






“Fiscal decentralization and rural ecotourism: Assessing the capacity of local budgets to improve life quality in Kazakhstan”

AUTHORS

Aigul Kalymbetova 
Dana Tubekova 
Raikhan Tazhibayeva 
Saule Kaltayeva 
Bektur Keneshbayev 

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© Aigul Kalymbetova, Dana Tubekova,
Raikhan Tazhibayeva, Saule Kaltayeva,
Bektur Keneshbayev, 2026

Aigul Kalymbetova, Ph.D., Department
of Hospitality, Faculty of Tourism,
International University of Tourism and
Hospitality, Kazakhstan.

Dana Tubekova, Ph.D., Department
of Hospitality, Faculty of Tourism,
International University of Tourism
and Hospitality, Kazakhstan.
(Corresponding author)

Raikhan Tazhibayeva, Associate
Professor, Ph.D., Department of
Hospitality, Faculty of Tourism,
International University of Tourism and
Hospitality, Kazakhstan.

Saule Kaltayeva, Associate Professor,
Ph.D., Department of Hospitality,
Faculty of Tourism, International
University of Tourism and Hospitality,
Kazakhstan.

Bektur Keneshbayev, Ph.D.,
Department of Management and
Tourism, Faculty of Economics,
Management and Law, Khoja Akhmet
Yassawi International Kazakh-Turkish
University, Kazakhstan.



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Aigul Kalymbetova (Kazakhstan), Dana Tubekova (Kazakhstan),
Raikhan Tazhibayeva (Kazakhstan), Saule Kaltayeva (Kazakhstan),
Bektur Keneshbayev (Kazakhstan)

FISCAL DECENTRALIZATION AND RURAL ECOTOURISM: ASSESSING THE CAPACITY OF LOCAL BUDGETS TO IMPROVE LIFE QUALITY IN KAZAKHSTAN

Abstract

This paper aims to quantitatively assess the functional capacity of local self-government (LSG) budgets to implement green economy strategies. This study uses longitudinal budget data from Turkestan, an administrative region of Kazakhstan (2019–2024), applying correlation and regression modeling. Four econometric models were constructed to define the dependencies between total revenues, transfers, tax yields, and expenditures of rural administrations.

The empirical analysis identifies a critical level of vertical fiscal imbalance: the correlation between aggregate revenue (D01) and external transfers (TR-P) reached $r = 0.991$ ($p < 0.01$). Regression diagnostics confirm that 98.1% of revenue variance and 98.4% of expenditure variance are dictated by centralized subventions. The study uncovers a state of “budgetary mirroring” (a coefficient of 0.9938 in the expenditure-to-revenue model), in which approximately 99.4% of every tenge received is immediately absorbed by operational costs, effectively neutralizing long-term investment in ecotourism infrastructure. Conversely, an endogenous growth lever was detected: a strong correlation ($r = 0.898$) between tax yields and the sale of fixed assets. A second-order polynomial model ($R^2 = 0.933$) reveals a compounding acceleration in local tax generation, suggesting that the region has reached a fiscal inflection point with the potential to transition toward a self-sustaining development model.

To transform ecotourism into a sustainable economic driver, rural governance must shift from a “survivalist” management model to one of active asset stewardship. We recommend reforming transfer architectures to include performance-based grants specifically earmarked for green infrastructure and the commercialization of municipal property.

Keywords

fiscal decentralization, local self-government, rural ecotourism, budgetary autonomy, quality of life, Kazakhstan

JEL Classification

Q01, Q26, R11, R58, H70

INTRODUCTION

The sustainable advancement of Kazakhstan’s rural hinterlands remains a critical imperative, especially as the nation grapples with widening territorial disparities; currently, the gap in GRP per capita between leading and lagging regions can exceed a factor of 3 to 1. While national initiatives like “Auyl – El Besigi” (the village is the foundation of the nation) have sought to revitalize these areas, a significant portion of the rural landscape remains burdened by stagnant income brackets and systemic infrastructure deficits. Central to overcoming these challenges is the strategic development of rural ecotourism, which serves as a catalyst for economic diversification. However, the transition from theoretical potential to tangible socio-economic wel-

fare is fundamentally dictated by the fiscal capacity of local self-government (LSG) frameworks, specifically the Level IV budget (at the city of district significance, village, and rural district levels).

In the context of Kazakhstan's evolving governance, fiscal decentralization has emerged as the pivotal mechanism for regional empowerment. As noted by Ismailova et al. (2023a), an innovative approach to LSG development in Kazakhstan requires a genuine decentralization of the budget system to ensure that local authorities have the financial tools to match their administrative responsibilities. LSG entities possess the proximity required to orchestrate resource allocation and cultivate green infrastructure. Yet, a critical paradox persists: while the Concept of Tourism Industry Development for 2023–2029 tasks local authorities with driving growth, their efficacy is compromised by a high degree of vertical imbalance. In regions like Turkestan, intergovernmental transfers (subventions) consistently account for over 85% of rural revenues, creating a transfer-dependent structural trap.

Furthermore, the effectiveness of these fiscal tools is closely linked to how they are managed and monitored at the ground level. Ismailova et al. (2023b) highlight that fostering citizen involvement through robust social control mechanisms is essential for ensuring that local budgeting actually reflects the community's needs, such as ecotourism development. Without such involvement and sufficient fiscal space, rural municipalities are unable to independently finance long-term ventures like protected trail maintenance or guest-house certifications.

This study addresses the functional nexus between local budget autonomy and the quality of life in rural areas. By evaluating the financial instruments available (ranging from land tax to property rental income), we explore whether current fiscal policies provide enough maneuverability. The analysis focuses on the Turkestan region (2019–2024), providing empirical evidence on how recalibrating local budgetary structures can transform ecotourism into a robust driver of rural prosperity. Turkestan region is a densely populated area in Kazakhstan, ranking second in population, with the majority of residents living in rural areas, which holds particular significance for this study.

1. LITERATURE REVIEW

Contemporary scholarship increasingly frames ecotourism as a holistic engine for rural revitalization, bridging the gap between economic growth and environmental preservation. For instance, Li et al. (2024) argue that the survival of traditional rural settlements and the diversification of agrarian economies are contingent upon robust governance frameworks and authentic communal involvement. This transition is further elucidated by Sgroi (2022), who describes a paradigm shift in rural ecosystems: a move from purely production-based agriculture to “multifunctional systems” where tourism serves as a primary economic pillar.

Global empirical datasets from emerging economies reinforce these theoretical claims. In Southeast Asia, Nguyen et al. (2024) highlight that community-centric models in Vietnam successfully synchronize livelihood improvements with resource stewardship. Similarly, Melese et

al. (2026) identify a symbiotic relationship between localized governance and social cohesion in Ethiopia, positioning tourism as a catalyst for resilience. Recent findings from the Chinese context by Zhang et al. (2026) and Yang et al. (2025) further emphasize that “governance synergy” – the alignment of state policy with local action – is the most significant determinant of rural sustainability.

However, a critical counter-narrative exists. Gu et al. (2025) warn that without rigorous institutional oversight and regulatory discipline, ecotourism can inadvertently expand the ecological footprint of a region. This “governance gap” suggests that the benefits of tourism are not inherent; rather, they are the product of deliberate and well-funded local administrative controls.

The efficacy of ecotourism is increasingly viewed through the lens of relational dynamics, specifically, the interplay between communal agency and social capital. Subongkoda et al. (2025) and

Alamineh et al. (2023) argue that the trajectory of tourism development is dictated by local perceptions; if the perceived social cost outweighs the benefit, grassroots cooperation diminishes. Furthermore, Yang et al. (2024) identify social capital not merely as a cultural asset but as a critical economic mediator that facilitates the transition from subsistence farming to diversified income streams.

Modern research also interrogates the well-being paradox. While Maung et al. (2025) observe that the commercialization of rural landscapes in Laos provides a material boost, they also highlight the emergence of social fractures and identity tensions. This duality is echoed by Andrade Suarez et al. (2025), who note that even established tourism models, such as pilgrimage routes in Spain, necessitate a fundamental restructuring of local governance to protect regional identities.

Ultimately, the literature suggests that socio-economic advancement is not a passive byproduct of industry growth. As argued by Rodríguez-Rodríguez et al. (2024) and Bennett et al. (2025), improvements in the human development index are contingent upon a triad of factors: participatory governance, equitable wealth distribution, and the institutional dexterity of local authorities to mitigate development-related risks.

Modern scholarship increasingly identifies governance architecture as the decisive factor in ecotourism viability. Olaya-Marín et al. (2026) underscores that environmental sustainability in the Colombian Amazon is inextricably linked to institutional trust and the subjective perceptions of the community. This perspective is mirrored in the Chinese context, where Zhang et al. (2026) argue that governance innovation – specifically the intersection of policy and technology – serves as a primary driver for regional resilience.

Furthermore, the evolution of environmental management has led to the adoption of integrated holistic frameworks. Sangkachai et al. (2025) advocate for multilateral coordination models, such as “One Health”, which synchronize the efforts of scientific actors, state agencies, and local populations to ensure ecological equilibrium. These governance complexities are equally evident in watershed man-

agement studies by Yang et al. (2025), which suggest that the efficacy of ecological protection policies is a prerequisite for successful rural revitalization.

Finally, the digital turn in rural administration is reshaping stakeholder dynamics. Sgroi and Modica (2024) demonstrate that digitalization acts as a technical enabler for sustainability, particularly in mountain tourism. By optimizing environmental monitoring and service delivery, digital tools allow for a more precise and coordinated approach to ecosystem-based management.

Existing scholarship predominantly prioritizes communal sentiment and livelihood metrics, often overlooking the material capacity of local administrations to facilitate these initiatives.

In the Kazakhstani context, the discourse is defined by a systemic tension between legislative aspirations and fiscal reality. As noted by Transparency Kazakhstan (2020), the prevailing institutional architecture is characterized by a high degree of vertical centralization. Although the Law on Local State Governance and Self-Government provides a theoretical mandate for regional development, the practical execution of these powers is curtailed by the Tax Code’s centralized revenue structure.

Evidence synthesized from the Ministry of Finance underscores a persistent transfer-dependency model. Rural municipalities operate within a constrained fiscal space where the lack of independent revenue streams forces a reliance on inter-governmental subsidies. This structural limitation creates a distinctive developmental barrier, differentiating the Kazakhstani experience from more decentralized global models. Consequently, there is an urgent need for an empirical, region-specific investigation into how this financial rigidity impacts the potential for ecotourism-led growth.

The theoretical and empirical discourse on the intersection of fiscal governance and rural sustainability highlights a complex nexus between local financial autonomy and socio-economic outcomes.

Recent studies emphasize that the effectiveness of institutional reforms depends on the adaptive capacity of local governments. Suryawati et al. (2026)

demonstrate that adaptive governance in fiscal decentralization is crucial for successful institutional reform at the regency level. This is complemented by the findings of Ren et al. (2025), who argue that fiscal decentralization stimulates regional innovation through the dual mechanisms of human capital and financial development. However, the relationship remains nuanced; W. Li and D. Li (2024) suggest that technological innovation itself reshapes how local governments exercise their fiscal powers, indicating a reciprocal relationship between governance and modernization.

The primary objective of decentralizing financial power is the improvement of public welfare. Song et al. (2025) provide evidence that public services, under a decentralized perspective, are fundamental drivers of economic growth. In the context of rural peripheries, Zheng (2025) highlights that infrastructure development – often funded by local budgets – is the backbone of rural livelihood improvement in the Global South. Furthermore, Tebkew and Atinkut (2022) illustrate that decentralization in resource management (such as forests) directly correlates with sustainable livelihoods, suggesting that local control over natural assets is a prerequisite for rural stability.

Ecotourism is increasingly viewed not just as a leisure industry, but as a strategic tool for economic resilience. Yan et al. (2025) emphasize the synergistic role of green industry and social capital in fostering sustainable development within local communities. The social dimension is further explored by Lin and Lai (2025), who identify that rural tourism significantly enhances farmers' subjective well-being by mediating their livelihood structures.

However, the transition to an ecotourism-based economy requires robust community participation and crime prevention. Pineda et al. (2023) highlight that community preferences are vital for the success of ecotourism projects, while Cozma et al. (2025) warn that tourism can play a moderating role in the impact of financial crimes on environmental degradation. Finally, Tang et al. (2026) connect fiscal decentralization with environmental regulation, suggesting that local financial autonomy is essential for achieving carbon emission reductions – a key component of the green infrastructure necessary for ecotourism.

The academic discourse on rural development in Kazakhstan has increasingly shifted from a top-down administrative approach toward a model of decentralized financial empowerment. Recent scholarship identifies two critical pillars for this transition: the structural reform of the budget system and the enhancement of social accountability at the local level.

Ismailova et al. (2023a) emphasize that an innovative approach to local self-government (LSG) in Kazakhstan is impossible without a genuine decentralization of the budget system. The study argued that while administrative responsibilities have been transferred to the local level, the financial tools – specifically the Level IV budget – often remain hollow without a robust tax base. This fiscal mismatch is particularly evident in rural districts where the lack of autonomous revenue streams forces local akims (regional mayors) to remain dependent on central subventions, thereby stifling independent initiatives in specialized sectors like ecotourism.

Beyond the structural mechanics of the budget, the human factor plays a decisive role in rural prosperity. Ismailova et al. (2023b) explore the effectiveness of social control mechanisms, asserting that citizen involvement is the primary engine for ensuring that local spending aligns with actual community priorities. Their research suggests that in the Kazakhstani context, when rural residents are empowered to monitor and participate in the budgeting process, the allocation of funds becomes more transparent and targeted. For the ecotourism sector, this means that investments in green infrastructure are more likely to succeed if they are co-designed and overseen by the village communities they intend to serve.

While the aforementioned studies establish the necessity of budget decentralization (Ismailova et al., 2023a) and the importance of social oversight (Ismailova et al., 2023b), there remains a quantitative gap regarding the specific capacity of these budgets to fund niche industries like ecotourism. Current literature lacks a granular analysis of how much “discretionary room” actually exists within the Turkestan region's rural budgets for non-operational, developmental spending.

This paper builds upon the theoretical frameworks of fiscal autonomy and social control by providing a longitudinal econometric analysis (2019–2024). It seeks to quantify the transfer dependency identified in previous articles and evaluate whether the current acceleration in local tax yields (as shown in our quadratic model) is sufficient to support the community-led initiatives advocated by recent Kazakhstani scholarship.

2. METHODOLOGY

This study employs a quantitative research design to evaluate the fiscal capacity of rural budgets in the Turkestan region. The methodological framework is divided into three sequential phases: data collection, correlation analysis, and econometric modeling.

The empirical basis consists of longitudinal budgetary data covering the period from 2019 to 2024. The primary data were sourced from the official reports of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan and the Treasury of the Ministry of Finance.

The analysis focuses on the following key variables:

- D01 (Total Revenues): Aggregate fiscal inflows at the Level IV budget;
- TR-P (Intergovernmental Transfers): Subventions and grants from higher-level budgets;
- NALOG (Tax Revenues): Endogenous tax yields (land tax, property tax, etc.);
- OF (Sale of Fixed Assets): Revenue generated from the liquidation or management of municipal property;
- Z (Total Expenditures): Aggregate municipal outlays.

To identify the structural dependencies within the rural fiscal architecture, we utilized a Pearson correlation matrix to measure the strength of linear relationships between revenue streams and expenditure categories.

Following the correlation analysis, four Ordinary Least Squares (OLS) regression models were constructed using EViews 13 software. These models were designed to test the following hypotheses:

Model (1): To determine the degree of fiscal mirroring between total revenues (D01) and expenditures (Z).

Models (2-3): To quantify the impact of external transfers (TR-P) on the overall fiscal capacity of rural districts.

Model (4): To explore the asset–revenue nexus by examining the influence of fixed asset sales (OF) on tax generation (NALOG).

To assess the long-term trajectory of local tax yields, a Time Series Analysis was conducted. Given the observed non-linear growth in recent years, a second-order polynomial (quadratic) function was applied:

$$NALOG = \beta_0 + \beta_1 t + \beta_2 t^2 + \epsilon \quad (1)$$

This approach allows for the identification of a fiscal inflection point, indicating whether the rural economy is transitioning toward an accelerated growth phase suitable for funding ecotourism infrastructure.

The validity of the models was ensured through standard diagnostic checks, including the Coefficient of Determination (R^2), t -statistics for significance testing, and p -values ($p < 0.01$ and $p < 0.05$). All financial figures were converted into Euro equivalents for international comparability, using the average annual exchange rates provided by the National Bank of Kazakhstan.

3. RESULTS

Local self-government (LSG) functions as the primary catalytic agent for ecotourism maturation, orchestrating the alignment of economic, social, and structural variables. The economic levers under municipal control encompass the incentivization of boutique tourism enterprises, the modernization of foundational infrastructure, and the re-

duction of barriers to investment capital. On the socio-cultural axis, LSG efforts are concentrated on augmenting human capital, fostering communal agency, and safeguarding the intangible cultural heritage that defines the region's identity.

Furthermore, institutional instruments ranging from multi-sectoral stakeholder coordination to the strategic cultivation of territorial branding provide the administrative scaffolding necessary for industry growth. However, the operationalization of these pillars is fundamentally contingent upon the fiscal solvency of the local administration. This intrinsic link between policy ambition and financial reality necessitates a granular examination of the budgetary frameworks that underpin municipal action.

A comprehensive audit of the realized rural accounts in the Turkestan region (2019–2024) uncovers a persistent vertical fiscal imbalance. Intergovernmental subventions served as the primary financial anchor, consistently marginalizing the role of endogenous tax and non-tax revenue streams. This centralized architecture highlights a profound lack of fiscal self-determination at the municipal level, effectively tethering local development potential to external grant allocations.

Furthermore, the data indicate that local expenditures were largely pro-cyclical, moving in lock-step with transfer cycles. This “revenue-tracking” behavior suggests a state of fiscal inertia, where the priority is administrative survival and operational equilibrium rather than the pursuit of transformative, long-term capital investments. Consequently, the capacity for rural authorities to act as independent financiers for specialized

sectors, such as ecotourism, remains structurally suppressed. The structure of revenues and expenditures is presented in Table 1.

Quantitative evidence reveals a systemic preponderance of intergovernmental subventions within the regional revenue architecture, a condition that fundamentally curtails the fiscal self-determination of rural administrative bodies. This top-down budgetary paradigm necessitates a high degree of vertical dependence, leaving local authorities with minimal discretionary space. Furthermore, the high degree of synchronicity between revenue inflows and expenditure outlays indicates a state of fiscal rigidity. Rather than deploying capital for strategic regional advancement, rural administrations are largely confined to a survivalist management model – prioritizing budgetary equilibrium and immediate operational obligations over long-term developmental investment.

The correlation matrix reveals a near-perfect positive linear relationship between aggregate revenue (D01) and external subventions (TR-P), yielding a coefficient of $r = 0.9905$ ($p < 0.05$). This extreme degree of convergence underscores a structural reality: the fiscal solvency of rural districts in the Turkestan region is almost entirely exogenous, dictated by vertical redistribution rather than localized economic productivity.

Furthermore, a robust correlation ($r = 0.898$) between tax yields (NALOG) and the divestment of fixed assets (OF) suggests a functional nexus between municipal asset stewardship and local revenue optimization. This indicates that the strategic mobilization of communal property remains a primary, albeit limited, driver of internal fiscal generation.

Table 1. Structure of executed local budget revenues and expenditures in rural areas of the Turkestan region (2019–2024) (thousand euro)

Source: Prepared based on the database of the Department of Finance and State Assets of the Turkestan Region (as of 2019–2024).

Indicator	2019	2020	2021	2022	2023	2024
I. Revenues (D01)	55 581.6	67 773.9	61 282.3	26 007.3	29 547.6	32 807.6
Tax revenues (NALOG)	7 641.9	7 017.7	6 679.5	7 334.3	8 302.9	13 389.0
Non-tax revenues (N-NALOG)	401.6	74.0	136.4	168.8	65.3	96.3
Sale of fixed assets (OF)	3.4	0.1	1.9	6.7	1 071.3	1 676.9
Intergovernmental transfers (TR-P)	47 534.7	60 682.1	54 464.5	18 497.6	20 108.1	17 645.4
II. Expenditures (Z)	54 580.5	67 770.4	60 945.5	26 590.6	29 052.7	32 449.5

Note: D01 – total revenues; Z – total expenditures.

Table 2. Correlation matrix of local budget revenue indicators in rural areas (2019–2024)

Variables	D01	N-NALOG	NALOG	OF	TR-P
D01	1.000				
N-NALOG	0.201	1.000			
NALOG	-0.469	-0.216	1.000		
OF	-0.578	-0.431	0.898**	1.000	
TR-P	0.991***	0.220	-0.585	-0.674	1.000

Note: *** $p < 0.01$, ** $p < 0.05$.

Critically, the analysis uncovers a structural decoupling between indigenous tax revenues and essential expenditure sectors, such as housing and communal services. The absence of a statistically significant correlation in these categories points to a fragmented feedback mechanism. This suggests that local fiscal efforts are not systematically reinvested into the immediate infrastructural needs of the community, thereby stifling the virtuous cycle required to improve the quality of life through ecotourism-led development. The results are presented in Table 2.

The econometric findings validate a near-perfect linear convergence between aggregate municipal revenues and external subventions, cementing the argument that local fiscal capacity remains a function of central redistribution. Furthermore, the robust correlation between tax yields and the liquidation of fixed assets suggests a critical asset-driven revenue cycle. This indicates that the strategic mobilization of communal property rather than organic market growth is currently the most potent lever for augmenting the endogenous tax base in Kazakhstan's rural districts. Consequently, for ecotourism to serve as a sustainable economic driver, local governance must transition from this reliance on asset divestment toward a more resilient model of value-added tax generation from the tourism services sector.

The regression diagnostics reveal an almost deterministic linkage between aggregate fiscal inflows and outlays within rural administrations. The estimated zero-intercept model indicates that 99.9% of expenditure variance is a direct function of revenue availability:

$$Z = 0.9938(D - 01). \quad (2)$$

This coefficient signifies a state of absolute fiscal compression, where rural authorities are confined

to a “spend-as-received” paradigm. Such a tight budgetary tether effectively eliminates the discretionary “fiscal cushion” required for long-term capital outlays, particularly for green infrastructure and ecotourism development. Every tenge of income generated is almost entirely (99.4%) spent on current expenses, leaving no resources for accumulation or long-term investment in ecotourism.

The structural vulnerability of these budgets is further underscored by the overwhelming influence of external subventions on total revenue (D-01):

$$D - 01 = 0.9027 \cdot TR - P + 6,764,240.97. \quad (3)$$

With a coefficient of determination ($R^2 = 0.981$), the model confirms that central transfers dictate over 98% of local financial capacity. This vertical dependency extends directly to the expenditure side (Z), as evidenced by the high explanatory power of the following equation:

$$Z = 0.8964 \cdot TR - P + 6,745,591. \quad (4)$$

These findings illustrate a “transfer-driven” budgetary cycle that leaves little room for localized economic agency. However, the analysis does identify a potential lever for internal growth; a significant correlation between tax yields (NALOG) and the liquidation or management of fixed assets (OF) suggests an asset-revenue nexus:

$$NALOG = 3.0732 \cdot OF + 3,759,147.1. \quad (5)$$

With an R^2 of 0.806, this result implies that optimizing the stewardship of municipal property is currently the most viable path toward bolstering the endogenous tax base, potentially providing the seed capital needed for community-led ecotourism initiatives. The key results are summarized in Table 3.

Table 3. Regression results: Determinants of rural budget revenues and expenditures

Model	Dependent variable	Independent variable	Coefficient	Std. error	t-statistic	R ²
(1)	Z	D01	0.9938***	0.0042	234.63	0.999
(2)	D01	TR-P	0.9027***	0.0626	14.42	0.981
(3)	Z	TR-P	0.8964***	0.0580	15.46	0.984
(4)	NALOG	OF	3.0732**	0.7529	4.08	0.806

Note: *** p < 0.01, ** p < 0.05.

The empirical results from Model (1) delineate a state of “budgetary mirroring” where the near-deterministic nexus between aggregate revenue and expenditure indicates that rural administrations possess almost zero fiscal elasticity. This suggests that spending is not a product of strategic prioritization but a procyclical response to immediate liquidity.

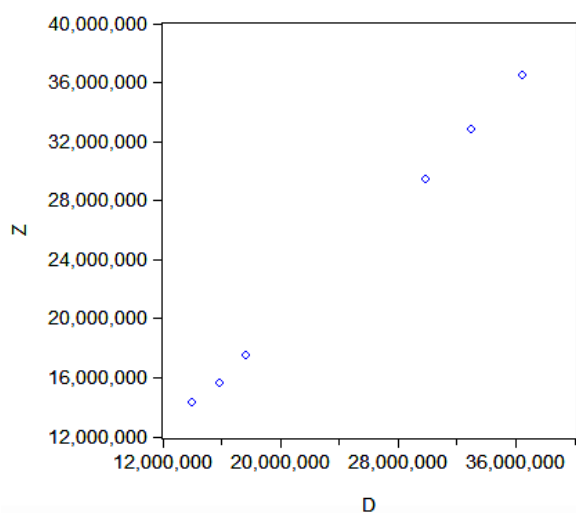
Furthermore, the findings in Models (2) and (3) validate the transfer-centric nature of the Turkestan region’s fiscal architecture. The supremacy of central subventions in determining both the scale of inflows and the scope of outlays confirms that rural municipalities function as administrative conduits for national redistribution rather than autonomous economic agents.

Finally, Model (4) uncovers a critical pathway for endogenous growth: the capitalization of municipi-

pal property. The statistically significant influence of asset-based revenue on tax generation suggests that the efficient stewardship of communal land and infrastructure serves as the primary internal lever for bolstering local financial resilience, offering a potential yet underutilized source of funding for ecotourism initiatives.

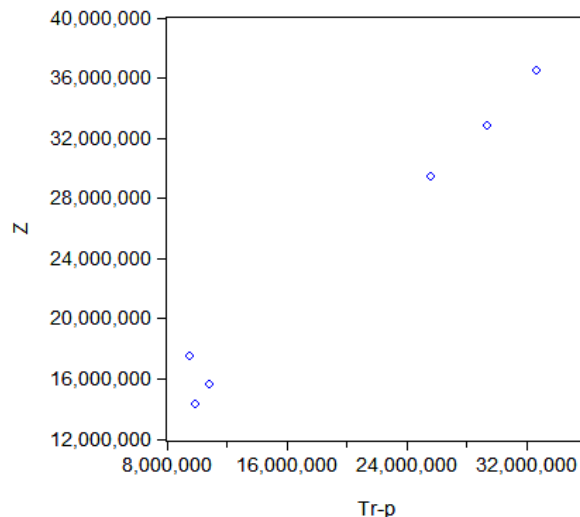
To visually confirm the almost deterministic relationship between total revenues and total expenditures of rural budgets, a scatter plot is presented in Figure 1.

The minimal stochastic variance observed, manifested by the tight concentration of data points along the regression trajectory, substantiates the hypothesis that municipal outlays are functionally synchronized with revenue inflows. This lack of fiscal elasticity indicates that rural administra-



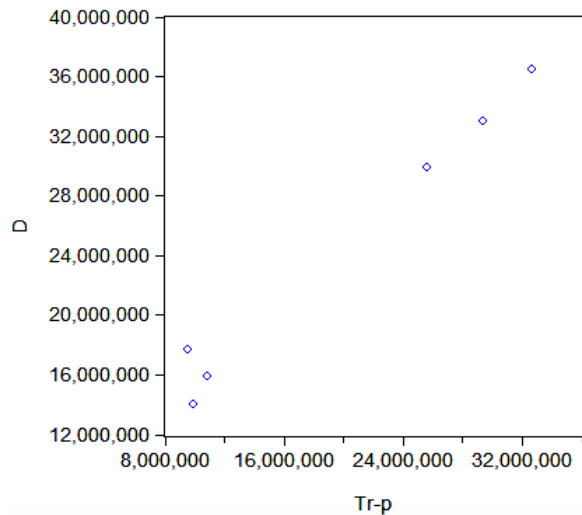
Note: The figure illustrates a nearly linear relationship between revenues (D01) and expenditures (Z), confirming the regression results. Axes: X-axis – Total revenues (D-01), Y-axis – Total expenditures (Z).

Figure 1. Scatter plot of total revenues and total expenditures of rural local budgets in the Turkestan region (2019–2024)



Note: Axes: X-axis – Intergovernmental transfers (TR-P), Y-axis – Total expenditures (Z).

Figure 2. Relationship between intergovernmental transfers and total expenditures of rural local budgets



Note: Axes: X-axis – Intergovernmental transfers (TR-P), Y-axis – Total revenues (D01).

Figure 3. Relationship between intergovernmental transfers and total revenues of rural local budgets

tions in the Turkestan region operate under a rigid budgetary ceiling. In such a framework, the capacity for discretionary spending is essentially neutralized, as virtually every unit of revenue is pre-allocated to non-discretionary operational costs, leaving no surplus for the proactive financing of ecotourism or green infrastructure.

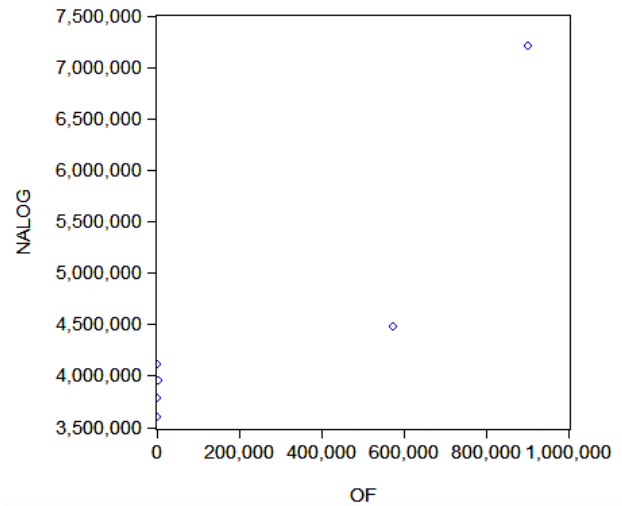
The dependence of rural budget expenditures on intergovernmental transfers is illustrated in Figure 2.

Figure 2 demonstrates a strong positive relationship, indicating that increases in transfers directly translate into higher expenditure levels. Similarly, the relationship between intergovernmental transfers and total revenues is shown in Figure 3.

Figure 3 confirms that the overall revenue capacity of rural local budgets in the Turkestan region is largely determined by transfer flows. Next, the relationship between tax revenues and revenues from the sale of fixed assets is presented in Figure 4.

Figure 4 supports the regression results, highlighting the role of municipal asset management in strengthening local tax revenues.

The temporal evaluation of tax yields in the Turkestan region reveals a distinctive curvilinear



Note: Axes: X-axis – Revenues from the sale of fixed assets (OF), Y-axis – Tax revenues (NALOG).

Figure 4. Scatter plot of tax revenues and revenues from the sale of fixed assets

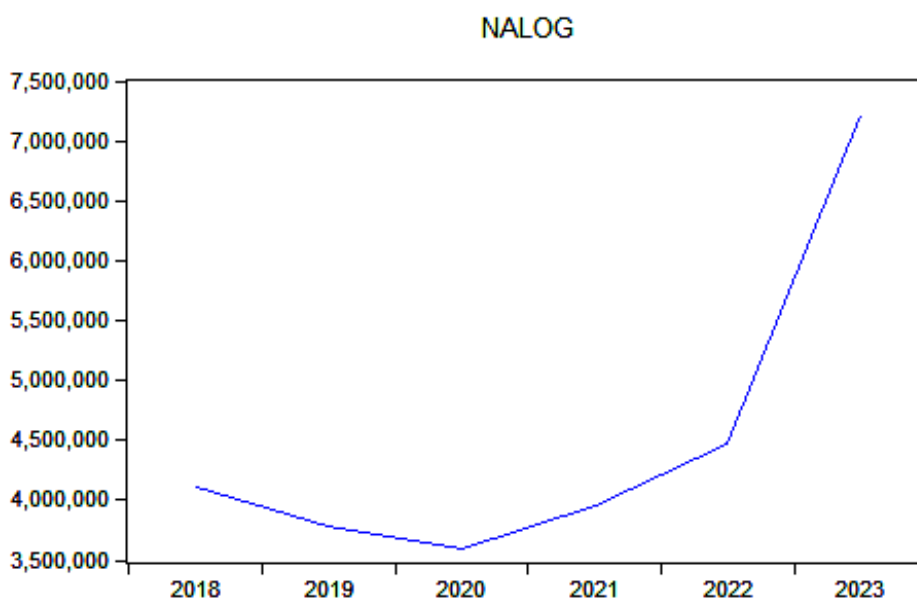
ear trajectory, effectively modeled by a quadratic function. With an explanatory power of 93.3% ($R^2 = 0.933$), the model captures a critical transition in rural fiscal dynamics:

$$NALOG = -1,112,541.57 \cdot t + 324,806.38 \cdot t^2 + 4,324,163.71. \quad (6)$$

The statistical significance of the quadratic term (t^2) is particularly revealing; it indicates that local revenue generation is not merely growing linearly but is experiencing a compounding acceleration. This pattern suggests a fundamental structural shift within the rural economy, likely driven by the gradual maturation of local tax-collecting mechanisms and the nascent diversification of economic activities. Such fiscal momentum provides a promising, albeit early, foundation for the self-sustained financing of ecotourism initiatives, moving beyond the traditional reliance on static budgetary transfers.

The dynamics of tax revenues exhibit a non-linear pattern approximated by a quadratic trend. The time series is illustrated in Figure 5, while the estimated trend explains 93.3% of the variation in tax revenues, indicating gradual structural changes in local economic activity.

Source: Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan (2024).



Note: Axes: X-axis – Year, Y-axis – Tax revenues (NALOG).

Figure 5. Time series of tax revenues in rural areas of the Turkestan region (2019–2024)

The longitudinal trajectory of the dataset uncovers a complex, non-linear progression, substantiated by a second-order polynomial model that accounts for 93.3% of the variance in tax yields ($R^2 = 0.933$). This quadratic curvature is particularly significant; it suggests that the Turkestan region's tax base is not merely expanding, but is reaching a fiscal inflection point where growth is beginning to accelerate. Such a pattern indicates an underlying maturation of the regional economic structure, transitioning from stagnant baseline yields to a more dynamic, self-reinforcing revenue model. For rural governance, this momentum represents a critical opportunity to reallocate incremental gains toward the high-value infrastructure necessary to catalyze a sustainable ecotourism sector.

4. DISCUSSION

The empirical findings of this study reveal a structurally constrained model of fiscal decentralization in rural Kazakhstan, where local governments operate under pronounced vertical dependence on intergovernmental transfers. The results demonstrate that, despite the formal assignment of responsibilities to local self-government (LSG), fiscal autonomy remains largely nominal. This aligns with broader literature on fiscal decentralization in transition economies, where decentralization reforms often de-

volve expenditure responsibilities without adequate revenue-generating capacity.

The challenges of rural development in the Turkestan region reflect a broader global need for integrated planning. While Sanjabi and Alibaygi (2026) emphasize the importance of non-agricultural employment scenarios, Yin et al. (2024) underscore that the success of such transitions is fundamentally tied to the environmental and social perceptions of the rural space – a reality that local Kazakh authorities cannot address without breaking their current state of fiscal inertia. The dominance of intergovernmental transfers in the revenue structure, as evidenced by their near-perfect correlation with total revenues ($r = 0.9905$), confirms that rural fiscal capacity is overwhelmingly exogenous. This finding suggests that local governments in the Turkestan region function less as autonomous economic actors and more as administrative intermediaries of central redistribution. Such a configuration significantly limits their ability to pursue place-based development strategies, including ecotourism initiatives that require long-term investment and financial flexibility.

A key implication of this transfer-driven system is the emergence of a “revenue-tracking” expenditure pattern. The regression results indicate an almost deterministic relationship between revenues and ex-

penditures ($R^2 = 0.999$), reflecting a highly rigid fiscal framework in which local authorities spend nearly all available resources on current obligations. This lack of fiscal elasticity effectively eliminates the possibility of accumulating investment reserves, thereby constraining the financing of capital-intensive projects such as green infrastructure, tourism facilities, and environmental conservation programs.

Importantly, the study identifies a critical structural disconnect between local revenue generation and expenditure priorities. The absence of significant correlations between tax revenues and key social sectors, including housing and communal services, indicates that locally generated income is not systematically reinvested into improving living conditions. This weak feedback loop undermines the potential of fiscal decentralization to enhance quality of life – a central objective of ecotourism-led development. In this context, decentralization without effective fiscal linkage mechanisms risks becoming administratively decentralized but economically ineffective. At the same time, the analysis reveals a notable internal growth mechanism through the strong relationship between tax revenues and the management or sale of fixed assets ($R^2 = 0.806$). This “asset-revenue nexus” suggests that municipalities rely on the mobilization of communal property as a primary source of endogenous revenue. While this strategy provides short-term fiscal relief, it raises concerns regarding sustainability, as asset divestment cannot serve as a long-term foundation for economic development. Instead, it reflects a transitional model where local governments compensate for weak tax bases through one-off or limited revenue streams. Encouragingly, the observed quadratic growth trend in tax revenues ($R^2 = 0.933$) indicates the early stages of structural transformation in rural economies. The acceleration of tax collection suggests gradual improvements in economic activity and administrative capacity. However, this emerging momentum remains insufficient to offset the overwhelming influence of central transfers. Without institutional reforms aimed at strengthening local revenue bases – particularly through the development of service-oriented sectors such as ecotourism – this growth trajectory may not translate into meaningful fiscal independence.

From a policy perspective, the findings highlight the necessity of rebalancing Kazakhstan’s fiscal

decentralization framework. Enhancing local fiscal capacity requires not only increasing the share of own-source revenues but also establishing stronger linkages between revenue generation and local expenditure priorities. In the context of rural ecotourism, this implies creating fiscal incentives for municipalities to invest in sustainable tourism infrastructure, support small-scale enterprises, and preserve environmental and cultural assets.

Furthermore, the results suggest that ecotourism could serve as a strategic instrument for transitioning from an asset-based to a value-added revenue model. By fostering local entrepreneurship, increasing tourist inflows, and expanding the taxable economic base, ecotourism has the potential to generate stable and recurring revenues. However, realizing this potential depends on granting local governments greater fiscal discretion and ensuring access to investment financing mechanisms.

In sum, the study demonstrates that the current model of fiscal decentralization in rural Kazakhstan is characterized by high dependency, low flexibility, and limited developmental capacity. While there are early signs of endogenous growth, the existing institutional and fiscal constraints prevent local governments from fully leveraging ecotourism as a tool for improving quality of life. Addressing these structural limitations is essential for transforming fiscal decentralization from a formal governance arrangement into an effective driver of sustainable rural development.

For ecotourism to truly improve the quality of life, fiscal decentralization must be accompanied by:

1. Ring-fencing revenues: Ensuring that taxes generated from tourism are directly reinvested into local “green” infrastructure;
2. Increased Discretionary Power: Reducing the “revenue-tracking” behavior by allowing municipalities to carry over surpluses for long-term capital outlays;
3. Institutional Scaffolding: Moving beyond fiscal management toward “territorial branding” and stakeholder coordination, as outlined in the theoretical framework of LSG.

CONCLUSION

The objective of this study is to quantitatively evaluate the functional capacity of local self-government (LSG) budgets in the Turkestan region to serve as an independent financial source for the development of rural ecotourism and the improvement of the local population's quality of life.

The empirical analysis identifies a critical dependence of rural territories on external transfers ($r = 0.991$), where 98.1% of the revenue capacity is dictated by vertical distribution and 99.4% of every tenge received is absorbed by immediate operational expenditures. Concurrently, a significant “asset-tax nexus” was discovered ($R^2 = 0.806$), indicating that effective municipal property management is a key internal lever for growth, while the identified quadratic dynamics of tax yields ($R^2 = 0.933$) confirm that the region has reached a fiscal “inflection point”.

Based on these results, the current budgetary mirroring model blocks the realization of ecotourism potential, rendering rural administrations passive executors of centralized policy. To transition toward self-sustaining development, it is necessary to reform the system of intergovernmental relations by introducing performance-based grants for green growth indicators and providing local authorities with genuine fiscal elasticity to reinvest surplus tax revenues into tourism infrastructure.

AUTHOR CONTRIBUTIONS

Conceptualization: Aigul Kalymbetova, Dana Tubekova, Saule Kaltayeva, Bektur Keneshbayev.

Data curation: Dana Tubekova.

Formal analysis: Aigul Kalymbetova, Dana Tubekova, Raikhan Tazhibayeva, Saule Kaltayeva, Bektur Keneshbayev.

Investigation: Raikhan Tazhibayeva, Saule Kaltayeva, Bektur Keneshbayev.

Methodology: Aigul Kalymbetova, Dana Tubekova, Raikhan Tazhibayeva.

Project administration: Saule Kaltayeva.

Supervision: Aigul Kalymbetova.

Validation: Dana Tubekova, Bektur Keneshbayev.

Visualization: Bektur Keneshbayev.

Writing – original draft: Aigul Kalymbetova, Dana Tubekova, Saule Kaltayeva.

Writing – review & editing: Aigul Kalymbetova, Dana Tubekova, Raikhan Tazhibayeva, Bektur Keneshbayev.

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