both grain sown area and total grain yield had a slight reduction in Hebei province from 2000 to 2003. No matter how to change the fast-growing trees planting area, the grain sown area always stabilized at around 6.2 million hm^2 from 2004 to 2010 (Fig.3). While the total grain yield presented a steady rise year by year (Fig.4). It showed that fast-growing trees planting had little effect on grain sown area in Hebei province. This may be due to fast-growing trees planting area was mainly in the non-cultivated land area. Moreover, fast-growing trees planting area and grain sown area were not an order of magnitude. The average annual fast-growing planting area was only 1/600 of the average grain sown area. Fast-growing trees planting had no effect on total grain yield, the reason was due to the increasing grain yield per hectare lead to total grain yield rising.

5 Conclusions

Fast-growing trees planting area interannual variability was great in Hebei province, mainly in 2001-2005, annual planting area were all more than 9,000 hm^2. Among them the figure was 28,522 hm^2 in 2003, reached the highest value. Fast-growing trees planting distribution was extremely uneven in each cities of Hebei province, the difference was very big. The largest three cities of planting area were respectively Hengshui, Langfang and Handan, the area were respectively 44,661 hm^2, 30,426 hm^2 and 10,612 hm^2， their figures were all more than 10,000 hm^2. The smallest three cities of planting area were respectively Zhangjiakou, Cangzhou and Qinhuangdao, the area were respectively 0, 333 hm^2 and 732 hm^2. Fast-growing trees interannual planting also varied greatly in each cities of Hebei province. Such as Hengshui, there were only 69 hm^2 in 2000, and it reached 13,341 hm^2 in 2003, 2 years differed 192 times.

The grain sown area always stabilized at around 6.2 million hm^2 from 2004 to 2010, it showed that fast-growing trees planting had little effect on grain sown area in Hebei province. This may be due to fast-growing trees planting area was mainly in the non-cultivated land area. Moreover, fast-growing trees planting area and grain sown area were not an order of magnitude. The average annual fast-growing planting area was only 1/600 of the average grain sown area. The total grain yield increased year by year in Hebei province from 2004 to 2010, it can be seen that fast-growing trees planting had no effect on total grain yield, the reason was due to the increasing grain yield per hectare.

The fast-growing and high-yielding timber plantation base construction is the sixth largest forestry engineering in China, and Hebei province is located around Beijing-Tianjin, the geographical position is particular. The soil erosion and land desertification are serious [5], sandstorm problem is prominent, water resources are shortage, wetland reduces, pasture degenerates, ecological environment problem is prominent in Hebei Province. While fast-growing trees can purify air, prevent dust, conserve water source, preserve water and soil, prevent wind and protect farmland, regulate climate and so on. The afforestation engineering completion not only affects the ecological environment construction, suburban rural agricultural structure adjustment in Hebei province, but also brings huge economic benefits. Fast-growing trees planting has little effect on grain sown area, and has no effect on total grain yield in Hebei province, So in the future it can continue to develop fast-growing trees planting in areas with suitable conditions. But the fast-growing trees planting should occupy less cultivated land as far as possible [6], and reduce the influence to grain production.

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