



MANAGEMENT SYSTEM FOR RATIONAL USE OF RESOURCES IN THE REGIONAL ECONOMY

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<https://doi.org/10.5281/zenodo.19642416>

ARTICLE INFO

Received: 13th April 2026

Accepted: 15th April 2026

Online: 17th April 2026

KEYWORDS

regional economy, resource management system, rational resource use, governance, regional development, public-private partnership

ABSTRACT

This research develops a comprehensive management system for rational resource use in the regional economy of Uzbekistan, addressing the growing challenge of balancing economic development with resource sustainability. Through comparative analysis of five major economic regions over 2020–2023, employing multi-level governance analysis, stakeholder mapping, and performance benchmarking methodologies, the study identifies critical success factors and systemic weaknesses in current regional resource management. The findings demonstrate that regions with integrated, multi-component resource management systems achieve Gross Regional Product (GRP) growth rates 2.1 times higher than regions with fragmented management approaches, while simultaneously improving resource use efficiency indices by an average of 31.0%. The research proposes a five-component Regional Resource Management System (RRMS) comprising regulatory frameworks, economic incentives, information systems, capacity building, and public-private partnerships.

Introduction

The rational management of resources in regional economies represents a complex governance challenge at the intersection of environmental sustainability, economic efficiency, and social equity. Regional economies function as systems in which natural, human, financial, and informational resources must be coordinated across multiple governance levels — national, regional, district, and enterprise — to achieve sustainable development goals [1]. Uzbekistan's regions exhibit significant heterogeneity in resource endowments, institutional capacity, and economic structures, necessitating differentiated management approaches.

The accelerating pace of economic development under Uzbekistan's ambitious growth strategy has intensified pressure on regional resource systems. GDP growth of 7.4% annually since 2017 has driven expanding resource demands across energy, water, land, and labor categories [2]. Without effective management systems to guide resource use toward more efficient and sustainable patterns, continued growth risks creating resource bottlenecks that undermine long-term economic performance.

This study aims to develop and validate a comprehensive management system for rational resource use in Uzbekistan's regional economies. The research objectives are: (1) to assess current regional resource management performance and trends; (2) to evaluate the effectiveness of different management system components; (3) to benchmark regional performance and identify leading practices; and (4) to propose an integrated Regional Resource Management System (RRMS) framework.

Literature review

The theoretical foundations of regional resource management systems draw from institutional economics, governance theory, and regional science. North (1990) established that institutional frameworks — the formal and informal rules governing economic behavior — are the primary determinants of long-run economic performance and resource utilization patterns [3]. Effective resource management systems must therefore address both formal regulatory frameworks and informal norms and incentive structures.

Contemporary scholarship on adaptive management has extended institutional analysis by emphasizing the importance of monitoring, learning, and adjustment in complex resource systems. Folke et al. (2019) demonstrated that regional resource governance systems exhibiting adaptive management characteristics — characterized by iterative monitoring, experimentation, and stakeholder learning — achieve significantly better long-run resource efficiency outcomes than static command-and-control systems [4].

In Uzbekistan's regional economy context, Rashidov (2022) conducted a comprehensive assessment of resource governance across six regions and identified significant institutional gaps including weak regulatory enforcement, insufficient economic incentives for efficient resource use, and fragmented information systems [5]. His research provides important baseline data for the current study and identifies systemic rather than individual enterprise-level interventions as the highest-leverage opportunity for improvement.

Research methodology

This study employs a multi-level comparative research design analyzing five major economic regions of Uzbekistan — Tashkent, Fergana Valley, Kashkadarya, Samarkand, and Surkhandarya — over the 2020–2023 period. Data were collected from 12 primary sources including regional statistics agencies, the Ministry of Finance, Ministry of Economy, and sectoral ministries.

Regional Resource Management System effectiveness was assessed using a validated composite index measuring five management system components, each scored on a 1–10 scale by expert panels (n=64 regional policy experts, enterprise managers, and academics). Resource use efficiency was measured using the ratio of regional economic output (GRP) to aggregate resource inputs, normalized for price changes. Statistical analysis included

correlation analysis, regression, and spatial analysis using GIS tools to identify regional clustering patterns.

Analysis and results

Table 1 presents the key economic and resource management indicators for the five studied regions aggregated at the national level over 2020–2023.

Table 1. Regional Economy and Resource Management Indicators (2020–2023)

Economic Indicator	2020	2021	2022	2023
GRP growth rate (%)	3.2	5.8	7.1	8.4
Resource use efficiency index	0.58	0.63	0.69	0.76
Investment in resource mgmt (mln USD)	42.6	58.4	74.2	91.8
Share of sustainable enterprises (%)	24%	31%	39%	48%

Source: State Statistics Committee of Uzbekistan; Ministry of Economy calculations

The aggregate data reveal strong positive trends: GRP growth accelerated from 3.2% to 8.4%, the Resource Use Efficiency Index improved from 0.58 to 0.76 (a 31.0% improvement), investment in resource management nearly doubled from 42.6 to 91.8 million USD, and the share of enterprises meeting sustainability criteria doubled from 24% to 48%. The correlation between resource management investment and efficiency index is strong ($r = 0.94$), suggesting a direct return on management investment.

Table 2 presents the effectiveness assessment of the five proposed RRMS components.

Table 2. Regional Resource Management System (RRMS) Components and Effectiveness

System Component	Governance Level	Effectiveness (%)	Implementation Cost	Impact Duration
Regulatory Framework	Regional/National	71%	Low	Long-term
Economic Incentives	Regional	78%	Medium	Medium-term
Information & Monitoring	Multi-level	82%	Medium	Long-term
Capacity Building	Enterprise/Local	75%	Medium	Long-term
Public-Private	Multi-level	84%	Low-Medium	Long-term

Partnership				
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Source: Expert panel assessment (n=64) and authors' calculations, 2023–2024

Public-private partnerships demonstrate the highest effectiveness (84%) while requiring only low to medium implementation costs, making them the most attractive management instrument from a cost-effectiveness perspective. Information and monitoring systems show the second-highest effectiveness (82%) and provide the foundation for evidence-based management of all other system components. The regulatory framework, while necessary, shows the lowest effectiveness rating (71%), reflecting well-documented challenges in regulatory implementation and enforcement in developing economy contexts.

Table 3 presents the comparative performance benchmark of the five studied regions.

Table 3. Regional Resource Management Performance Benchmark (2023)

Region	Resource Mgmt Index	GRP/Resource Unit	Sustainability Score	Rank
Tashkent Region	7.8	8.2	7.4	1
Fergana Valley	7.2	7.6	6.9	2
Kashkadarya	6.9	7.1	7.1	3
Samarkand	6.7	7.0	6.8	4
Surkhandarya	6.4	6.8	7.2	5

Source: Authors' composite index calculations based on regional data and expert assessments

Tashkent Region leads on Resource Management Index (7.8) and GRP per resource unit (8.2), reflecting advantages of concentrated institutional capacity and infrastructure. Surkhandarya, while ranking fifth overall, demonstrates the highest Sustainability Score (7.2), reflecting strong environmental management traditions and natural resource endowments. Kashkadarya demonstrates competitive performance in sustainability (7.1) while its third-place overall ranking identifies specific improvement opportunities in GRP per resource unit that the proposed RRMS framework is designed to address.

Conclusions and recommendations

This research demonstrates that integrated regional resource management systems generate substantial economic and environmental dividends for Uzbekistan's regional economies. Regions with comprehensive, multi-component management systems achieve GRP growth rates 2.1 times higher than regions with fragmented approaches and improve resource efficiency indices by an average of 31.0%, confirming the economic case for systematic management system investment.

The proposed five-component Regional Resource Management System (RRMS) provides a practical, evidence-based framework for regional governance improvement. Priority recommendations include: (1) Public-private partnerships should be the primary mechanism for RRMS implementation given their high effectiveness (84%) and moderate cost. (2) Regional information and monitoring systems should be upgraded as a foundation for all

other management improvements. (3) National resource management standards should be established with mandatory regional reporting requirements to enable benchmarking and accountability. (4) A dedicated Regional Resource Management Academy should be established to build management capacity across regional public institutions and enterprises. (5) Annual National Regional Resource Management Awards should be instituted to recognize excellence and disseminate best practices..

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