

# Problems and Countermeasures of Cultivated Land Protection in Wucheng County

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**Abstract:** Cultivated land is an important material basis for human survival and development, and it is also a precious non-renewable resource and wealth, which plays a fundamental and decisive role in China's economic and social development. With the development of economy, especially the acceleration of urbanization, urban expansion has led to the encroachment of cultivated land. China's existing cultivated land has gradually approached the red line of cultivated land protection of 1.8 billion mu, and the form of cultivated land protection is very severe, posing a serious threat to China's food security production. It is urgent to solve the current problem of cultivated land protection. Taking the cultivated land protection of Wucheng County as an example, this paper discusses the problems and countermeasures of cultivated land protection, and provides useful reference for the cultivated land protection of other areas.

**Keywords:** Cultivated land protection; Analysis of current situation; Existing problem

## 1. Analysis of cultivated land status in Wucheng County

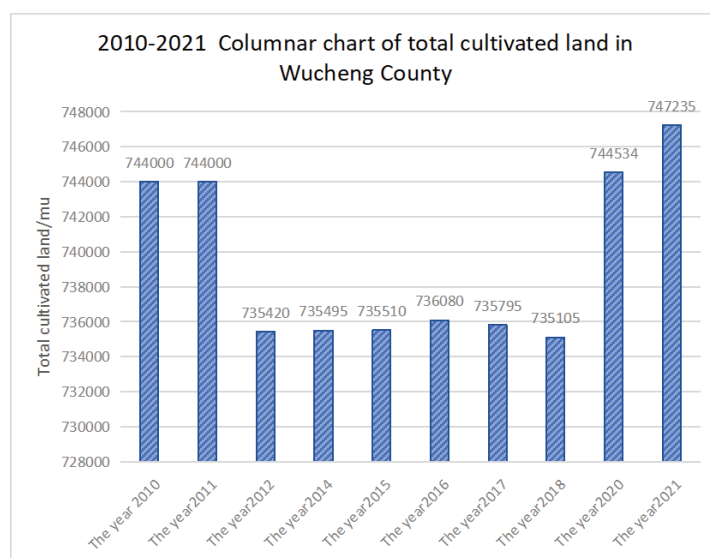
### 1.1 Overview of Wucheng County

Wucheng County belongs to Dezhou City, Shandong Province, is located in the northwest border of Shandong Province, northwest plain, the east bank of the Beijing-Hangzhou Grand Canal, an area of 750 square kilometers, a population of 390, 000, the terrain of the jurisdiction is typical of the Yellow River alluvial plain, flat terrain, high in the south and low in the north, tilted from southwest to northeast, deep soil.

### 1.2 Current situation of land resources

As of 2022, the total land area of Wucheng County is 1126, 267 mu. Among them, the agricultural land area is 879, 223.65 mu, accounting for 78.07% of the total land area; The construction land area is 224, 910 mu, accounting for 19.97% of the total land area; The unused land area is 22, 133.4 mu, accounting for 1.97% of the total land area. The per capita cultivated land is about 1.8 mu, and the per capita cultivated land is relatively low.

Combining data from the Shandong Natural Resources Yearbook, the total amount of cultivated land in Wucheng County has shown a U-shaped trend of overall reduction and then increase from 2011 to 2021. In 2021, the total amount of cultivated land in Wucheng County



remained at its highest point, with an area of 747, 235 mu; the lowest point was in 2018, with an area of 735, 105 mu, a difference of 12, 130 mu between the two years. Between 2011 and 2012, the total cultivated land area decreased rapidly by 8, 580 mu, and then remained at a relatively lower total level for a long time, which also indicates that there was a lot of land loss during this period and that the replenishment efforts were insufficient, resulting in huge pressure on land protection. Starting from 2019, the total cultivated land area in Wucheng County increased rapidly, reflecting that Wucheng County has taken active measures and the total cultivated land area has been rapidly increased. (Please refer to the column chart of the total cultivated land area in Wucheng from 2010 to 2021)

## 2. Wucheng County cultivated land and cultivated land protection problems

### 2.1 The quality of cultivated land is not high

In Wucheng County, due to the historical changes in the course of the Yellow River and the long-term impact of the Weihe Canal, the problem of soil salinization in agricultural land is particularly prominent, and the overall quality of agricultural land is not high. There are large areas of land in Wucheng County where groundwater nitrate content exceeds the standard, which constitutes a surface source of pollution and poses a significant threat to the improvement of soil quality and the maintenance of agricultural ecology. The nitrate content in the Weihe Canal water passing through Wucheng County exceeds the standard of 45mg/L. There is a clear seasonal change in NO<sub>3</sub>-in surface water and groundwater, with high NO<sub>3</sub>-content in the dry season fertilization period (May) and the dry season non-fertilization period (10th month), while the highest value in groundwater appears in the rainy season (6th month), indicating that NO<sub>3</sub>-pollution is strongly influenced by agricultural activities<sup>[1]</sup>. This reflects that the quality of agricultural land in Wucheng County is not only affected by natural conditions, but also intensified by the current farming methods.

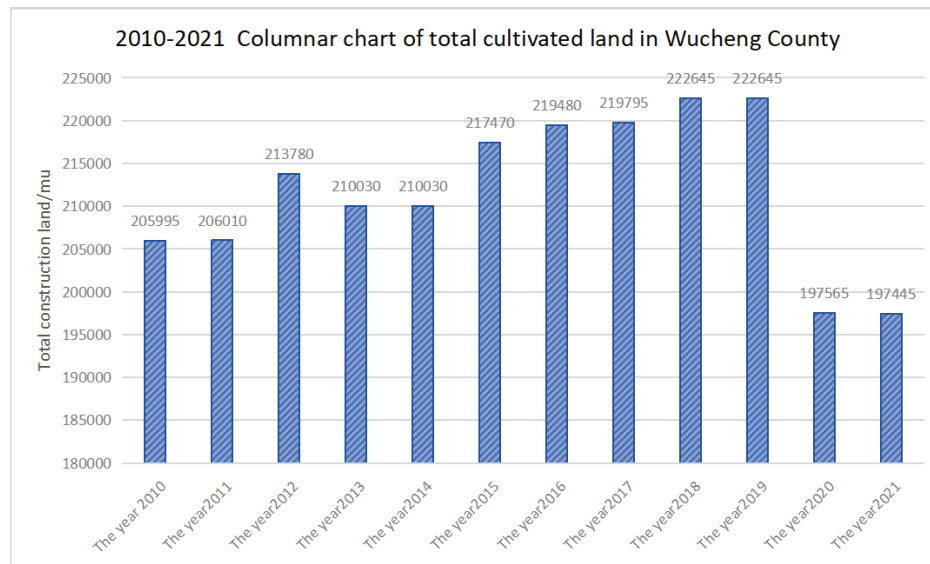
In accordance with the requirements of Dezhou's "Dun ban liang" construction work (the average yield of grain per mu exceeds 1500 kg), Wucheng County will complete the specific construction tasks of 100, 000 mu core area, 250, 000 mu driving area and 500, 000 mu radiation area in 2025. In addition, there are quite a few cultivated land in the state of medium and low yield, a large part of which is saline-alkali cultivated land. According to the survey, Wucheng County light, moderate, severe three categories of saline-alkali land about 70, 000 mu, taking the area of Haowangzhuang town as an example, the township saline-alkali land in about 15, 000 mu, affected by the nearby Datun reservoir, the groundwater level is shallow, resulting in a saline-alkali degree of 2.6‰-5.8‰, belongs to the medium and severe saline-alkali land, wheat yield of about 300 jin per mu. Due to the weak fertility of these saline-alkali land, it is necessary to use a large amount of chemical fertilizers and pesticides to maintain grain output, and flood irrigation aggravates salinization, leading to further degradation of cultivated land quality and more fragile cultivated land ecology.

### 2.2 The problem of cultivated land pollution appears

In Wucheng County, the ecological attention of cultivated land is not high, and the methods of cultivated land pollution are few and insufficient, especially with the strong demand for vegetables and the spread of mulch covering technology, the problem of "white pollution" caused by mulch in agricultural production is increasingly obvious. During the field visit, it was found that some villagers turned to planting crops of high economic value such as vegetables because of the low economic benefits of grain planting, and the use area of mulch gradually expanded. In Shandong area, the residual amount of mulching film in farmland soil with two, three, four and five mulching films increased by 40%, 49.5%, 56.2% and 61%, respectively, compared with that with one mulching film. According to relevant data, the statistical data of waste agricultural film recycling in Dezhou in 2021 is more than 12, 000 tons, and the annual recycling capacity of waste agricultural film recycling stations in the city is only more than 5, 000 tons, with a large gap. The research shows that the mulch mainly remains in the tilling layer of 0-10cm in the soil, accounting for about 2/3 of the residual mulch, the rest is distributed in 10-30cm, and basically no distribution below the tilling layer. Part of the mulch residue is gradually decomposed into smaller pieces due to factors such as sun exposure and weathering, and the difficulty of cleaning is rising. The fragmented mulch film further infiltrates into the soil with precipitation or surface runoff, aggravating the pollution of cultivated land.

### 2.3 Strict control over land use is lacking

From the chart of the total cultivated land area in Wucheng County, it can be seen that the effect of land use control on cultivated land in Wucheng County was not obvious during the period from 2011 to 2018, and the total loss of cultivated land was large. Starting from 2020, the total cultivated land area began to rise gradually, which is consistent with the change in the total construction land area in Wucheng County. Combining the data from the Shandong Natural Resources Yearbook, the total construction land area in Wucheng County has shown a trend of first rising and then falling from 2010 to 2021. The highest point was 222, 645 mu between the years 2018 and 2019, and the lowest point was 197, 445 mu in 2021, with a difference of 25, 200 mu between the two, showing a steep decline overall, which is consistent with the overall trend of the change in the total cultivated land area in Wucheng County.



## 2.4 The integration of land management is insufficient

First, the historical debt has not been cleared. In the period of high-speed economic development, the demand for construction land has risen sharply. In order to guarantee the land use index, land improvement projects have been launched in large quantities, and the projects seek fast and not good, quantity and not quality. With the backward investigation of land renovation projects in recent years, a large number of land renovation projects have collective "thunder". Second, the hollow village regulation is insufficient. According to the survey of land use in 40 villages in Yucheng City, Dezhou City, the average land potential of each village can be mined 250.2 mu, and the per capita land increase is 0.84 mu. If sorted into cultivated land, the per capita land of the village can be increased by 35%. The investigation situation of hollow village in Wucheng County is basically similar, and the preliminary estimate of renovation potential is more than 20,000 mu, because most of its location is in the center of the village, can not effectively connect with the surrounding fields, and it is difficult to reach the cultivated land reclamation standard. In recent years, Wucheng County has carried out renovation work on the hollow villages with strong will of the masses and achieved positive results, but the efforts are still insufficient and the progress is slow.

## 3. Suggestions on cultivated land protection in Wucheng County

### 3.1 Improving the quality of cultivated land in multiple ways

Steadily promote the comprehensive treatment of saline-alkali land, and reduce soil salinity by irrigation and drainage. Actively explore new ways to save water, and gradually replace the traditional irrigation methods of flood irrigation with new water-saving irrigation technologies such as dropper and sprinkler irrigation, so as to reduce water evaporation and salt accumulation. Continue to promote saline-alkali tolerant agriculture, on the basis of overall protection of food security, focus on promoting the cultivation of Chinese medicinal materials, fruits and vegetables, livestock products, aquatic products and other species. Hao Wangzhuang Town in Wucheng County develops crayfish farming in saline-alkali land serious areas, silt fertilized fields, improve soil conditions, and transform saline-alkali land into good land while developing aquaculture.

### 3.2 Strengthen land use control in multiple directions

Strengthen the target responsibility system, strictly implement the cultivated land protection targets issued by superiors, sign the target responsibility letter for cultivated land protection, establish a five-level linkage mechanism between cities, counties, towns, villages and contractors, clarify the division of responsibilities, and ensure that the land use control work is effective. Strictly implement the policies of "balanced access" and "balanced compensation for occupation", strengthen the management of agricultural land for facilities, strictly prohibit the conversion of cultivated land in functional areas for grain production into forests and grasslands, and prevent the abuse of land resources. Improve the evaluation system, combined with the annual change survey data, carry out supervision and assessment of the implementation of the target responsibility for the protection of rural land in towns and townships, and give better policies and funds to rural land protection work. Strict access to projects, increase the channels and proportion of farmers to express their will, more public opinions and suggestions should be consulted on the land occupation work of new projects, and the scientific and rational level of land control should be enhanced.

### 3.3 Multiple measures to crack down on illegal land use

Strengthen the publicity of laws, regulations and policies, popularize the knowledge of cultivated land protection through various channels and forms such as television, radio, Internet, newspapers and brochures, and raise the public's awareness of the importance of cultivated land protection. Intensify law enforcement efforts, seriously deal with illegal land use behaviors found in accordance with the law and regulations, and investigate the legal responsibilities of relevant responsible personnel for illegal land use behaviors that cause serious impacts. Improve the composition of law enforcement personnel and enhance the comprehensive professional literacy of law enforcement personnel. Improve the land supervision mechanism, coordinate governments and departments at all levels to form joint efforts, improve the reporting and reward system for illegal land use, encourage the public to actively participate in the reporting and reward system for illegal land use, and promote the formation of a good atmosphere for joint supervision of the whole society. Implement dynamic monitoring of cultivated land, and make full use of advanced technical means such as aerial photography and satellite monitoring to improve monitoring efficiency.

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### References

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