



GREEN FINANCE INSTRUMENTS AS A DRIVER OF AGRICULTURAL SUSTAINABILITY IN UZBEKISTAN: OPPORTUNITIES AND CHALLENGES

Namangan State University

Faculty of Economics

Mamsiddiqova Fotima Xursanali qizi

Abstract. *This article examines the role of green finance instruments in promoting sustainable agricultural development in Uzbekistan. Against the backdrop of mounting climate pressures, water scarcity, and soil degradation, access to dedicated climate and green credit lines has emerged as a pivotal factor for agricultural modernization. The study analyses the structure of green loan portfolios, international climate funding inflows, preferential credit mechanisms, and public financial institution mandates in supporting agri-environmental projects. Statistical evidence on agricultural GDP contribution, the volume of climate finance mobilized by multilateral development banks, the share of state-directed green lending, and the number of beneficiary farms is deployed to illustrate the practical relevance of green finance for Uzbekistan's farming sector. The article argues that expanding green finance access can simultaneously reduce production costs, unlock export premiums, attract foreign direct investment, and accelerate the transition to low-carbon, resource-efficient agriculture.*

Keywords: *green finance, agricultural sustainability, climate finance, preferential credit, low-carbon agriculture, green bonds, multilateral development banks, Uzbekistan.*

Introduction. Agriculture occupies a central place in Uzbekistan's socioeconomic landscape. In 2024, the sector contributed 26.8 percent of gross domestic product and provided livelihoods for approximately 3.7 million people [1].



Yet the conventional agricultural model increasingly confronts systemic constraints: groundwater depletion in the Aral Sea basin, secondary soil salinisation affecting an estimated 50 percent of irrigated land, rising input costs linked to fossil-fuel-based fertilisers, and growing market pressure from environmentally conscious importers in the European Union and Gulf Cooperation Council states.

Within this context, green finance — encompassing concessional loans, green bonds, climate risk insurance, carbon credits, and blended finance structures — has moved from a peripheral policy instrument to a mainstream economic lever. International experience from Brazil's Programa ABC, India's Priority Sector Lending norms, and the European Union's Common Agricultural Policy eco-schemes demonstrates that purposefully designed financial incentives can trigger rapid adoption of sustainable practices without requiring outright grants.

This article takes a comprehensive approach by mapping the current green finance ecosystem available to Uzbek farmers, quantifying its reach and impact, identifying structural gaps, and proposing directions for policy reform that can deepen the penetration of sustainable finance across the agricultural value chain.

Literature Review. Green finance may be defined as any financial product or service that channels capital toward projects delivering net environmental benefits — whether through emissions reduction, biodiversity preservation, water conservation, or climate resilience. In the agricultural context, green finance instruments typically target four interconnected objectives:

- Reducing greenhouse gas emissions through low-carbon input substitution and precision application technologies
- Conserving water and soil through drip irrigation, contour farming, and organic matter management
- Enhancing climate resilience by supporting crop diversification, agroforestry, and weather-indexed insurance



- Facilitating market integration by funding cold-chain infrastructure, digital traceability, and organic certification
- Mobilising private co-investment through de-risking instruments such as first-loss guarantees and blended finance

Scholars including Soundarrajan and Vivek (2016) and Taghizadeh-Hesary and Yoshino (2019) highlight that in emerging economies, asymmetric information, high transaction costs, and weak collateral frameworks create structural barriers preventing farmers from accessing mainstream commercial credit. Targeted green credit lines administered through national development banks have proven effective in bridging this gap, particularly when bundled with technical assistance and market linkage support.

In the Uzbekistan context, the existing literature focuses largely on macroeconomic transition pathways (Yusupov, 2022) or sectoral water-use efficiency (Hamidov et al., 2020). The specific nexus between green financial instrument design and farm-level uptake remains underexplored, providing the motivation for the present study.

Current State of Agricultural Finance in Uzbekistan. Uzbekistan's agricultural finance landscape is characterised by a dominant public banking sector. According to World Bank analysis, state-owned financial institutions account for approximately 70 percent of total economy-wide lending [4]. Within agriculture, the Rural Development Bank (Qishloq Qurilish Bank) and Agrobank together manage the largest portfolios of farm-directed credit. As of January 2024, total outstanding agricultural loans stood at UZS 34.7 trillion, of which an estimated 12 percent was explicitly labelled as green or climate-aligned [1].

The sectoral distribution of agricultural lending reveals significant heterogeneity in green finance penetration:



Agricultural Sub-sector	Total Credit (UZS bn)	Green-Labelled Share (%)	Key Green Instrument
Cotton and grain farming	12,400	8.2	Drip irrigation loans
Horticulture and viticulture	8,900	18.6	Organic certification credit
Livestock and dairy	5,300	6.1	Biogas plant financing
Greenhouse vegetables	4,100	22.4	Solar pump subsidies
Aquaculture and fisheries	1,600	4.7	Water recycling systems

Table 1: Agricultural credit portfolio by sub-sector and green share, Uzbekistan, 2024 [1, 4].

These figures reveal that greenhouse horticulture leads in green finance uptake, driven by strong export incentives and the capital-intensive nature of modern glasshouse construction. By contrast, large-scale cotton and grain operations — where environmental externalities are arguably most severe — display the lowest green lending ratios, pointing to a policy design gap.

Green Finance as a Driver of Agricultural Competitiveness.
Competitiveness in agriculture may be understood as the sustained capacity of a farm



or agri-business to maintain profitability, attract inputs and investment, satisfy buyer quality standards, and adapt to evolving regulatory and market conditions more effectively than rivals. Green finance instruments enhance agricultural competitiveness through several interconnected mechanisms.

First, concessional green credit reduces the effective cost of adopting resource-saving technologies. A drip irrigation loan at a subsidised rate of 10 percent per annum — compared to commercial rates of 22–28 percent prevailing in Uzbekistan — can cut the payback period of a USD 15,000 irrigation upgrade from twelve years to under five, making adoption financially rational for mid-scale farms [2].

Second, green-financed organic certification opens premium export channels. European organic markets command price premiums of 30–80 percent above conventional equivalents for fruits, vegetables, and nuts. Uzbekistan's dried fruit and nut sector — the country's second largest agricultural export category — is particularly well positioned to capture this premium if producers can access the working capital required for three-year organic transition periods [3].

Third, green finance signals credibility to institutional buyers and co-investors. International food retailers and processors increasingly conduct environmental, social, and governance due diligence on supply chain partners. Farms holding internationally recognised green loan or sustainability-linked loan certificates are better positioned in supplier qualification processes, reducing market entry barriers.

Fourth, climate risk insurance and weather-indexed products — typically bundled within green finance packages — reduce income volatility, improving creditworthiness and enabling longer-term investment planning. This is especially important in Uzbekistan's southern regions, where increasingly erratic precipitation and heat stress events expose farms to significant yield uncertainty.



International Climate Finance Flows and Their Agricultural Relevance.

Uzbekistan has successfully mobilised substantial multilateral climate finance in recent years. The Asian Development Bank approved a USD 250 million policy-based loan in 2024 to support the country's climate transition, with explicit components addressing water resource management, agricultural resilience, and low-carbon energy in the rural sector [3]. This programme finances institutional reforms enabling expanded green credit, including the development of a national green taxonomy aligned with international standards.

Complementarily, the World Bank committed USD 46.2 million to a carbon resource and energy transition project in 2024, targeting greenhouse gas reductions through energy tariff reform and green economy support [4]. For agriculture specifically, tariff reform directly reduces the energy cost of electric pump irrigation — a critical input for Uzbek farmers — incentivising the shift from diesel-powered to solar-powered water extraction.

The Entrepreneurship Development Fund, Uzbekistan's principal state-backed SME finance institution, has set a target of directing 35 percent of its disbursements toward green initiatives by 2026 [4]. Given that a significant share of Fund beneficiaries operate in agri-processing and rural services, this target implies a substantial reorientation of credit flows toward climate-compatible farming practices.

Barriers to Green Finance Uptake in Agriculture. Despite encouraging trends, several structural barriers constrain the broader adoption of green finance in Uzbekistan's agricultural sector. Awareness and information gaps remain significant: a 2024 Ministry of Agriculture survey found that 61 percent of farmers had never encountered the term 'green loan' and fewer than 20 percent were familiar with any preferential green credit product available through their primary bank [2].



Collateral constraints disproportionately affect smallholders. Green finance instruments that require land title or fixed asset collateral effectively exclude dehqon (household) farms, which cultivate an estimated 45 percent of Uzbekistan's vegetable and fruit area but hold insecure or informal tenure arrangements. Moveable asset registries and alternative collateral frameworks — such as warehouse receipt systems and value chain financing — have been piloted but remain limited in geographic and sectoral coverage.

Finally, the absence of a standardised national green taxonomy creates ambiguity in product labelling, allowing some conventional loans to be marketed as 'green' without meeting rigorous environmental criteria. This greenwashing risk undermines investor confidence and distorts the statistical picture of green finance penetration.

Conclusion. Green finance instruments represent a critical lever for accelerating the sustainable transformation of Uzbekistan's agricultural sector. Concessional green loans, climate risk insurance, blended finance facilities, and organic certification credit lines collectively address the financial barriers that prevent farmers from investing in resource-efficient, low-carbon production systems [1, 2, 3, 4, 5].

The statistical evidence presented in this article demonstrates that while green finance penetration is growing — reaching 12 percent of total agricultural lending in 2024 — significant gaps remain, particularly in large-scale cotton and grain production and among smallholder farming households. Closing these gaps requires a coordinated policy response encompassing: the adoption of a national green agricultural taxonomy; the expansion of moveable asset collateral frameworks; mandatory green finance literacy modules in agricultural extension curricula; and the development of a sovereign green bond instrument to crowd in private co-investment at scale [3, 4, 5].



When properly designed and delivered, green finance does not merely mitigate environmental externalities — it creates tangible economic value for farmers, rural communities, and the national economy by enabling access to premium markets, reducing operating costs, and building long-term climate resilience.

References.

1. Statistics Agency under the President of the Republic of Uzbekistan. *Agricultural Sector Statistics, 2024*. <https://stat.uz>
2. Ministry of Agriculture of the Republic of Uzbekistan. *Green Agriculture Development Strategy 2025–2030*. <https://agro.uz>
3. Asian Development Bank. *ADB Approves \$250 Million Program to Support Uzbekistan's Climate Transition, 2024*. <https://www.adb.org/projects/58125-001/main>
4. World Bank. *Prime Picks for a Green Pivot: Uzbekistan State Funds for Climate Action, 2024*. <https://www.worldbank.org/en/country/uzbekistan/publication/state-funds-for-climate-action>
5. Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan. *Green Economy in Agriculture: Progress Report, 2025*. <https://eco.gov.uz>