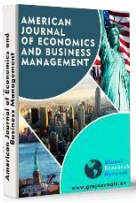

American Journal of Economics and Business Management

Vol. 9 Issue 2 | **pp.** 298-305 | **ISSN:** 2576-5973
Available online @ https://www.globalresearchnetwork.us/index.php/ajebm

Article

Improving the Use of Innovative Approaches and Investments in the Development of Sustainable Agriculture

Rakhmatov Komoliddin Urolovich[*1]

1. GulSU, Senior Lecturer, Department of Economics
* Correspondence: saidamamajonova76@gmail.com

Abstract: The study investigates innovative approaches and innovative investment mechanisms of sustainable agricultural development in Uzbekistan, emphasizing the Syrdarya region. Research aim: To better understand the composition and efficiency of investments in agriculture and derive actionable policy suggestions to promote sustainable agriculture transformation. The methodology of the research is formalized as follows: based on the statistical analysis of regional data for 2015–2023, regression analysis, expert assessment, and comparative and systematic analysis methods. The findings indicate that while total investments in the real sector have grown (15.2–18.6%), the contribution of agriculture to the investments remains low (6.8–7.4%), which is limiting for sustainable development. The study recommends that green finance instruments, such as legal reforms, sukuk-based financing options, and a common framework for sustainable investments in agriculture, should be introduced.

Keywords: Sustainable Agriculture, Sustainable Development Factors, Sustainable Investments, Investments in Fixed Capital, Investment Projects, "Smart" Agriculture, Food Security.

Citation: Urolovich R. K. Improving the Use of Innovative Approaches and Investments in the Development of Sustainable Agriculture. American Journal of Economics and Business Management 2026, 9(2), 298-305.

Received: 12th Nov 2025
Revised: 25th Dec 2025
Accepted: 16th Jan 2026
Published: 16th Feb 2026

Copyright: © 2026 by the authors. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/)

1. Introduction

The Sustainable agricultural development is the main strategic priority for food security, rational use of natural resources, sustainable ecosystems and economic growth. The FAO notion of Sustainability Assessment of Food and Agriculture Systems (SAFA) represents an important methodological foundation for the assessment of sustainability of agriculture [1].

Agricultural output around the world more than tripled from 1960 to 2015 (FAO, 2017). But, climate change, natural resource degradation, low investment and technological poverty make, the growth process intricate. InnovationTech: Smart Agriculture and Investment Policy for Sustainable transformation

Improving the investment climate and strengthening sustainable development mechanisms are state priorities of Uzbekistan. But still, the agricultural sector registered only a small fraction of total investments growing.

This study aims to provide practical recommendations based on innovations and sustainable investment mechanisms for ensuring the long-term development of agriculture in Uzbekistan.

Improving the theoretical foundations of sustainable agricultural development in the global economy is of particular importance not only for increasing economic efficiency in agriculture, but also as a strategic basis for ensuring food security, rational use of natural resources and maintaining ecological balance. In this regard, the concept of "Sustainability Assessment of Food and Agriculture systems" (SAFA), developed by the Food and Agriculture Organization of the United Nations (FAO), serves as an important methodological basis for establishing criteria and assessment indicators for sustainable agriculture [2].

The highest growth in agricultural production was recorded for the period from 1960 to 2015, during which the volume of world agricultural production increased by more than 3 times (FAO, 2017). Climate change, increasing pressure on natural resources, insufficient investment in agriculture and technological shortcomings make it more difficult than ever to maintain production growth rates. Only innovation and rapid technological development will open up prospects for meeting the demand for food products on a sustainable basis. This can only be achieved through effective state policies to increase investment and develop public-private partnerships, which will use the opportunities to maintain the current level of productivity, sustainably increase profitability, and sustainably reduce poverty. "We strive for every investor to imagine, when they think of Uzbekistan, first of all, stability and confidence in the future"

Analysis of literature on the topic. When referring to "sustainable development", the United Nations, international organizations, and Western scientists mainly mean the combination of economic, social, and environmental factors, while in the views of scientists from the Commonwealth of Independent States, the word "sustainability" is mainly emphasized, that is, in the sense of uniform, steady growth without sharp declines. "Sustainable development" is a type of development of a complex system in which, based on innovative investments, on the basis of a "green" economy, its purposeful transformation is achieved under the influence of internal and external factors, and the creation of a certain quality product is ensured with minimal deviations, with minimal costs, taking into account the interests of current and future generations of humanity [3].

Literature Review

Sustainable development works with economic, social and environmental dimensions together. Sustainable agriculture is and only can be defined as a system that can produce food for 7.5 billion people, without compromising the needs of future generations to feed and nourish their growing populations (FAO).

Modern research emphasizes:

Ocean-friendly farming

Green financing instruments

ESG and sustainable investments — Friede et al., 2015

Big Data Technologies for Smart Agriculture

Investment policy and sustainable development of agriculture in national conditions have been studied by Uzbek scholars (Kholmatov, Haydarov, Ponedelnikov).

But regional structure of investments and the integration of innovative financial instruments for sustainable agricultural transformation in Uzbekistan still have been not so much addressed. This is a lacuna which the research seeks to address [4].

Sustainable agriculture is the sustainable management of agriculture in a way that meets the present needs of society for food and textiles without compromising the ability of present or future generations to meet their own needs . The Food and Agriculture Organization of the United Nations defines "sustainable agricultural development" as the sustainable development of food production and food security. According to a group of Polish scientists, the goals of sustainable agricultural development are: ensuring a high standard of living for agricultural workers; achieving production methods that do not

cause pollution or other risks to the environment; using renewable resources to the maximum extent possible; preserving rural society and traditional ways of life; and taking into account the advanced aspects of animal husbandry [5].

In our opinion, ensuring the sustainable development of the country's agriculture is the result of the complex influence of four groups of factors, including ecological-economic, socio-economic, organizational-technological, and socio-ecological-economic factors. As a strategic direction for the development of agriculture, it is necessary to maximize the use of natural and biological factors of agricultural crops and livestock productivity. Among the factors of the fourth group, namely socio-ecological-economic (investment resources, level of development of rural areas, ecological situation in the region), the analysis of the investment resources factor is important [6].

In Uzbekistan, on the basis of market reforms, the views on the content of the category of "investments" have changed, and this change has been reflected in the legislation. A number of economists in our republic are conducting research on investment problems. Uzbek economists D. Gozibekov and T. Koraliyev define "Investments – all types of property and intellectual assets that bring income (profit) or social benefits and are involved (spent) in entrepreneurial and business activities that are not prohibited by the state."

Professor N. Khaidarov defined "investments" as follows: "Investment is the expenditure of financial, material, and intellectual assets at the disposal of individuals and legal entities operating on an entrepreneurial basis, regardless of the form of ownership, in any business object within the framework of the law in order to obtain economic and social benefits from the state".

The most popular and sustainable development-friendly concepts of investment are the terms sustainable and responsible investment. The term "responsible investment" is closely related to the "Principles for Responsible Investment (PRI), a voluntary initiative of the UN Global Compact [7].

Sustainable investment in Uzbekistan can also be one of the factors for the stable functioning of the country's financial system. Sustainable investment is an approach to making investment decisions that takes into account environmental, social, and corporate governance, as well as market stability in the long term.

2. Methodology

The research is based on a comprehensive methodological framework combining quantitative and qualitative approaches in order to assess the effectiveness of innovative approaches and investment mechanisms in the development of sustainable agriculture. The empirical base of the study includes official statistical data of the Republic of Uzbekistan for the period 2015–2023, with particular emphasis on the Syrdarya region. Data were obtained from national statistical reports, regional development programs, and official investment records [8].

The study applies statistical analysis to examine the dynamics of investment flows, sectoral distribution of capital investments, and their contribution to gross regional product (GRP). Comparative analysis was used to evaluate structural changes in the allocation of investments between agriculture and industry over time. Systematic analysis allowed for identifying interconnections between investment policy, technological modernization, and sustainable agricultural outcomes.

To quantitatively assess the relationship between sectoral investment structure and regional economic growth, a regression model was employed. The model is specified as:

$$GRP_growth = \beta 0 + \beta 1(Agricultural_Investment_Share) + \beta 2(Industrial_Investment_Share) + \varepsilon$$

where GRP_growth represents the annual growth rate of gross regional product; Agricultural_Investment_Share reflects the percentage of total investments allocated to agriculture; Industrial_Investment_Share indicates the percentage directed to industry; and ε denotes the stochastic error term [9].

This model allows evaluation of how changes in the share of agricultural investments influence regional economic performance. In addition, expert assessment methods were applied to identify priority investment directions and evaluate the feasibility of introducing innovative financing instruments. Hierarchical analysis methods were used to rank strategic factors influencing sustainable agricultural development. The integrated use of these methods ensures the reliability and scientific validity of the research findings [10].

3. Results

Investment structure of Uzbekistan for the period 2015–2023 however, in terms of sectoral allocation capital inflows show positive dynamics and insufficient level of achieving goal. The proportion of investments allocated to agriculture rose from 4.4 percent in 2015 to 7.4 percent in 2023. This growth increases interest in the agricultural sector, but is still not enough relative to its strategic importance for ensuring food security and rural employment.

On the other hand, the industrial sector holds the largest share of total investments over the years. In 2015, its share stood at 32.6 percent, and by 2023, it rose to 36.3 percent. In 2023, the share of agriculture in total foreign investments in fixed capital amounted to only 6.8 percent, while the processing industry and energy received a far greater share. The above-mentioned structural imbalance reflects that, even though agriculture is crucial for sustainable development, still a rather small portion of financial resources goes out for agriculture [11].

Novosibirsk, the economic epicenter of Siberia, grows rapidly with the Syrdarya region. For example, gross regional product rose from 6 trillion soums in 2016 to 18 trillion soums in 2023. From 2017 to 2023, 30 trillion soums of investments were attracted, 6,640 new enterprises emerged, and 55,000 permanent Jobs Created.

However, the growth of modernization in agriculture is still hampered by lack of financial resources, low levels of farm mechanization, and underdeveloped irrigation infrastructure. This implies that mere quantitative growth does not ensure lasting structural transformation [12].

The findings demonstrate that there is ample scope for introducing new concepts such as precision irrigation, digital monitoring technologies, eco-complex livestock production systems, Big Data, green bonds, sukuk-based financing, and the modernization of seed systems. These tools can boost productivity and potentially lower environmental pressures while enabling long-term sustainability.

Each region of our country is unique. The potential of each regional district is different. If one region is rich in mineral resources, then another region has very few mineral resources, such a difference should be eliminated by increasing human potential.

As a positive result of the work carried out in the socio-economic development of Syrdarya region over the past six years, the volume of gross regional product per capita is 22 million soums, industrial products are 14.2 million soums, agricultural products are 13.1 million soums, and budget revenues are 1.2 trillion soums.

Over the past six years, the region's industrial output has increased by almost six times, from 3.5 trillion soums to 12 trillion soums. Due to the effective use of the potential of the regional economy, the gross regional product has reached 18 trillion soums in 2023 from 6 trillion soums in 2016. As a result of the launch of large and small industrial projects in all districts of the region, the volume of industrial production in Yangier city has

increased by 10 times, in Mirzaabad district by 6 times, and in the remote districts of Sardoba and Khavos districts by almost 2 times.

A 220 MW thermal power plant was commissioned in Khavos district in cooperation with Turkey, and in 2023 it is planned to launch modern thermal power plants with a capacity of 1,500 MW in Shirin city and Boyovut districts [13].

In 2017-2023, the region absorbed 30 trillion soums of investments. As a result, 6,640 new enterprises were launched, 55,000 permanent jobs were created, and 17,000 families were lifted out of poverty. Chinese investments worth $250 million were attracted to Syrdarya region, which is 90 percent of the total volume of investments.

2 trillion soums were allocated for the Syrdarya "unemployment-free zone" program. With these funds, 20,000 residents were given preferential loans, 5,000 young people were provided with subsidies for equipment, 2,000 artisans were established, 1,200 young people were trained in their professions, and 10,000 residents were provided with jobs due to the allocation of 5,000 hectares of land to the population. As a result of special attention paid to employment, 41 thousand people were employed in 2016, and this figure is expected to reach 125 thousand in 2023.

As a result of special attention to the social sphere, the level of coverage of children with preschool education increased from 26 percent in 2016 to 70.1 percent in 2023. 165 thousand people were provided with centralized drinking water.

As a positive result of the work carried out over the past six years on the socio-economic development of Syrdarya region, the volume of gross regional product per capita is 22 million soums, industrial products are 14.2 million soums, agricultural products are 13.1 million soums, and budget revenues are 1.2 trillion soums.

Along with the positive developments observed in the economy of Syrdarya region, there are also opportunities, including:

- Syrdarya is rich in land, water and natural resources. The area of cultivated land per capita is 2-3 times greater than in other regions. The region also has a high level of water supply for agriculture, and there is a potential to increase agricultural production by 2-2.5 times and export by 5-7 times;
- Syrdarya region serves as a kind of bridge connecting the regions of the Republic with Tashkent, and the proximity of Tashkent city and Tashkent region alone allows for the creation of a market with about 5 million consumers;
- An important condition for an innovative economy is the harmony and cooperation of education, science and production, but today this cooperation is not sufficiently manifested;
- Syrdarya region's proximity to 2 neighboring countries, Kazakhstan and Tajikistan, provides the region with additional advantages in terms of logistics;
- At least one and a half thousand citizens of neighboring republics visit Syrdarya region for treatment per month, which indicates that the region has great potential for the development of medical tourism and the medical sector in general.

The most advanced agricultural technologies will be introduced in Syrdarya region. Investors from China will be attracted to the modernization of irrigation and land reclamation systems for sustainable agriculture.

Also, using China's experience in developing sustainable agriculture, livestock and poultry eco-complexes will be established in Saykhunabad, and intensive pomegranate, melon, pecan and fish plantations will be established in Mirzaabad. A technological park for the production of natural dyes from plants, as well as for the storage, processing and packaging of fruits and vegetables will be established in Khovos. Cooperation with leading Chinese universities will be established to create salt and drought-resistant crop varieties and livestock breeds [14].

If we analyze the structure of investments in the real sector of the country's economy in 2015-2023, then investments attracted to the agricultural sector amounted to 4.4% in 2015, but by 2023 this indicator had increased, that is, to 7.4%. We can see that the industrial sector has the largest share, while in 2015 the share of this sector was 32.6%, in 2023 this share increased to 36.3%.

If we pay attention to the spending of 112219.5 billion soums of total foreign investments and loans in fixed capital in the republic in 2023 by types of economic activity, the largest volumes were observed in the processing industry - 42.5%, electricity and gas supply - 14.1%, extractive industry - 9.8% and other sectors - 10.7%. The share of the agricultural sector was 6.8% or 7612.2 billion soums, which is not a high figure [15].

4. Discussion

These results show that although total investment volumes in the region have significantly increased, the structure of investment allocation is inadequate to achieve sustainable transformation in agriculture. The dominance of industry investments may drive short-term economic growth but also undercut long-term food security, environmental sustainability, and regional equity.

International experience shows that sustainable growth in agriculture calls for diversified financial mechanisms. Green bonds and similar frameworks designed to channel investment into environmentally friendly projects have been shown to successfully mobilize capital. Digital agriculture platforms and Big Data give a large boost to productivity while better utilizing resources and improving supply chain traceability.

Climate change and water scarcity are among the major problems facing Central Asia. Long-term financing for sustainable irrigation modernization, water-saving technologies and eco-efficient farming systems The issuance of sukuk instruments represent a mode of financing compatible with the principles of Islamic finance that could open up markets for new classes of investors.

Sustainable agricultural development, therefore, necessitates integrated reforms, combining financial innovation, legal modernization, technological advancement and institutional coordination. But without the structural rebalancing of investments and the innovative financing tools needed to pursue them, long-term sustainability goals may remain elusive.

5. Conclusion

It is difficult to arouse the interest of a foreign investor in investing capital in a place where there is no information. From this point of view, it is necessary to organize the placement and updating of a set of information on the investment potential of regions, their existing opportunities and all other information of interest to investors on the investment portal.

It is advisable to develop a list of ready-made investment proposals reflecting the investment potential of each region and present them to foreign investors in a recommendatory manner. This will not only facilitate the work of foreign investors, but also reduce the time for implementing investment projects. It is necessary to adopt the “Law of the Republic of Uzbekistan on Investment Development of Agriculture”.

The legal framework for attracting and encouraging investment in sustainable agriculture has not been improved to the level of market economy requirements. Although the regulation of investment activities in the development of sustainable agriculture in our country is reflected in some laws, we believe that the adoption of this law will serve to

improve the investment climate in agriculture and the effective use of investment resources.

Taking into account the fact that the agricultural production process is more susceptible to damage than other sectors due to various external and internal subjective factors, the difficulty of predicting the occurrence of unexpected events (force majeure), and the differences between insured entities and entities in other sectors, it is advisable to adopt a separate law on the insurance system for agriculture.

One of the methods of financing agriculture is Islamic bonds called sukuk, which provide for the use of real estate as a guarantee for the repayment of the loan.

Alternative and effective ways of structural changes in agriculture should be sought, in accordance with which it is necessary to grow and export agricultural products that are valuable in the world market, as well as widely introduce technical varieties of cannabis (Latin Cannabis) that require little water in the region.

The emergency situation requires the development of a “Program for the radical reconstruction and improvement of the sewage system and water networks in the republic”. In our opinion, before developing a program, it is necessary to conduct an inventory of all problems in the sewage and water systems in the republic.

The "green" path of agricultural development involves increasing productivity, employment and profitability, and improving the environment. In our opinion, the creation of small natural lakes (Russian: prud) in places where possible is also an attempt to reduce poverty, develop agriculture, fisheries, and forestry. Our ancestors created lakes along the paths of rain and runoff, and built villages around them to achieve their goals. The seed sector, which is the basis of food security, needs additional funding. When a country is able to provide itself with good, high-quality seeds, then the main problem of food security will be solved. Each country should have its own seed system and policy. As a way to solve the problem of feed for livestock, alfalfa should be planted instead of lawns on land plots far from major highways.

Farms that have changed their organizational and legal form to LLC should be subject to a "harmonized land tax" (MES) based on the quality of the land they occupy, and differentiated benefits should be provided from all mandatory payments and taxes levied on working capital, which has a significant impact on the formation of "smart" agriculture and the establishment of "green" economic development. It is important that any organization and institution is strictly prohibited from interfering in the activities of farms that have changed to MES. Business entities that have switched to the MES type should be required to pay 25 percent of the land tax calculated for the land area they occupy in the 1st quarter, 25 percent in the 2nd quarter, 25 percent in the 3rd quarter, and 25 percent in the 4th quarter. If business entities that have switched to the MES type do not pay taxes on time, the land ownership contract should be terminated ahead of time and a procedure for transferring the land to other entities on a tender basis should be introduced.

Based on the experience of China, it is necessary to form and use at least 15% of the profits of industrial enterprises, mainly agricultural processing enterprises, as a source of investment for the development of agriculture.

It is necessary to introduce generally accepted international principles of sustainable financing into the practice of forming a green financing market in the country. Based on the analysis of foreign practice, “green” bonds and debts are considered a special tool for financing environmental projects, allowing to satisfy both the property interests of issuers and investors of these bonds, and the interest of society and the state in improving the environmental situation. For its wider use by the state, it is necessary to adopt a number of legal, organizational, methodological, information, consulting, support, and incentive measures that will serve to increase the interest of issuers and investors in issuing and purchasing “green” bonds.

Big Data has a significant impact on "smart" agriculture and covers the entire food chain; intelligent sensors and devices generate large amounts of data, which provide enormous opportunities for decision-making; Big Data is expected to lead to significant changes in the roles and relationships between traditional and non-traditional players; governance (including data ownership, privacy, security) and business models are key issues that need to be addressed in future research.

REFERENCES

[1] J. R. et al, "A safe operating space for humanity," *Nature*, vol. 461, pp. 472–475, 2009.

[2] J. Pretty, "Agricultural sustainability: Concepts, principles and evidence," *Philos. Trans. R. Soc. B*, vol. 363, pp. 447–465, 2008.

[3] Y. Zhang and L. Wang, "Big data and smart agriculture: Challenges and opportunities," *Comput. Electron. Agric.*, vol. 142, pp. 418–429, 2017.

[4] G. Friede, T. Busch, and A. Bassen, "ESG and financial performance: Aggregated evidence from more than 2000 empirical studies," *J. Sustain. Finance Invest.*, vol. 5, no. 4, pp. 210–233, 2015.

[5] H. C. J. G. et al, "Food security: The challenge of feeding 9 billion people," *Science*, vol. 327, no. 5967, pp. 812–818, 2010.

[6] B. Scholtens, "Finance as a driver of corporate social responsibility," *J. Bus. Ethics*, vol. 68, pp. 19–33, 2006.

[7] D. Tilman, C. Balzer, J. Hill, and B. Befort, "Global food demand and the sustainable intensification of agriculture," *Proc. Natl. Acad. Sci.*, vol. 108, no. 50, pp. 20260–20264, 2011.

[8] N. H. Haydarov, "Improving Financial and Tax Relations in Investment Activities under Economic Liberalization," PhD Thesis, Tashkent State Economic University, 2003.

[9] S. Kholmatov, "Investment directions in improving agricultural efficiency," *Eurasian J. Law Finance Appl. Sci.*, vol. 2, no. 13, 2022.

[10] V. V. Ponedelnikov, "Investment Support for Sustainable Development of Agricultural Production," PhD Thesis, Russian State Economic University, 2006.

[11] Organisation for Economic Co-operation and Development, *Making Better Policies for Food Systems*. OECD Publishing, 2020.

[12] World Commission on Environment and Development, *Our Common Future*. Oxford University Press, 1987.

[13] S. K. Kholmatov, "Scientific and theoretical foundations of sustainable agricultural development," *Tafakkur Manzili*, vol. 52, no. 1, pp. 71–83, 2022.

[14] Food and Agriculture Organization of the United Nations, *The Future of Food and Agriculture: Trends and Challenges*. FAO, 2017.

[15] J. Clapp, "The rise of financial investment and common ownership in global agrifood firms," *Rev. Int. Polit. Econ.*, vol. 25, no. 4, pp. 604–629, 2018