EFFICIENT USE OF WATER RESOURCES AND MECHANISMS FOR AGROBUSINESS DIVERSIFICATION IN AGRICULTURE OF SURKHANDARYA REGION.

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Abstract. This article analyzes the potential of agrobusiness diversification using the examples of horticulture, greenhouse farming, livestock production, and agro-processing sectors. Special emphasis is placed on the modern importance of implementing water-saving practices to ensure sustainable development. The research findings demonstrate that integrating water-efficient technologies with agrobusiness diversification strategies contributes to increasing overall production volumes and improving farmers' incomes.

Key words: W*ater resource efficiency, rational water use, sustainable agricultural development, agrobusiness diversification.*

МЕХАНИЗМЫ ЭФФЕКТИВНОГО ИСПОЛЬЗОВАНИЯ ВОДНЫХ РЕСУРСОВ И ДИВЕРСИФИКАЦИИ АГРОБИЗНЕСА В СЕЛЬСКОМ ХОЗЯЙСТВЕ СУРХАНДАРЬИНСКОЙ ОБЛАСТИ

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Аннотация. В данной статье анализируется потенциал диверсификации агробизнеса на примере таких направлений, как садоводство, тепличное хозяйство, животноводство и агропереработка. Особое внимание уделяется современной значимости внедрения водосберегающих практик для обеспечения устойчивого развития. Результаты исследования показывают, что интеграция водоэффективных технологий со стратегиями диверсификации агробизнеса способствует увеличению общего объёма производства и росту доходов фермеров.

Ключевые слова: Эффективность использования водных ресурсов, рациональное водопользование, устойчивое развитие сельского хозяйства, диверсификация агробизнеса.

Introduction. Agriculture plays a crucial role in the socio-economic development of Surkhandarya, providing livelihoods and supporting local communities. However, the region faces significant challenges that threaten its sustainability, including limited water resources, inefficient irrigation systems, and the impacts of climate change. Additionally, the cultivation of water-intensive crops exacerbates water scarcity issues. These factors highlight the urgent need for innovative solutions and better resource management to ensure the long-term prosperity and environmental health of Surkhandarya's agricultural sector. This article examines water-efficient practices and agribusiness diversification in Surkhandarya, highlighting their crucial role in promoting sustainable agriculture.

Research Methodology. This research adopts a mixed-methods approach, combining both quantitative and qualitative techniques to provide a comprehensive analysis of water resource management and agrobusiness diversification in the Surkhandarya region.

Analysis and discussion of results. The complexity of the water resources management system is determined not only by the presence of numerous infrastructure components, but also by their close interconnection.

Therefore, a systems approach—which involves justifying complex decision-making across all sectors and ensuring coordination among them—is considered the most effective method in terms of its essence and significance. This requires a thorough analysis and comprehensive explanation of the system's structure and operating principles, as well as an examination of the specific characteristics, interrelationships, and internal structure of all its components. In other words, it is necessary to take into account the individual elements of the water resources management system as a complex system, their interactions, and the role of each element in the overall functioning of the system. The analysis of the water resources management system requires not only the identification of its structural components but also the determination of opportunities for coordinating the system's activities. This is particularly important for making sound decisions in the water management sector, expanding their scope of impact, and improving overall efficiency. One of the main challenges of the water resources management system is the mismatch between existing water resources and future demand, meaning that available resources may not be sufficient to meet growing needs. This problem can be addressed through the development of an effective water use management system. Such a system makes it possible to meet water demand in terms of both quality and quantity while taking environmental safety into account.

The Surkhandarya region is experiencing water shortages that threaten agriculture and local livelihoods. To address this, adopting modern irrigation techniques such as drip and sprinkler systems can greatly enhance water efficiency. These methods not only conserve precious resources but also increase crop yields. With small investments, farmers can achieve substantial improvements in productivity, ensuring sustainable growth and better economic stability for the community. Diversification in agribusiness has become a vital strategy for ensuring sustainability and resilience. By integrating crops with livestock, farmers create a more balanced and productive system that maximizes

resource use. Greenhouse farming allows for the cultivation of high-value crops in controlled environments, extending growing seasons and increasing income. Agro-processing adds value to raw products, opening new market opportunities and reducing post-harvest losses. Water-efficient farming practices enable farmers to grow premium crops even amid water shortages, enhancing profitability. Support from institutions, including training programs and easy access to credit, encourages farmers to adopt these innovative approaches, ultimately strengthening their livelihoods and fostering a more resilient agricultural sector. Currently, countries around the world, including those in the Central Asia region, are facing water resource shortages. This situation can lead to desertification and a reduction in agricultural land. Experts recommend the proper and rational use of water resources as a solution to this problem. In the Surkhandarya region, 95% of the water drawn from natural sources is used for irrigating agricultural crops. However, between 2019 and 2022, water resources decreased by 10%, which makes even more rational water use necessary. In the region, 276,000 hectares, or 85% of crop fields, are still irrigated using traditional furrow methods. Due to outdated water infrastructure, water losses exceed 34%. Taking these factors into account, in recent years special attention has been paid to introducing water-saving technologies in the region. Specifically, between 2017 and 2022, modern water-saving irrigation technologies were implemented on 73,000 hectares, or 27% of irrigated agricultural land. In addition, 10,100 hectares were irrigated using flexible pipes, and 10,700 hectares were irrigated using plastic-covered furrows. According to the data, the implementation of water-saving technologies in the region has saved 126.4 million m^3 of water and improved additional water supply on 23,000 hectares. According to the Decree of the President of the Republic of Uzbekistan dated February 24, 2021, “On Approving the Strategy for Water Resources Management and Development of the Irrigation Sector in the Republic of Uzbekistan for 2021–2023,” a total of 22,100 hectares in the region

are planned to be equipped with modern water-saving technologies this year. To implement this decree, farmers have already started operating sprinkler irrigation technologies on 502 hectares.

Conclusion and Recommendations. The findings from this research indicate that both the effective management of water resources and the expansion of agrobusiness activities are essential for achieving sustainable agricultural development in the Surkhandarya region. Persistent issues such as restricted water supply and outdated irrigation methods continue to limit agricultural output. Nevertheless, integrating advanced irrigation systems that conserve water has been shown to greatly enhance water efficiency, stabilize crop yields, and lessen the demand on existing water sources. Simultaneously, the diversification of agrobusiness—including the advancement of horticulture, greenhouse cultivation, livestock farming, and agro-processing—supports higher and more reliable income for farmers. The joint implementation of water-efficient irrigation and diversified agricultural practices yields a synergistic effect, resulting in better resource management, increased production, and diminished environmental harm. In light of these outcomes, the study recommends broadening the use of water-efficient irrigation technologies, aided by financial incentives and technical assistance for farmers. Efforts to modernize irrigation infrastructure should take precedence to minimize water loss. Additionally, policies need to support the growth of diverse, high-value, and low water-dependent agricultural sectors. Enhancing institutional backing, farmer education, and water resource governance is also crucial to further strengthen the sustainability and adaptability of agriculture in Surkhandarya.

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