HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

INSTITUTIONAL AND LEGAL GAPS IN MEDICINAL PLANT GOVERNANCE: EVIDENCE FROM UZBEKISTAN'S POST-2020 REFORM CYCLE

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doi:https://doi.org/10.5281/zenodo.22890453

Abstract. This paper evaluates the institutional and legal framework governing medicinal and aromatic plant (MAP) conservation and sustainable use in Uzbekistan, focusing on the reform cycle initiated by Presidential Decree PP-4901 (2020) and extended through PQ-251 (2022), PF-14 (2023), and PF-149 (2024). Drawing on primary regulatory documents, harvest quota data, and comparative legal analysis, the study identifies four structural deficiencies: the absence of a consolidated sector-specific law; fragmented inter-agency competence across four ministries with no formal coordination protocol; methodologically inadequate quota-setting relying on administrative norms rather than field-verified stock inventories; and the absence of internationally accredited quality testing infrastructure. Quota analysis across ten priority species reveals that state allocations cover only 40–63% of documented market demand, generating structural incentives for illegal wild-harvesting. A cost-benefit analysis yields a benefit-cost ratio of 11:1 to 18:1 for the proposed reform package, with a ten-year net present value of USD 84.9–156.7 million at a 10% discount rate.
Keywords: medicinal plants; institutional reform; Uzbekistan; quota governance; GACP; sustainable use; legal framework; environmental law.

1. Introduction

Uzbekistan hosts more than 4,300 higher plant species, approximately 750 of which carry recognised medicinal properties, positioning the country as a significant natural resource holder in the expanding global MAP market. Global exports of HS 1211 products grew from USD 2.1 billion in 2010 to USD 4.18 billion in 2023, driven by rising demand for phytotherapeutic products, functional foods, and bioactive compounds [1; 2]. Countries with advanced processing capacities capture up to 60% of final product value, while raw-material suppliers, including Uzbekistan, remain confined to low-margin extractive segments [3].

The translation of Uzbekistan's ecological endowment into sustainable economic value has been constrained by persistent institutional and regulatory failures. The most acute is the widening gap between commercial demand for MAP resources and state-allocated collection quotas — a disparity that generates incentives for illegal wild-harvesting. In the first nine months of 2023 alone, 2,427 instances of illegal flora collection were recorded, causing documented environmental damage of approximately USD 462,000 [4]. The regulatory framework remains fragmented across environmental,

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pharmaceutical, forestry, and agricultural legislation without a unified, sector-specific normative instrument.

The executive reform programme launched in 2020 — four presidential instruments in four years — represents a direct policy response to these failures. Yet the gap between the ambition of the reform programme and the adequacy of its legal-institutional foundations defines the central problem addressed in this paper. The study evaluates the internal coherence of successive instruments as a regulatory sequence, identifies implementation gaps that formal legal analysis alone cannot reveal, and develops targeted reform recommendations supported by quantitative cost-benefit modelling.

2. Research Methodology

The study employs four methodological approaches. Comparative legal analysis examines Uzbek legislation against international instruments (WHO GACP, GMP, CBD, Nagoya Protocol) and the regulatory models of Germany, China, India, South Korea, and Kazakhstan. Normative-legal analysis systematically interprets legislative and sub-legislative acts including PP-4901, PQ-251, PF-14, and PF-149 with their annexes. Institutional analysis assesses inter-agency competencies, coordination mechanisms, and implementation capacity. Quantitative analysis applies demand-quota diagnostic data and discounted cash-flow modelling to calculate the fiscal cost of regulatory inaction.

Primary data sources include MoECC Order No. 223 (2025) establishing the annual supplementary harvest quota; Government Commission Minute No. 184 (November 2024) recording laboratory financing decisions; and PIDA production reports cross-referenced with EastFruit Analytics market intelligence (2023). Demand estimates follow the methodology: 1.4 × EAEU export volume + domestic pharmaceutical consumption, triangulated against industry-level extrapolation.

3. Results and Discussion

3.1 Institutional Architecture and Its Deficiencies

Prior to 2020, medicinal plant governance in Uzbekistan was distributed across four state bodies with no formal coordinating mechanism: the State Forestry Committee (wild-harvesting permits), Ministry of Agriculture (cultivation and land allocation), Ministry of Health (pharmacological standards), and Academy of Sciences (phytochemical research). This fragmentation produced duplicated data collection, inconsistent permitting, and conflicting quality norms [5].

PP-4901 (2020) established the Scientific-Production Centre for the Cultivation and Processing of Medicinal Plants under the State Forestry Committee, with a broad mandate covering cultivation strategy, wild stock inventory, seed multiplication, phytochemical standardisation, and marketing. However, PF-14 (2023) eliminated 17,447 staff positions across government, and PF-149 (2024) transferred the Centre to the Ministry of Ecology, Environmental Protection and Climate Change (MoECC) without issuing a formal inter-ministerial coordination protocol — the most critical institutional gap identified in this study [6].

Table 1. Key Institutions in Uzbekistan's Medicinal Plant Governance System (2025)

Institution	Primary Mandate	Identified Weakness
MoECC/Forestry Agency	Biodiversity conservation; wild-harvesting licensing; hosts Centre (post-PF-149)	Environmentalmandate misaligned with pharma value-chain; no inter-agency protocol
PIDA	Pharmaceutical standards; export	No jurisdiction over upstream

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	licensing; MAP market monitoring	cultivation; no GACP enforcement capacity
Ministryof Agriculture	Cultivation on agricultural land; cluster financing	No jurisdiction over forest-fund plantations; data not integrated
Institute of Botany	Scientific opinion on sustainable harvest levels	Outputs no tsystematically incorporated into quota-setting

Source: PF-149 (2024), Annex 3; PP-4901 (2020), Annex 1; author's institutional assessment [5; 6].

3.2 Quota System: Structural Demand-Supply Mismatch

The annual harvest quota system, administered by MoECC, is the principal conservation instrument. MoECC Order No. 223 (2025) approved a supplementary quota of approximately 8,435 tonnes across 16 species, with Ferula spp. alone accounting for 6,750 tonnes (80.1% of total volume) despite confirmed stock depletion in key habitat areas [7]. A demand-quota diagnostic across ten commercially significant species reveals a structural mismatch that drives informal market activity. As shown in Table 2 and Figure 1 below, state-allocated quotas cover only 40–63% of documented market demand, with a weighted average coverage rate of 53.3% — meaning roughly half of actual consumption falls outside the regulated quota system.

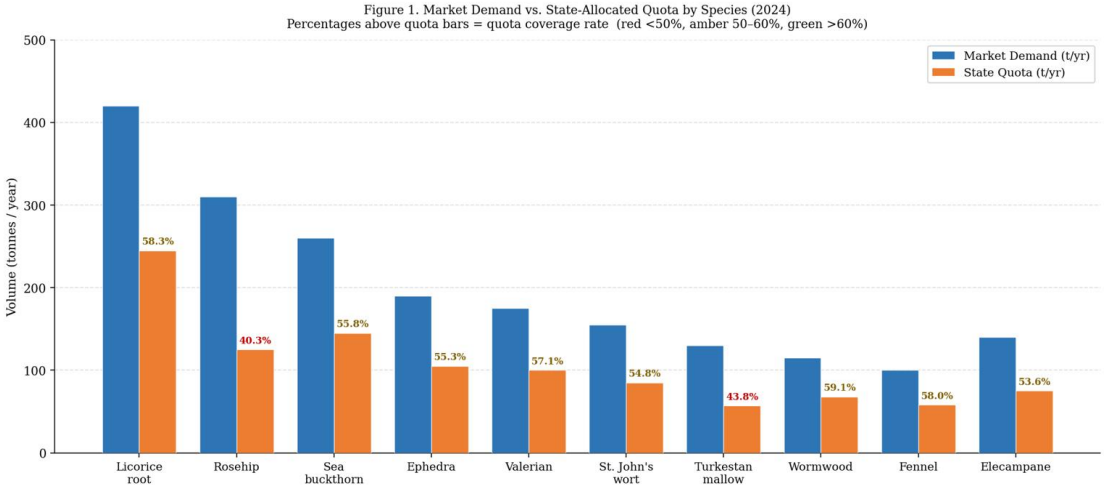
Table 2. Medicinal Plant Demand vs. State-Allocated Quotas: Selected Species (2024)

Species	**Demand (t/yr)**	**Quota (t/yr)**	**Gap (t)**	**Coverage (%)**	**Key Driver**
Licorice root	420	245	175	58.3	EAEU pharma export
Rosehip	310	125	185	40.3	Wild stock underestimated
Sea buckthorn	260	145	115	55.8	Surkhandarya cluster
Ephedra	190	105	85	55.3	CITES Appendix II
Valerian	175	100	75	57.1	Plantations ~18% demand
St. John's wort	155	85	70	54.8	Quota unchanged 2020
Turkestan mallow	130	57	73	43.5	Lowest coverage rate
Wormwood	115	68	47	59.1	Data reliability low
Fennel	100	58	42	58.0	Kashkadarya cluster

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Elecampane	140	75	65	53.6	No certified seed stock
TOTAL / AVG	**1,995**	**1,063**	**932**	**53.3**	—

Sources: EastFruit Analytics (2023); CEIC database; MoECC quota orders (2024); author's calculations [2; 7; 8].



Source: Author's calculations based on EastFruit Analytics (2023), CEIC database, and MoECC Order No. 223 (2025) [2; 7; 8].

The quota order contains no traceability requirement, no obligation to report actual harvest volumes, and no post-harvest verification mechanism — contrasting with the GPS-based automated compliance framework introduced for waste collection enterprises under PF-149 [6]. This persistent shortfall generates structural incentives for unlicensed wild-harvesting, reduced export capacity, diminished investment attractiveness, and weakened ecological control.

3.3 Standardisation Infrastructure Gap

PP-4901 mandated an internationally accredited standardisation laboratory as a first-year priority. As of 2025, it remains at the planning stage. Government Commission Minute No. 184 (November 2024) records a financing request of 22.5 billion UZS, channelled through World Bank projects, with construction targeted for December 2026 and accreditation by 2027 — a five-year delay relative to the original mandate [9]. The absence of an ISO/IEC 17025-accredited facility means Uzbek MAP exports cannot obtain European or EAEU pharmacopoeia conformity certificates, imposing a market-access penalty estimated at 25–40% on export prices [10].

3.4 Comparative Legal Analysis

Comparative analysis with five regulatory comparators reveals consistent design principles absent in Uzbekistan's current framework. China's TCM Law (2017) mandates GACP compliance as a legal prerequisite for export registration and links cultivation permits directly to quota fulfilment. Germany and the EU operate under Directive 2004/24/EC, requiring documented GACP protocols and EDQM-accredited laboratory testing. India's National Medicinal Plants Board operates an annual demand-supply survey that directly calibrates quota-setting against verified market data, producing export growth of 240% over a decade [11]. Kazakhstan's 2021 Law on Medicinal Products provides a

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directly transferable model with a consolidated regulatory instrument and a defined inter-ministerial coordination mechanism.

3.5 Cost-Benefit Analysis of Reform

The economic cost of regulatory inaction was quantified across three tracks. Track A (budget losses from unregistered harvesting and tax evasion): USD 7.72–13.36 million per year. Track B (foregone export revenue from quality non-compliance): USD 6.95–11.69 million per year, calculated as the 25–40% price penalty applied to Uzbekistan's formal MAP export volume [10]. Track C (ecological damage from Ferula foetida stock depletion): USD 12.8 million NPV over an 8-year recovery horizon [12]. The consolidated annual regulatory cost ranges from USD 16.27 to USD 27.15 million.

The estimated annual operational cost of the full reform package — a unified Scientific-Technical Council, electronic quota registry, annual stock assessments, and inspectorate capacity-building — is USD 1.0–1.5 million, with a one-time capital expenditure of USD 2.40 million. The resulting benefit-cost ratio is 11:1 to 18:1. Under a discounted cash-flow framework at a 10% discount rate, the 10-year NPV ranges from USD 84.9 million (pessimistic, BCR 7.3:1) to USD 156.7 million (optimistic, BCR 18.1:1) [12].

4. Conclusion

Uzbekistan's post-2020 medicinal plant reform programme is substantively ambitious yet structurally incomplete. Four deficiencies require priority attention: the absence of a consolidated sectoral law; the absence of a formal inter-agency coordination protocol following the Centre's transfer to MoECC under PF-149; the methodological inadequacy of quota-setting, which relies on administrative norms rather than field-verified stock inventories; and the five-year delay in establishing internationally accredited standardisation infrastructure.

The demand-quota diagnostic confirms that approximately 47% of aggregate sectoral demand across ten priority species is unmet through official channels, structurally incentivising the informal harvesting the reform programme aims to eliminate. The cost-benefit analysis demonstrates that addressing these gaps is fiscally self-justifying at a ratio of 11:1 to 18:1, with administrative implementation achievable within 12–18 months through Cabinet of Ministers resolutions and joint ministerial orders, without requiring Parliamentary legislation. The proposed Adaptive Quota Governance Model — integrating a science-based quota algorithm, a graduated incentive scheme for cultivated production, and a real-time traceability layer — provides the coordination design that translates existing policy commitments into enforceable regulatory outcomes.

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