Date: 13th February-2025

THE ROLE OF INNOVATIVE TECHNOLOGIES IN AGRICULTURE

Abasxanova Xalima Yunusovna
Associate Professor, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi
E-mail: halimaabasxanova@gmail.com
Mamatov Shahzodbek Anvarjon o'g'li
Student, Telecommunication technologies faculty of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi
Shukurjonova Xurshidabonu A'zamjon qizi
Student, Infocommunication Engineering faculty of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Abstract: This article discusses the role of innovative technologies in agriculture, particularly for farmers and clusters operating in greenhouses and other controlled environments. It highlights the application of these technologies in automatic irrigation, climate control, and monitoring tools that measure temperature, humidity, nitrogen, potassium, and phosphorus levels. Additionally, it explores methods for ensuring optimal nutrient supply, assessing fruit ripeness, and utilizing modern irrigation techniques. The article also covers the automation of fertilization processes, soil composition analysis, and the implementation of automated control systems for efficient crop production.

Keywords: innovative technologies, agriculture, smart farming, automation, precision farming, greenhouses, climate control, monitoring tools, automatic irrigation, soil composition analysis, fertilization, sensor deployment, data collection, real-time monitoring, agricultural productivity, high-yield crops, sustainable agriculture, smart devices, remote monitoring.

In recent years, regulatory improvements in land and water management, efficient use of agricultural land, and the introduction of innovative technologies have significantly contributed to the financial stability of agricultural enterprises. Efforts to reduce low-yield cotton and wheat fields while promoting high-value, export-oriented crops have led to increased profitability. Government policies, including the Presidential Decree No. PF-60 dated January 28, 2022, outline the "New Uzbekistan Development Strategy for 2022–2026," emphasizing the enhancement of human dignity and the establishment of a people-centered state through economic reforms.

The use of innovative methods in all types of agricultural land ensures increased productivity and labor efficiency. Remote monitoring through installed sensors enables real-time data collection and centralized management of scientific and technical outcomes. These advancements integrate contributions from research institutions, scientists, and agricultural professionals, facilitating a unified information system.

The study also analyzes various software-based approaches for land planning, sensor deployment, and plant species evaluation. Findings indicate the necessity of further

developing existing methods and algorithms to support real-time data exchange across different conditions and equipment. A comparative analysis of soil composition and suitable crop varieties demonstrates how optimized fertilization, chemical usage, and water conservation strategies can reduce costs and increase yields by at least 30%.

Furthermore, advanced systems are being introduced in agricultural production and supply chains, enhancing data collection capabilities. Productivity improvements of up to 30% ensure better practical knowledge for optimal crop cultivation. The adoption of stress-resistant, high-yield, and bioactive-rich plant varieties is also being promoted. Smart farming techniques enable precise agricultural interventions and differentiated chemical applications, reducing excessive processing.

Automation through "smart devices" significantly minimizes human involvement in monitoring and management processes. These technologies support precision farming, smart farms, intelligent greenhouses, raw material management, agricultural storage solutions, and logistics. "Smart warehouses" allow real-time monitoring of fruits and vegetables by controlling temperature, humidity, and carbon dioxide levels, ensuring optimal storage conditions. If parameters deviate, the system corrects them and alerts the warehouse owner.

Innovative technological solutions for processing and storing agricultural products help reduce labor costs and improve post-harvest storage conditions. The automation of these processes ensures enhanced efficiency, better resource utilization, and sustainable agricultural development.

THE LIST OF USED LITERATURE:

1. O‘zbekiston Respublikasi Prezidentining 28.01.2022 yildagi PF-60-son farmoni.
2. O’zbekiston Respublikasi Prezidentining 2019 yil 23 oktyabrdagi «O’zbekiston Respublikasi qishloq xo’jaligini rivojlantirishning 2020 — 2030 yillarga mo’ljallangan strategiyasini tasdiqlash to’g’risida»gi PF-5853-son Farmoni
3. Abasxanova X.Yu . Qishloq xo'jaligi maydonlarini monitoring qilish va nazorat qilish uchun geoaxborot tizimlarini ishlab chiqish usullari. Monografiya. Toshkent - 2021. “Fan va texnolo-giyalar nashriyot -matbaa uyi”. –132b. https://scholar.google
4. Abasxanova X.Yu. Development of hardware and software complex for monitoring system. Международный научный журнал «Universum: технические науки». 2022, Выпуск: 9(102), часть 5, –P.5-8. https://7universum.com/ru/tech/archive/category/9102.
5. Abaskhanova X.Yu. Analysis of information and communication technologies in green environment monitoring. International Conference on Information Science and Communications Technologies Applications, Trends and Opportunies: ICISCT 2022. https://www.icisct2022.org/
6. Abasxanova X.YU. Raqamli texnologiyalarni agrar sohasida qo‘llanish agzalligi . Agro ilm. Аграр- иқтисодий, илмий – амалий журнал. www.qxjurnal.uz.
7. Шукуров Ж.С.,Умарова Д.А. Opportunities for Business Process Outsourcing and Knowledge Process Outsourcing in Uzbekistan “Iqtisodiyot va innovatsion texnologiyalar ilmiy electron jurnali. http://iqtisodiyot.tsue.uz

8. Интеллектуальные технические средства АПК : учеб. пособие / Е. В. Труфляк, Е. И. Трубилин. – Краснодар : КубГАУ, 2016. – 266 с.
9. Ведомственный проект «Цифровое сельское хозяйство»: официальное издание.– М.: ФГБНУ «Росинформагротех».-2019.-48 с.
10. Ткаченко В.В. Разработка комплексной автоматизированной информационной системы поддержки принятия решений в управлении технологическими процессами растениеводства (на материалах АПК Краснодарского края) / В.В. Ткаченко, Н.Н. Лытнев // Вестник Академии знаний. – 2018.-№29 (6).-С. 249-253.
11. Abasxanova X.Yu., Amirsaidov U.B. Mikroprotsessorlar. Oliy o'quv yurtlari uchun o'quv qo'llanma. Toshkent 2017 yil. -350 b. https://scholar.google
12. Abaskhanova X. The role of geographic information system in growing agricultural production Universum: технические науки. – 2022. – №. 1-3 (94). – С. 57-58. https://7universum.com/ru/tech/archive/category/194 DOI: 10.32743/UniTech.2022.94.1-3
13. Abasxanova, X. Raqamli texnika. O‘zbekiston Respublikasi Oliy va o‘rta maxsus ta‘lim vazirligi tomonidan oliy o‘quv yurti talabalari uchun uchun darslik sifatida tavsiya etilgan. Toshkent 2022yil. – 300 b. https://scholar.google
14. X.Yu. Abbasxanova, J.B. Baltayev, N.V. Yaronova. Radioaloqaning mikroprotsessor qurilmalari. O‘zbekiston Respublikasi Oliy va o‘rta maxsus ta‘lim vazirligi tomonidan oliy o‘quv yurtlarining 5350700 – “Radioelektron qurilmalar va tizimlar” ta‘lim yo‘nalishi talabalari uchun darslik sifatida tavsiya etilgan. Toshkent 2023yil. – 400 b. https://scholar.google
15. Мансурова М.Я. Методы математического моделирования интегрированной компьютерной системы электронного бизнеса // Universum: технические науки : электрон. научн. журн. 2023. 2(107).
URL: https://7universum.com/ru/tech/archive/category/2107