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ANALYSIS OF IRRIGATION METHODS FOR PROMISING VARIETIES OF MOSH IN THE CONDITIONS OF BUKHARA REGION

Jo'rayev Umid Anvarovich

Xayridinov Sardor Nutfullo o‘g‘li

Bukhara Institute of Natural Resources Management

Abstract: The Bukhara region, with its unique climatic and geographical conditions, plays a significant role in agricultural productivity. Among the various crops cultivated in the region, the cultivation of mosh (an example crop) holds particular importance. In this article, we will delve into the analysis of different irrigation methods for the development of promising varieties of mosh, taking into consideration the specific environmental factors of the Bukhara region.

Key words: Agricultural productivity, climatic conditions, agriculture, a fundamental crop, long-term sustainability.

Introduction. The Bukhara region, with its distinct climatic conditions and historical significance in agriculture, faces the challenge of optimizing irrigation procedures for the cultivation of mosh. Mosh, or barley, is a fundamental crop that plays a vital role in the local economy and sustenance of the population. This article explores the development of irrigation procedures specifically tailored to the unique environmental conditions of the Bukhara region, aiming to enhance agricultural productivity and ensure long-term sustainability. The Bukhara region is characterized by arid and semi-arid climates, with high temperatures and limited rainfall. The scarcity of water resources poses a significant challenge for agriculture, necessitating the adoption of innovative irrigation techniques to maximize water efficiency and crop yield. Traditional irrigation methods may not suffice to meet the increasing demand for mosh production, prompting the need for a comprehensive approach to irrigation management [1]. Understanding the environmental conditions of the Bukhara region is essential for developing effective irrigation procedures. The region is characterized by arid and semi-arid climates, with hot summers and limited precipitation. The scarcity of water resources emphasizes the need for efficient irrigation methods to maximize crop yield and ensure food security.

Importance of Mosh Cultivation. Mosh, also known as barley in some regions, is a staple crop that has been cultivated for centuries. It serves as a crucial component of the local diet and contributes to the economy through its various applications, including animal feed and the production of traditional food products [2].

Environmental Factors of Bukhara Region. Understanding the environmental conditions of the Bukhara region is essential for developing effective irrigation procedures. The region is characterized by arid and semi-arid climates, with hot summers and limited precipitation. The scarcity of water resources emphasizes the need for efficient irrigation methods to maximize crop yield and ensure food security.

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Figure 1. The map of Bukhara region

Analysis of Irrigation Methods. This method involves digging furrows between crop rows and allowing water to flow through them. While traditional, it may not be the most efficient method, as water distribution can be uneven, leading to water wastage and inconsistent crop growth.

Drip Irrigation. Drip irrigation is a modern and water-efficient method that delivers water directly to the plant roots. This method minimizes water loss through evaporation and ensures a consistent water supply to each plant. However, the initial setup cost may be a limiting factor for some farmers [3].

Sprinkler Irrigation. Sprinkler irrigation involves spraying water over the crops, mimicking natural rainfall. This method is effective in covering a large area but may face challenges in water efficiency due to evaporation and wind drift. Subsurface Drip Irrigation. This method places drip lines below the soil surface, minimizing water contact with leaves and reducing evaporation. It is suitable for regions with high evaporation rates but may require careful

monitoring to prevent clogging. Soil

Type of crops	Crop yields (%) for different soil salinity classes				
	Non-Saline	Slightly Saline	Moderately Saline	Highly Saline	Very Highly Saline
Cotton	100	94	50	22	6
Wheat	100	80	39	15	0
Corn (fodder)	100	98	72	57	35
Alfalfa	100	96	73	53	39
Potato	100	90	68	0	0
Tomato	100	98	74	54	34
Pea	100	66	27	0	0
Eggplant	100	92	74	48	32
Beet	100	95	88	73	66

Figure 2. The influence of the soil salinity on crop yields

Moisture Sensors:

Integrating soil moisture sensors into irrigation systems provides real-time data on soil conditions. This data-driven approach allows farmers to tailor irrigation schedules based on actual moisture levels in the soil, optimizing water use and avoiding over-irrigation. This precision agriculture technique contributes to resource efficiency and sustainability. Rainwater Harvesting: Considering the limited rainfall in the region, rainwater harvesting systems can be employed to capture and store rainwater during infrequent but intense rainfall events. This stored water can then supplement irrigation needs during dry periods, providing a supplementary and sustainable water source.

Community Engagement and Education: The successful development and implementation of improved irrigation procedures require collaboration among farmers, researchers, and local communities [4]. Education and outreach programs can raise awareness about water conservation practices, encourage the adoption of modern irrigation methods, and foster a collective commitment to sustainable agriculture.

Analysis of Soil Moisture Sensors. Integrating soil moisture sensors into irrigation systems allows for real-time monitoring of soil conditions. This data-driven approach ensures that water is applied only when and where needed, optimizing water use and promoting sustainable agriculture. In the pursuit of enhancing mosh cultivation in the Bukhara region, the development of advanced irrigation procedures is essential. By embracing modern techniques such as drip irrigation, subsurface drip irrigation, and soil moisture sensors, farmers can not only optimize water usage but also increase crop resilience in the face of changing climatic conditions. Moreover, community engagement and education are pivotal in ensuring the widespread adoption of these sustainable practices. Through a holistic and collaborative approach, the Bukhara region can pave the way for a more resilient and sustainable agricultural future, securing the livelihoods of local farmers and ensuring food security for generations to come. The groundwater-soil-meteorology-irrigation system is highly complex, so that not a single parameter is controlling the salinization process at all times. Different parameters seem to dominate the system at different times, which also means that such a simple solution as excessive leaching will not work in the long term [5]. In order to manage the groundwater table

and the soil salinity more effectively, the data from the existing monitoring network have to be implemented into the agricultural practices, so that the water usage can be tailored to the actual demand and the on-site capacity. Further advisable actions include the rehabilitation and extension of the drainage system, an increase of the irrigation efficiency, the improvement of the irrigation water quality and the consideration of more salt-tolerant crop types. High water tables of saline groundwater lead to a capillary rise of the salts into the upper soil layers and to water logging in the root zone, resulting in a reduction of the crop yields. In order to secure sufficiently high yields and regain the sustainability of the agriculture a better understanding of the groundwater dynamics and the spatial distribution of salinized areas, water logging and the salinization risk [6]. The combination of the high salinity of the irrigation water and the generous application of fertilizers leads to a widespread soil salinization. Excessive leaching is supposed to reduce the top soil salinity, but as the drainage system is only covering a small portion of the irrigated areas and is in need of maintenance, this process only contributes to the ongoing salinization and the reduction of soil fertility and crop yields.

Conclusion. In the Bukhara region, the development of irrigation procedures for promising varieties of mosh requires a thoughtful analysis of various methods. The choice of irrigation technique should consider factors such as water availability, cost-effectiveness, and environmental sustainability. As technology continues to advance, precision irrigation methods, coupled with modern tools like soil moisture sensors, can contribute to increased crop yields while conserving precious water resources. It is crucial for farmers, researchers, and policymakers to collaborate in implementing irrigation strategies that align with the unique needs of the Bukhara region, ensuring the continued success of mosh cultivation in the face of changing environmental conditions.

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