
RANSFORMATION AND INNOVATION APPROACHES: ASSESSING THE DEMAND AND SUPPLY OF LABOR RESOURCES IN RURAL AREA

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Abstract

This article evaluates the balance of labor supply and demand in rural labor markets under conditions of digital transformation and innovative approaches. Based on statistical data for the 2021–2025 period, the reduction of manual labor in the agricultural sector and the growing demand for innovative jobs are analyzed. Based on the research findings, proposals to reduce structural mismatches have been developed.

Keywords

Transformation, Innovation, Rural Labor Market, Labor Demand, Labor Supply, Structural Mismatch, Agricultural Clusters, Digitalization, Human Capital, Employment Structure, Modernization, Sustainable Development.

Introduction: relevance of the topic. In the global economy, digital transformation, the modernization of the agro-industrial complex, and institutional changes are fundamentally reshaping rural labor markets. The introduction of innovative technologies and smart farming systems reduces the need for traditional manual labor while increasing the demand for highly skilled personnel with modern technological capabilities.

Concurrently, high demographic growth rates in rural areas lead to a steady expansion of the labor supply. This creates a labor-displacing effect in the traditional agricultural sector. Evaluating and regulating these emerging structural mismatches using innovative approaches is a critical economic task for ensuring sustainable development and regional stability.

literature review. Transformational processes in rural labor markets and innovative employment mechanisms represent a core focus area for modern economic research across global, regional, and national contexts.

Among global researchers, J. Taylor and G. Anriquez modeled how economic growth in developing countries reduces informal employment in rural areas but

triggers sharp demand for qualified human capital. K. Schwab and A. Smith determined that the Fourth Industrial Revolution and the deployment of "Smart Farming" infrastructures create entirely new categories of intellectual and digital jobs in rural environments.

In the Commonwealth of Independent States (CIS) context, I. V. Tarasova evaluated the optimization of agricultural enterprises through digitalization, highlighting mechanisms to redirect displaced labor into rural service sectors and local manufacturing units. A. N. Semenov examined the demographic pressures on the rural youth labor market, advocating for digital employment platforms, agritourism, and family entrepreneurship clusters as vital modern solutions.

In Uzbekistan, Q. X. Abdurahmonov explored demographic dividend utilization and human capital advancement strategies tailored to the structural shifts within the national workforce. N. K. Zokirova formulated a conceptual framework for expanding flexible employment formats – such as remote work and freelancing – specifically for rural youth and women experiencing digital transformations. B. B. To'rayev analyzed the evolution of agricultural clusters, demonstrating how industrialization and technical re-equipment accelerate labor productivity while shifting the demand toward specialized technical competencies.

Research methodology. This research utilizes a combination of systemic analysis, economic-statistical grouping, comparative dynamic analysis, and statistical trend forecasting. The empirical foundation relies on official datasets and reports spanning 2021–2025 from the Statistics Agency under the President of the Republic of Uzbekistan and the Ministry of Poverty Alleviation and Employment. For evaluation purposes, labor supply is measured via the economically active rural population, whereas labor demand represents the total volume of filled and vacant jobs within agricultural and integrated non-agricultural rural sectors.

Analysis and results. During the 2021–2025 period, the rural labor supply in Uzbekistan grew steadily due to demographic dynamics, while the volume and structural composition of labor demand evolved dynamically under the influence of agricultural clusters and technologic innovations.

Table 1

Dynamics of Rural Labor Supply and Demand (million people)

Years	Economically Active Rural Population	Formal and Informal Employment (Demand)	Structural Gap (Mismatch)	Rural Unemployment Rate (%)
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	(Supply)			
2021	4.2	3.8	0.4	9.5%
2022	4.3	3.9	0.4	9.3%
2023	4.5	4.0	0.5	8.9%
2024	4.6	4.2	0.4	8.6%
2025	4.8	4.3	0.5	8.3%

Source: Compiled by the author based on data from the National Statistics Committee of the Republic of Uzbekistan.

Scientific Commentary on Table 1: The empirical data demonstrates that the rural labor supply grew from 4.2 million individuals in 2021 to 4.8 million in 2025, marking a 14.2% expansion. Concurrently, expansions in innovative infrastructure helped lower the rural unemployment rate from 9.5% to 8.3%. However, in absolute numbers, the structural gap between demand and supply persisted at a baseline of 0.4–0.5 million people. This structural retention indicates that technological improvements compress traditional manual agricultural roles faster than the broader rural economy absorbs the expanding workforce.

To assess the systemic allocation of these labor trends, the distribution of rural employment across various economic sectors was evaluated.

Table 2

Distribution of Rural Employment by Sector (%)

Sectors and Spheres of Activity	2021	2022	2023	2024	2025
Traditional Agriculture (Manual Labor)	48.5%	45.2%	42.0%	39.1%	36.5%
Agro-industrial Clusters and Modern Manufacturing	18.2%	20.5%	22.1%	23.8%	25.2%
Service and Infrastructure Spheres	22.1%	23.4%	24.8%	25.5%	26.3%
Digital and Flexible Employment (Freelance, IT)	11.2%	10.9%	11.1%	11.6%	12.0%
Total	100%	100%	100%	100%	100%

Source: Compiled by the author based on data from the National Statistics Committee of the Republic of Uzbekistan.

Scientific Commentary on Table 2: The structural decomposition reveals a distinct shift away from primary agriculture. The share of individuals engaged in traditional manual agricultural work dropped from 48.5% in 2021 to 36.5% in 2025.

Conversely, employment within agro-industrial clusters and modern manufacturing expanded from 18.2% to 25.2%, and modern digital/flexible formats rose to 12.0%. This structural evolution confirms that agricultural innovations displace obsolete manual operations but simultaneously stimulate demand for industrialized and technology-driven operations. As noted by Q. X. Abdurahmonov, bridging this gap fundamentally requires target-oriented re-skilling strategies to elevate the quality of rural human capital.

Conclusion and recommendations. Based on the systemic evaluation of the rural labor market during 2021–2025, the following conclusions and strategic recommendations are presented:

1. The expansion of the rural labor supply runs parallel to a contraction in traditional manual labor demand caused by digital and automation waves in primary agriculture.
2. To mitigate the structural mismatch, regional "Agro-Incubators" should be established to equip rural populations with modern capabilities, such as automated equipment maintenance, agrilogistics, and basic IT competencies.
3. Diversification of the rural economy must be accelerated by supporting the service sector, localized processing industries, and flexible or digital employment models to smoothly absorb the displaced agricultural workforce.

REFERENCES:

1. Taylor, J., & Anriquez, G. (2022). Structural transformations and rural labor markets in developing nations. *Journal of Agricultural Economics*, 73(2), 312-328.
2. Schwab, K., & Smith, A. (2021). *The Fourth Industrial Revolution and the Transformation of Rural Economies*. Oxford University Press.
3. Тарасова И. В. (2023). Цифровизация и инновационное развитие рынка труда в аграрном секторе. *Экономика и менеджмент*, 12(4), 45-53.
4. Семенов, А. Н. (2024). Демографические проблемы и занятость сельской молодежи в странах СНГ]. *Вопросы экономики*, 8(2), 89-102.
5. Abdurahmonov, Q. X. (2022). *Mehnat iqtisodiyoti: nazariya va amaliyot* [Labor Economics: Theory and Practice]. Toshkent: O'zbekiston.
6. Zokirova, N. K. (2023). Raqamli transformatsiyalar sharoitida qishloq iqtisodiyotida moslashuvchan bandlik shakllarini rivojlantirish [Development of flexible forms of employment in the rural economy under digital transformations]. *Iqtisodiyot va innovatsion texnologiyalar*, 11(3), 114-125.

7. To'rayev, B. B. (2024). Agrosanoat klasterlarida mehnat resurslariga bo'lgan talabni prognozlashtirish va innovatsion boshqarish [Forecasting and innovative management of labor demand in agro-industrial clusters]. *O'zbekiston iqtisodiy axborotnomasi*, 5(1), 34-42.