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Discussion on Agricultural Planting Models in Hanjiang River Basin

-- Take Hanzhong City as an Example

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Abstract

In response to the new challenges and opportunities faced by the development of characteristic agriculture in the floodplains of the Hanjiang River Basin. Taking Hanzhong City as an example, this article expounds the current status of the agricultural industry and current problems in the area under its jurisdiction, and explores the ecological agriculture model, with a view to further optimizing the agricultural planting structure in the Hanjiang beach area, expanding the development space of characteristic agriculture, and improving agricultural integration. Provide reference for production efficiency and the realization of agricultural efficiency, farmers' income, and industry prosperity.

Keywords

Land Degradation; General Situation; Governance Measures; Classification.

1. Overview of the Study Area

Hanzhong City, a prefecture-level city in Shaanxi Province, is located in the southwest of Shaanxi Province, 105°30'30"-108°24'37"E, 32°15'15"-33°56'37"N. It borders Ankang, Xi'an and Baoji to the east and north, and Gansu and Sichuan provinces to the southwest. The total area is 27246 square kilometers. The total population is 3.8521 million (2015). It administers Hantai District and 10 counties of Nanzheng, Chenggu, Yangxian, Mianxian, Xixiang, Lueyang, Zhenba, Ningqiang, Liuba, and Foping.

The Hanzhong Basin is 500 meters above sea level, and the Qinba Mountain is 500 to 2500 meters higher than the Hanzhong Basin. The types of landforms are diverse, but mountainous areas are the main ones, accounting for 75.2% of the total land area (including low mountains accounting for 18.2%, high and middle mountains accounting for 57%), hills accounting for 14.6%, and flat dams accounting for 10.2%. The rivers in Hanzhong City belong to the Yangtze River Basin. In terms of water system composition, the main water systems are the Hanjiang River system that runs from east to west and the Jialing River system that runs from north to south[1].

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2. Current Status of Planting Industry

(1) The planting industry accounts for a large proportion of the total agricultural output value. Planting is the leading industry of agriculture and the foundation and guarantee for the survival and development of the national economy and the people's livelihood. Due to location restrictions, the degree of mechanization of agricultural production in the region is relatively low. The crops are mainly crops in the subtropical regions of southern China. Rice, wheat, and corn are all planted. Fungi and Chinese herbal medicine are the characteristics of planting, and some fruits are planted. "Pig, oil, tea, vegetables" are the traditional four pillar industries in Hanzhong. Among them, the pillar industries under the planting industry account for 75%, which shows the economic status of the planting industry in Hanzhong[2].

(2) Grain output has increased steadily. Hanzhong is the main grain producing area in Shaanxi Province. Grain production in Hanzhong City has been increasing steadily in the past five years. In 2011, the city's agriculture, forestry, animal husbandry and fishery completed a total output value of 24.556 billion yuan, an increase of 6.8% compared with 2010. Among them, the agricultural output value was 13.450 billion yuan, an increase of 5.4%; the forestry output value was 942 million yuan, an increase of 16.0%; and the animal husbandry output value was 88.99 billion yuan. The output value of fishery was 307 million yuan, an increase of 6.2%; the output value of agriculture, forestry, animal husbandry and fishery services was 958 million yuan, an increase of 7.3%.

(3) The quality of grain is improving steadily. In 2011, Hanzhong's food production declined for the first time. The grain production in Hanzhong City has declined to varying degrees in terms of planting area, output, and output value. In 2011, the annual grain crop planting area in Hanzhong City was 267,000 hm2, a decrease of 6.60% compared with 2010; the total grain output was 951,400 tons, including 223,800 tons of summer grain and 727,500 tons of autumn grain, which was a 16.61% year-on-year decrease compared with 2010. The total grain output value was 2.873 billion yuan, down 16.64% year-on-year compared with 2010. Among them, rice, wheat, corn, beans, and tubers were the main food crops. The output of these five crops accounted for 99.6% of the total grain output. However, it is worth noting that with the slight decline in grain production, the quality of grain has risen steadily[3].

(4) The development momentum of vegetables and fruits is good. The proportion of vegetables and fruits in the output value of the planting industry is increasing year by year. In 2011, the actual fruit planting area in Hanzhong City at the end of the year was 36,500 hm2, an increase of 8 million hm2 compared with 2010, a growth rate of 2.32%. The fruit output was 382,900 tons, an increase of 25.37% compared with 2010; the total fruit output value was 995 million. Yuan, an increase of 70.7% compared with 2010. In 2011, the vegetable planting area in Hanzhong City was 56,400 hm2, an increase of 1,600 hm2 compared with 2010, a growth rate of 2.94%; the output of vegetables was 1,794,100 tons, an increase of 2.82% compared with 2010; the total output value of vegetables was 4.585 billion yuan, and In 2010, it increased by 12.59% year-on-year. The reason for the sharp increase in the output value of fruits and vegetables may be the continuous rise in prices in recent years. The favorable price factors ensure the production efficiency of farmers, and also stimulate farmers' enthusiasm for planting[4].

(5) The layout of the industrial structure is distinctive. Climate changes such as temperature, precipitation, sunshine, and agricultural natural disasters are important factors affecting the changes in China's planting industry and its spatial layout. Hanzhong City governs 10 counties and 1 district. The total area of the city is 27,200 km2, of which basins account for 6%, shallow hills and hills account for 36%, and medium-high mountainous areas account for 58%. Based on the resource conditions, climate conditions, production levels and farming systems of each county, as well as unique geographical vegetation and stable subtropical zone Due to the

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climate, the region has formed a pattern of local specialty industries such as Chenggu oranges, Xixiang cherries, Liuba mushrooms, black fungus, and Lueyang eucommia[5].

3. Existing Problems

(1) The price of agricultural materials fluctuates greatly, and the market regulation is weak. In 2011, the total price of agricultural materials in the city rose by 12.0% over the previous year, the price of domestic urea rose by 9.1%, and the price of domestic compound fertilizer rose by 6.7%. Compared with the same period last year, the purchase and storage prices of seeds, especially new varieties and varieties with intellectual property rights, have risen, leading to an increase in market sales prices. The overall market retail price of rice seeds has increased by 5-10 yuan/kg year-on-year, with an average of 50-65 yuan/kg. ; The retail price of corn seeds increased by 1.5-2 yuan/kg year-on-year, with an average of 20-30 yuan/kg.

(2) The input and output of the employees are disproportionate, and the labor enthusiasm is not high[6]. The rural population has the largest number of employees in the planting industry, but the overall output value of the planting industry is much lower than that of other industries. high. The production cycle of crops is generally longer, so the return of funds from the planting industry is slow. The production time of agricultural products is relatively fixed, the market price fluctuates widely, and there is often a short-term surplus of products, causing farmers to increase production but not income.

(3) The blindness of planting crops is large, and the agricultural technology content is not high. Most of the farmers engaged in planting are in the 40-55 age group, belonging to the first generation of farmers, generally not high in cultural knowledge, and limited development thinking. Coupled with the lack of scientific guidance[7], there is greater blindness to the crops to be sown, and the production of individual crops is poorly resistant to disasters, and is susceptible to natural disasters, resulting in a large-scale reduction in production. Although Hanzhong is a big agricultural city, the yields of most crops (potatoes, corn) are lower than the national average. The low level of production technology, scattered planting, small scale, low degree of mechanization application, and high production cost per unit area have become another major factor restricting the development of the planting industry in Hanzhong.

(4) The scale of modern agriculture is small, and the driving force is not strong. The construction of modern agricultural parks in Hanzhong City started late, with insufficient investment, low industrial concentration, weak radiation driving ability, and weak demonstration and leading role; key leading agricultural industrialization enterprises and farmers' professional cooperatives are scattered, small, and weak, and have a low degree of organization. The brand is not loud, and the level of industrialization is generally not high; the rural land transfer platform and mechanism have not been fully established, and the pace of large-scale agricultural operations has been slow.

(5) The industrial chain is imperfect and the degree of organization is low. The packaging and branded sales of native products in Hanzhong City are still blank, and it is urgent to develop industrialization and increase the added value of the industry. Ruyang County's sweet potato products have problems in the operation: First, there are many raw materials, no processing, single-family workshop-style initial processing of vermicelli, which is not a competitive advantage in the market; second, there is no standardized storage and packaging, and the product market image Not pretty; third, marketing activities are operated by individual households, each operating independently, lack of unified management, low degree of organization, and scale efficiency cannot be used; fourth, lack of unified regional brand management, although relying on the external influence of the crested ibis, building a local brand is A "null" creates a distribution bottleneck between high-quality products and low prices.

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Fifth, it is difficult to guarantee quality and food hygiene and safety due to workshop-style farmer production.

4. Ecological Agriculture Planting Countermeasures

Facing the real problems of declining arable land, lack of arable land resources, and intensifying human-land conflicts, along with the rapid implementation of urbanization and industrialization, the comprehensive development and utilization of beach land has become a The main source of newly-added land such as industry. The beach land has been affected by flood alluvium for many years, the soil is deep, the soil is generally fertile, light, heat, and water resources are abundant, and the climate is suitable. It has great potential for the development of large-scale and modern agriculture. It is especially suitable for the growth of crops, suitable for growing winter wheat, For seasonally harvested crops such as green corn and rice, it is not advisable to plant trees and fruit, otherwise it will affect flood discharge. Beach land also plays an extremely important role in the river landscape. For example, it can be used as a place for people to get close to nature and leisure during the low water level, and it is an area for the surrounding citizens to watch and relax on the beach; during the flood season and flood period When the water level is high, it acts as a natural "sponge" for regulation, storage and flood control. In some places abroad and in China, large areas of crops are also planted on some beaches. This not only promotes the development of local agriculture and forestry industries and the local economy, but also further develops beachland resources[8]. The beaches at Xiayukou of the Hanjiang River are closer to and farther away from the river bank, the terrain is from low to high, the flooding time of the beaches is gradually shortened, the frequency is gradually reduced, the aeration conditions are gradually enhanced, and the soil gradually transitions from a reducing environment to a redox and then a reducing environment. . In the dry season, the groundwater level decreases, and the input of organic matter such as litter and roots increases. The thicker the litter, the stronger the soil's ability to retain water and fertilizer, which is more conducive to the accumulation of organic matter and is suitable for the growth of crops. There are 3 main planting optimal modes.

(1) The planting industry in this area is dominated by rice, and paddy fields account for a large proportion of all cultivated land. Using this model can improve soil fertility, reduce the application of pesticides and fertilizers, not only can alleviate environmental pollution, but also improve economic benefits. Raise fish and some aquatic microorganisms in rice fields. Rice provides habitat and shelter for fish. The decaying leaves of rice can also promote the reproduction of aquatic microorganisms. Aquatic microorganisms are bait for fish. At the same time, fish feed on microorganisms and insects in the water to reduce the occurrence of rice pests and diseases, and fish manure can improve soil fertility. In this way, various organisms in the paddy field jump into each other, promote each other, and form a benign ecosystem.

(2) The area is rich in lake resources. While protecting the precious lake resources, rational utilization of water bodies for the development of ecological aquaculture can achieve better ecological and economic benefits. It can be divided into various economic circles according to the simulation design of the topography and geomorphology. For example: According to the difference of micro-regional elevation, the research area is developed in ecological cascade according to the water body circle, waterlogged geosphere, waterlogged geosphere, and dry land circle. The ecological agriculture construction mode of the water body circle is implemented at the bottom of dish-shaped depressions with a groundwater level of less than 20cm. In aquaculture, the past marsh wasteland is transformed into a three-dimensional aquaculture base. In this model, an intensive fish pond occupies an area of 1hm2, and the pond is 3m deep. The upper, middle, and lower floors are used to stock silver carp, bighead, grass, and bream. Species, carp eat benthic organisms, grass carp and bream eat aquatic plants, silver

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carp and bream eat plankton and commercial feed. Intensive fish pond pond stems are planted with economic trees, and grass can be planted under the trees to reinforce pond stems. Grass can raise fish to form a tree-grass-fish three-dimensional structure. Intensive fish ponds have a certain regulation and storage capacity and annual net income can be up to The ecological agriculture construction model of 11,000 yuan/hm2 in the waterlogged area is to implement fish-and-rice co-cultivation or co-cultivation of fish and lotus roots in the middle and lower part of dish-shaped depressions with groundwater level <50cm. 50%, rice fields account for 30%. In the autumn and winter, dig ponds to raise the fields, fences, and add Taiji. In the first half of the year, the fish are small, fish are raised in ponds, and rice fields are used; in the second half of the year, adults need to be irrigated and flood the rice fields. Raising the water level to 80% will not affect the fish. The growth is increased by another season of rice cultivation. Co-cultivation of fish and lotus roots. When the lotus roots in the lotus pond grow high, a certain number of fry will be put into the lotus pond to eat duckweed and weeds and lotus leaves to protect the fish from being attacked. The annual net income can reach 120,000 yuan. The construction model of ecological agriculture in the flooded geosphere is to implement a concealed pipe project in the middle of a dish-shaped depression with a groundwater level of 50~90cm to lower the groundwater level, and transform it into a good field with high resistance to waterlogging damage. -Watermelon-late rice" model, the field design of the winter rapeseed is 2.0m wide (ditch to ditch), east-west direction, 0.33m ditch. Sow rapeseed on September 10th, and transplant on October 20th at 6-7 leaves. The row spacing is 40cm, and the plant spacing is 8cm. Plant 4 rows of rapeseed on one side of the box surface, and reserve 0.49m for watermelon on the other side. May 10 The rapeseed is harvested when it matures around the day. The watermelon was sown on March 8, and seedlings were raised in a double-film nutrient bowl. The seedlings were transplanted to the rapeseed field on April 20. The watermelon row reserved for watermelon was planted by the side of the ditch. It was cultivated by mulching, the row spacing was 2.0m, the plant spacing was 0.4m, and the planting density was 1.2. Ten thousand plants/hm2, the late rice was sown on June 8, and the watermelon was harvested, vines, leaves, plowed, and re-planted, and then transplanted from July 23 to 28. The transplanting density was 375,000 holes/hm2. The annual net income of this model can reach 16,500 yuan/hm2, which is 3.4 times the output value of the "wheat (or rape-medium rice)" model. The construction model of ecological agriculture in the dryland circle is to implement high-efficiency planting such as the "vegetable-melon-hybrid cotton" model in the middle and upper part of dish-shaped depressions with groundwater level >90cm. In this model, Chinese cabbage is sown on August 20. Transplanted to the field on September 20, spinach was sown in the field from September 20 to 30, and the harvest was completed before the end of March. The melon was sown from February 25 to 28. The seedlings were grown in large sheds or small arch sheds and nutrient bowls covered with plastic film. April Transplanted to cotton fields around the 5th. The cotton was sown on April 1, and seedlings were raised in a double-membrane-covered nutrient bowl, and transplanted to cotton fields from April 25 to 30. The annual net income of this model can reach 18,000 yuan/hm2, which is 2.8 times that of the "Wheat-Silk" model. . The construction mode of ecological agriculture in courtyard circle is to implement greenhouse vegetable production in the uppermost part of the dish-shaped depression and dry land near the courtyard. This mode is conducive to intensive management and can develop planting, breeding and processing industries[9].

(3) With water and soil conservation as the core, establish a continuous restoration management model such as forest, fruit, grass, and grazing fungus. In the landscape layout. The original woodland landscape is retained on the top of the mountain to form the first line of defense for soil and water conservation; grass and fruit trees are planted on the hillside, and the foot of the mountain is generally farmland and water storage ponds. In terms of configuration, select species combinations with symbiosis and mutual benefit, and use fruit-

grass-grazing, fruit-green manure-soil, fruit-legume crops and other modes to improve the utilization efficiency of artificial plant communities.

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