

A Practical Examination and Conception of Water Saving Irrigation in Agriculture

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Abstract: With the increasing number of population in our country, the contradiction between people's survival needs and natural resources between supply and demand is becoming more and more obvious, and people's survival and development not only need to consume a lot of water resources, but also destroy the natural environment and affect the balance of natural ecology. Based on this, how to balance the relationship between nature and human development has become the focus of attention in today's society. Taking the water resources environment and utilization as an example, this paper briefly analyzes the water resources environment and agricultural water-saving irrigation problems, grasps the agricultural water-saving irrigation technology, and probes into the countermeasure conception of the water resources environment and agricultural water-saving irrigation problems in depth, in order to provide valuable reference for solving the water resources shortage problem and improve the water resources utilization ratio in agricultural production.

1. Water Resources Environment and Agricultural Water Saving Irrigation

The rapid development of agriculture is closely related to the situation of water resources and environment. At present, the water resources reserve of our country presents obvious regional imbalance and seasonal imbalance, and the situation of water resources waste is more serious. In the process of agricultural production and irrigation, some areas lack the correct irrigation consciousness, and the low level of agricultural production leads to the low irrigation efficiency and the inability to make full use of water resources, which exacerbates the problems of water resources and environment in our country. Based on this, the agricultural technicians in various regions should not only maintain the regional water resources environment and promote the ecological balance of the natural environment from the perspective of the actual situation, but also introduce advanced agricultural water-saving irrigation technology, establish water-saving irrigation mechanism and improve the utilization ratio of water resources in regional agricultural production, with a view to realizing the innovation and development of water-saving irrigation and promoting the healthy and sustainable development of our country.

1.1. Water Resources and Environment

Question 1: According to incomplete statistics, the surface flow of water resources in China is about $2.7115 \times 10^{12} \text{m}^3$, the underground runoff is $1.009 \times 10^{11} \text{m}^3$. The total annual water resource is 28124 billion m^3 , 96% of the total flow of water. Although the total amount of water flow in China ranks sixth in the world, the conditions of natural water resources are poor, so it is difficult to develop, that is to say, the available water resources are very few, and the per capita available water resources are less [1].

Problem two: China has a large geographical area, vast territory, different distribution of water resources in different regions, and a large gap in water reserves. Combining with the specific data, it can be found that the water reserve of our country is gradually decreasing from southeast to northwest (Fig .1), which can indicate that the water resource situation of our country is directly affected by the atmospheric precipitation, the tropical areas such as Sanya are the areas with high

water production and water storage, and the semi-arid areas such as Gansu are lack of water resources.

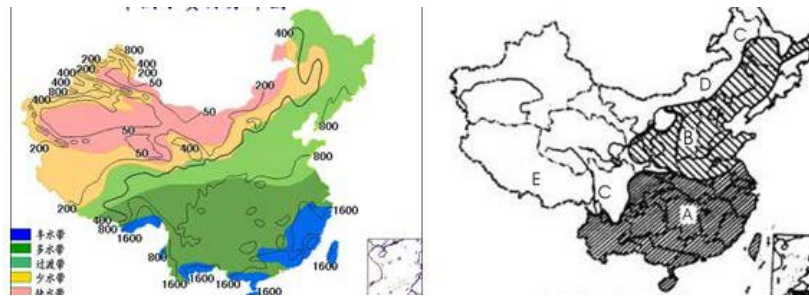


Figure 1 Schematic diagram of water resources distribution in China

Question 3: In addition to uneven geographical distribution, there is also the problem of uneven time distribution of water resources. Under the influence of monsoon, the precipitation time in our country is mainly concentrated in summer, and the precipitation changes greatly in the year, and there is obvious alternation of abundant withered. In the past two years, the northern regions of our country, such as Ningxia, Shaanxi, Gansu, Shanxi and Inner Mongolia, have gradually appeared the situation of precipitation decreasing year by year, resulting in more serious water shortage problems.

Problem Four: Since the reform and opening up, China's population has risen rapidly and its economy has developed rapidly. However, the lack of rational resource utilization and development planning has not balanced the relationship between economic development and water resources and environment, resulting in serious damage to water resources and environment, and caused many kinds of water resources and environment pollution problems, such as soil erosion, water pollution, lack of fresh water resources, and reduction of surface runoff. In addition, water control projects have been carried out in various regions of our country, but due to the early construction of the project and the lack of maintenance and repair for a long time, the mud and sand statement and many hidden dangers of engineering quality have led to the inability of many natural precipitation resources to be stored, further exacerbating the shortage of water resources[2].

1.2. Water-Saving Irrigation in Agriculture

Nowadays, the most commonly used water-saving irrigation methods in various regions of our country are small water conservancy projects, which are built by local farmers with self-financing, lack of scientific, rational and systematic planning, lack of technology, and relatively simple main facilities and poor quality of construction, which will frequently malfunction during the period of use. There are also some irrigation projects with state financial funds or higher-level government subsidy, which can not achieve the expected construction effect because of lack of maintenance for many irrigation facilities over the years, and need to be further improved[3].

In the agricultural production areas of various regions, agricultural technicians will build a ditch (figure 2) for water diversion and irrigation, combining the local human, material and financial resources. However, due to the disrepair and long use time, there have gradually been silting and leakage of channels, which will affect the irrigation effect, which is not conducive to improving the efficiency of water-saving irrigation in the region.



Figure 2 Rural water-saving irrigation channels

In addition, due to the rapid construction of water conservancy irrigation projects in various regions, the lack of scientific management, and the unclear property rights of many water conservancy projects, the maintenance and nursing responsibilities of the projects can not be clearly implemented after the completion of the water conservancy projects, and the situation of "three regardless" appears. This not only reduces the construction quality of water conservancy irrigation project, but also directly affects the use effect of water conservancy irrigation project, and hinders the construction and development of agricultural water-saving irrigation in the region.

2. Solution of Water Resources Environment and Agricultural Water Saving Irrigation

2.1. To Choose a Variety of Technologies Flexibly and Improve the Utilization Rate According to Local Conditions

In the face of the problem of "water resources, environment and water-saving irrigation in agriculture ", the regional agricultural technicians should realize their own deficiency, grasp the agricultural production structure and production demand of the region according to the actual situation of the region, choose a variety of different irrigation technologies flexibly, optimize the collocation, improve the application level of water-saving irrigation technology, and effectively improve the uneven distribution of water resources in the region and the shortage of reserves4].

In practice, technical personnel can choose drip irrigation technology (as shown in figure 3), channel irrigation technology, sprinkler irrigation technology and water conveyance irrigation technology in low-pressure pipeline respectively. Taking the application of drip irrigation technology as an example, technical personnel can select pipeline pores or dropper equipment according to the basic growth characteristics of crops, and directly pour water resources into the roots of crops to ensure that crops can absorb the water resources of irrigation to the maximum extent, so as to improve the utilization rate of water resources. The application equipment of this drip irrigation technology is relatively simple, easy to install, and the water demand is small, which is very suitable for the area where water resources are scarce.



Figure 3 Schematic illustration of drip irrigation technology in a region of Yunnan province

In addition, we can choose the low-pressure pipeline water conveyance irrigation technology, which is to use the pipeline to realize irrigation, instead of the traditional channel irrigation mode, so as to reduce the construction cost of water-saving irrigation project and improve the utilization ratio of water resources.

Build a standardized water-saving system to promote the development of water-saving irrigation in agriculture

In the face of the problem of "water resources, environment and agricultural water-saving irrigation ", the regional agricultural authorities should recognize the shortcomings of the existing water-saving irrigation system, further improve it, construct a standardized and modern water-

saving irrigation system, and raise the level of regional water resources utilization. In the process of using water-saving irrigation technology, relevant departments should take regional agricultural production as the starting point, introduce more advanced equipment and technology, improve the overall construction level of hardware facilities, and strengthen the quality of water-saving irrigation projects. In addition, it is necessary to strengthen cooperation and contacts with water conservancy departments, meteorological departments and production departments, grasp the water production, distribution and savings of natural water resources in the region, establish corresponding management mechanisms, implement specific management systems, and promote the development of regional agricultural water-saving irrigation[5].

2.2. Increase the Investment of Funds to Train High-Quality Water Conservancy Personnel

In the face of the problem of "water resources, environment and water-saving irrigation in agriculture ", the competent department of agriculture in the region should increase the investment of funds, focus on the introduction of water conservancy professionals with high literacy, enrich the regional talent reserve, and lay a good foundation. Regional departments in charge should start to readjust the construction and management team structure of water-saving irrigation projects in the region, conduct regular training on water-saving irrigation techniques and concepts, improve the professional level of current staff, and enable current staff to master the key points of water-saving irrigation technology and management and maintenance. In addition, it is necessary to strengthen the contact with the regional agricultural universities in the province, encourage college students to graduate into the production base practice, and introduce more professionals with scientific ideas, so as to improve the level of agricultural water-saving irrigation construction in the region and create a healthy water resources environment.

Water conservancy projects, the use of advanced water-saving irrigation technology to implement water-saving, the quality of each link to strengthen control.

2.3. Construction of Water Control Projects and Regular Recharge of Groundwater

In the face of the problem of "water resources and environment and water-saving irrigation in agriculture ", the competent departments of agriculture in the region should start from two aspects: on the one hand, the construction of water control projects should be strengthened, if the original water control projects are found to be out of repair, the technical transformation should be carried out, the planting of trees in the surrounding areas of the water control projects should be strengthened, and the strengthening of water control projects should be strengthened, the construction of water control projects should be strengthened, the construction of reservoirs, the expansion of water storage capacity and the improvement of the efficiency of the interception of water resources in the region. On the other hand, it is necessary to carry out the work of groundwater recharge regularly, seize the opportunity of precipitation season, recharge the intercepted atmospheric precipitation into the ground, and enrich the groundwater resources[6].

3. Conclusion

To sum up, the problems of water resources and environment and water-saving irrigation in agricultural production will not only affect the development of agricultural economy in China, but also affect the overall development of national economy in China. Faced with the lack of advanced water conservancy facilities, more channel silt and lack of effective management, the agricultural technicians in various regions should choose suitable water-saving irrigation methods according to the actual situation of the region and according to the demand of agricultural production, such as drip irrigation technology, channel irrigation technology, sprinkler irrigation technology and low-pressure pipeline water conveyance irrigation technology. In addition, the competent departments of agriculture in various regions should set up corresponding water-saving irrigation systems, increase investment in funds, build water-control projects, improve the efficiency of regional water resources utilization in an all-round way, promote the construction and development of regional agricultural water-saving irrigation, and effectively improve the water resources environment.

References

- [1] You, Lei. Problems in water-saving irrigation planning and design of water conservancy projects and corresponding solutions. *Southern Agricultural Machinery*, vol. 50, no. 23, pp. 275, 2019.
- [2] Xu, Wentao., Zhang, Peng., Chen, Mengyue. Analysis of water supply and demand balance based on efficient water-saving irrigation. *Technological Wind* , no. 34, pp. 122, 2019.
- [3]Yuan, Chao. Zhang, Fei. Problems and Countermeasures of Water Saving Irrigation in Farmland Water Conservancy. *Farm Staff*, no. 23, pp. 11, 2019.
- [4] Tall, swallow. Application of water-saving irrigation technology in irrigation and water conservancy engineering. *Tech Wind*, no. 33, pp. 171, 2019.
- [5] Cui, Yan. On the Relationship between Water Saving Irrigation and Sustainable Agricultural Development. *Gansu Agriculture*, no. 11, pp. 109-110, 2019.
- [6] Cheng, Li. To explore the application of high-efficiency water-saving irrigation technology in irrigation and water conservancy engineering. *Agricultural Development and Equipment*, no. 10, pp. 169, 2019.