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ASSESSMENT OF THE MODERN SPRINKLER IRRIGATION REGIME FOR SORGHUM CULTIVATION IN THE CLIMATIC CONDITIONS OF KARAKALPAKSTAN

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Abstract
In the area of irrigated agriculture, sprinkler irrigation is used on meadow and gray-earth meadow soils, where fresh and partially mineralized groundwater is located close to the surface, as well as on soils with high water permeability. In comparison with other types of irrigation through furrows or surface irrigation, sprinkling has a number of advantages: it creates favorable conditions for plant development, not only increases soil moisture, but also increases humidity in the surface air layer, reduces air temperature and reduces the cost of evaporation and transpiration of plants.

Keywords: cross-pollinated plants, grain, food, sorghum, straw stalks, sprinkling.

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Introduction

Water is vital for human civilization and plays a key role in food production, economic development, and human well-being. However, the world is facing a growing water crisis, which is compounded by growing water demands, climate change, and widespread water demands, affecting millions of people around the world.Agricultural resources, which are the largest consumer of freshwater, account for about 70% of global water intake, which Highlights the importance of effective water resource management in this sector to ensure crop cultivation in areas with low rainfall and is an integral part of ensuring food security and economic sustainability.

Today, as a result of population growth, the demand for food products, including meat and dairy products, as well as other high-quality livestock products, is growing in the world. This, in turn, is due to the further development of animal husbandry in saline and arid regions, and the strengthening of the forage base. Based on this, improving the reclamation status of saline acreage, further strengthening the forage base, choosing food crops resistant to stress conditions, developing measures to increase and increase yields, and meeting the population's food needs is one of the urgent issues of agriculture. The further development of the livestock industry in the world in recent years is primarily related to strengthening the feed base and improving its quality.

In addition to its role in food security, sorghum is also used as livestock feed, making it an important part of Sudan's agricultural economy. Given its resistance to water, corn is an ideal crop for regions where water scarcity is a major concern, such as Khartoum.

Literature Analysis and Methodology

Currently, large-scale work is being carried out in our country to develop the agricultural sector and accelerate agricultural production. Resolution No. 06/19/5853/3955 "Strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030" noted that population growth and dramatic climate change are the main factors affecting food security of the population. In this strategy, important strategic objectives are defined as bringing grain yields to an average of 70 c/ha by 2025, the share of forage crops in the total sown area to 12%, and increasing livestock productivity [1,2,3,4].Along with the use of sorghum as a

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fodder crop, the green mass of sweet sorghum is a raw material for the production of environmentally friendly fuels - bioethanol. At the same time, sorghum is a good phytomeliorant plant that removes salt ions from the soil during the growing season along with the crop (green mass) and improves the land reclamation condition.

It is known that 23-25 of the cultivated areas in the world and 50-55 in our republic are saline to varying degrees. Salinization of cultivated areas causes certain difficulties in the development of agriculture, including animal husbandry.

In the Republic of Karakalpakstan, salinization is permanent, and if appropriate measures are not constantly taken to eliminate this problem, the reclamation condition of the soils of the Republic of Karakalpakstan will deteriorate, and it will not be possible to obtain the planned amount of harvest from these areas. Along with sowing plants resistant to salinity and drought, their sowing as precursors can help restore soil condition, a striking example of such plants is sorghum [5,6,7].

Results and Discussions

Saline soils are found among the soils of Uzbekistan. When using soils with a high salinity level, we must choose and Seed plants that are suitable for this soil. At this time, the necessary soil preparation is carried out before Sowing the plant. Before applying fertilizers, the salt of these soils is washed. During the growing season, plants require a significant amount of macronutrients (100-300 kg/ha) and a small amount of trace elements (in grams per hectare). Trace elements contribute to the absorption of phosphorus and potassium from the soil.

Five advantages of sprinkler irrigation

Water conservation: Spraying irrigation allows you to control the amount and uniformity of spraying water, preventing the loss of groundwater and deep runoff, thereby significantly improving the degree of water use, 30% -50% less than with flood irrigation in general, which also means energy savings to reduce irrigation costs.

2. Labor saving: Watering facilitates the mechanization and automation of irrigation, which saves a lot of labor. The abolition of irrigation channels not only facilitates the performance of mechanical work, but also significantly reduces the field workforce. Sprinkling is also combined with chemical fertilizers and pesticides, which saves a lot of labor. According to statistics, irrigation requires only one fifth of the surface irrigation spent on irrigation.

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3. Erdan foydalanish koeffitsientini yaxshilang: sug'orish sug'orish usuli qo'llanilganda, daladagi sug'orish ariqlari va chegaralari talab qilinmaydi. U erni sug'orishdan ko'ra haydaladigan erlardan to'liq foydalanishi va erdan foydalanish darajasini yaxshilashi mumkin. Odatda, u ekin maydonini 7%dan 10%gacha oshirishi mumkin.

4. Improved land utilization rate: Irrigation ditches and field boundaries are not required when using sprinkler irrigation. It can fully utilize arable land rather than irrigate the land, and improve the level of land use. It can usually increase the acreage from 7% to 10%.

5. Strong adaptability: Sprinkler irrigation adapts well to different types of soils. There is no need to irrigate and level the land. Sprinkler irrigation can be carried out on slopes and undulating areas. It is especially suitable for sprinkler irrigation on sandy soil with a thin soil layer and high water permeability. . In addition, irrigation is suitable not only for all field crops, but can also have a positive economic impact on various crops, vegetables and pastures. Sprinkler irrigation has many advantages, but it also has disadvantages. The main reason is the high cost of investment. Currently, a mobile irrigation system is considered the cheapest and requires an investment of 20-50 yuan/mu per head. It is also greatly influenced by wind speed and climate. If the wind speed exceeds 5.5 m/s (equal to the 4th degree of wind), raindrops can be blown away, which reduces the uniformity of irrigation and makes it unsuitable for irrigation. Secondly, if the climate is too dry, evaporation losses increase, which also reduces the impact.

Figure 1. Sprinkler irrigation system

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To'liq sug'orish tizimi odatda sug'orish tizimidan iboratnozullar, quvur tarmog'i (suv quvurlari tarmog'i), sarlavha (suv nasosi kabi suvni burish uskunalari) va suv manbai. Umuman olganda, oddiy sharoitda sug'orish an'anaviy sug'orishga qaraganda ancha tejamkor va samaralidir.Ishni sifatli bajarish uchun to'g'ri o'rnatish va sozlash uchun to'g'ri nozulni tanlang.

Sprinkler irrigation is a method of supplying water in the form of natural sprinkling during the cultivation of grain crops:

• "Sprinkler" - with an area of up to 15 hectares
• "Mobile irrigation" - when the area is from 15 hectares to 40 hectares;
• The Center Pivot irrigation system is recommended for areas over 40 hectares.

Sprinkling is a method of supplying water to agricultural crops in the form of rain; mobile or stationary sprinkler machines and installations are used to create artificial rain. Research on sprinkler irrigation was conducted in several countries in the 19th century and has been applied in development since the beginning of the 20th century. Sprinkling is widely used in many foreign countries (USA, Italy, Germany, Hungary, Bulgaria, Czech Republic, etc.). In Kazakhstan and Kyrgyzstan, most of the cultivated areas are irrigated using this method. Sprinkler irrigation is especially widely used in the cultivation of vegetables, feed, grains, industrial crops, fruits and berries in areas with unstable moisture. In the area of irrigated agriculture, sprinkler irrigation is used on meadow and gray-earth meadow soils, where fresh and partially mineralized groundwater is located close to the surface, as well as on soils with high water permeability. In comparison with other types of irrigation through furrows or surface irrigation, sprinkling has a number of advantages: it creates favorable conditions for plant development, not only increases soil moisture, but also increases humidity in the surface air layer, reduces air temperature and reduces the cost of evaporation and transpiration of plants.