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Protocol: Municipal-Scale Natural-Capital Accounting for Local Governance in Albania

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We use this protocol and it's working

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Abstract

Natural capital accounting (NCA) provides a systematic approach to identify, quantify and value the biophysical and economic contributions of ecosystems to human well-being. Although widely applied at national scales, methods for municipal-level NCA remain underdeveloped. Here we present a replicable protocol for implementing NCA in local government systems, based on the methodology adopted by Albania's Ministry of Interior and the OSCE Presence in Albania (2021). The protocol consists of three sequential phases: (1) creation of the municipal Natural Capital Asset Register, (2) quantification of annual physical ecosystem-service flows, and (3) monetary valuation of flows and asset stocks. The protocol integrates spatial datasets, hydrological and geological records, agricultural and forestry statistics, mineral and energy extraction data, and municipal administrative information into SEEA-EA-aligned accounts. It includes guidance on institutional setup, data harmonization, ecosystem-service modelling, valuation techniques and local governance integration. This protocol has been piloted in four municipalities (Mat, Roskovec, Selenicë, Pogradec) and subsequently scaled to all 61 municipalities through a national training curriculum and legal integration in the Decentralization Strategy 2023–2030. The workflow enables municipalities to build coherent, evidence-based natural-capital accounts in 18–28 weeks and supports long-term local planning, budgeting, and environmental governance.



Materials

- Software
- GIS software (QGIS recommended)
- Spreadsheet software (Excel)
- Statistical or scripting software (R/Python optional)
- OSCE–Mol NCA data templates
- Documents
- Natural Capital Manual for Municipalities (OSCE 26 MB, 2021)
- Municipal asset registries
- MTBP and territorial plans

Overview of the protocol

- 1 Creation of the Municipal Natural Capital Asset Register: Identification of all biotic and abiotic natural assets (minerals, forests, water, energy resources, land, biodiversity).
- 2 Assessment of physical ecosystem-service flows: Annual quantification of provisioning (agriculture, timber, hydropower, oil, minerals), regulating (carbon, soil retention, water regulation), and cultural services.
- 3 Monetary valuation: Conversion of physical flows into Albanian Lek (ALL/year) through market-price, resource-rent, replacement-cost, and benefit-transfer methods.

Procedure

- 3.1 Phase 1 — Institutional Setup (1–2 weeks)
Appoint Working Group (environment, agriculture, forestry, water, tourism, finance).
Sign internal data-sharing order.
Identify NCA focal point.
- 3.2 Phase 2 — Create Asset Register (3–4 weeks)
Collect spatial layers (land cover, hydrology, forests, soils).
Populate asset inventory:
Mineral resources
Energy resources
Water resources
Land resources
Biodiversity 6 protected areas
Classify assets using SEEA-EA ecosystem-types + Manual typologies.
Produce asset maps and tables.
- 3.3 Phase 3 — Quantify Physical Flows (4–6 weeks)
Agricultural yield calculations.
Forest biomass estimation.
Water regulation 6 hydrology modelling.
Soil erosion (RUSLE).
Oil/mineral extraction volumes.
Tourism visitation 6 recreation metrics.
Compile annual physical flow tables.
- 3.4 Phase 4 — Monetary Valuation (3–5 weeks)
Market-price valuation (agriculture, tourism, timber).
Resource-rent valuation (oil, minerals, hydropower).
Replacement cost (water purification, erosion control).



Benefit transfer (biodiversity).
Convert all physical flows to ALL/year.
Compute asset values using present-value formula.

- 3.5 Phase 5 — Integration into Governance (4–8 weeks)
Present results to Working Group.
Integrate into MTBP and local plans.
Prepare council briefing.
Upload to national system (Mol-ASLSG).

Timing

- 4 Institutional setup: 1–2 weeks
Asset register: 3–4 weeks
Physical flows: 4–6 weeks
Valuation: 3–5 weeks
Governance integration: 4–8 weeks
Total: 18–28 weeks per municipality (8–12 weeks after scaling)

Troubleshooting

- 5 Missing data on water flows: Incomplete AMBU records. Solution: Use basin averages + municipal checks.
Agricultural data inconsistent: Multiple registries. Solution: Cross-verify with INSTAT + field-based expert opinion.
Mineral/oil data restricted: Operator confidentiality. Solution: Use AlBEITI or aggregated AKBN data.
GIS misalignment: Different projections. Solution: Reproject to EPSG:32634.

Anticipated Results

- 6 Complete municipal Natural Capital Asset Register
Physical flow accounts for all major ecosystem services
Monetary-flow accounts (ALL/year)
Long-term natural-capital asset valuation
Integration into budgeting and planning
Councils adopting NCA-based decisions
National NCA consolidation across 61 municipalities

Protocol references

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Acknowledgements

DEVELOPMENT OF THE PROTOCOL

The protocol was developed through a national co-creation process involving:

- Ministry of Interior
- OSCE Presence in Albania
- ASLSG
- Municipal working groups
- National agencies (AKBN, AMBU, ASIG, NAPA)
- The piloting process across Mat, Roskovec, Selenicë, and Pogradec generated iterative refinements that now form the official national methodology.

APPLICATIONS

This protocol is suited for:

- Local governments (budgeting, territorial planning, reporting)
- National agencies (environment, energy, water, land, statistics)
- Researchers modelling ecosystem flows at subnational scale
- International donors implementing green-governance programmes

It can be extended to:

- Watershed-scale management
- Concession oversight for minerals, hydropower, hydrocarbons
- Climate adaptation funding proposals
- Environmental fiscal reforms

EXPERIMENTAL DESIGN

- Study type
 - Observational, spatial-economic assessment combining GIS, administrative statistics, and valuation models.
- Sampling
 - Full population (entire municipal territory).
- Data sources
 - Spatial datasets (ASIG)
 - Hydrology (AMBU)
 - Energy resources (AKBN, ERE)
 - Agricultural statistics (INSTAT, municipal directories)
 - Mineral extraction records
 - Biodiversity monitoring (NAPA, AKM)

EQUIPMENT

- Computer with ≥8 GB RAM
- GIS-capable processor
- GPS (optional for field verification)

PROCEDURE

Phase 1 — Institutional Setup (1–2 weeks)

- Appoint Working Group (environment, agriculture, forestry, water, tourism, finance).
- Sign internal data-sharing order.
- Identify NCA focal point.

Phase 2 — Create Asset Register (3–4 weeks)

- Collect spatial layers (land cover, hydrology, forests, soils).
- Populate asset inventory:
 - Mineral resources
 - Energy resources
 - Water resources
 - Land resources
 - Biodiversity 6 protected areas
- Classify assets using SEEA-EA ecosystem-types + Manual typologies.
- Produce asset maps and tables.

Phase 3 — Quantify Physical Flows (4–6 weeks)

- Agricultural yield calculations.
- Forest biomass estimation.
- Water regulation 6 hydrology modelling.

Phase 4 — Monetary Valuation (3–5 weeks)

- Market-price valuation (agriculture, tourism, timber).
- Resource-rent valuation (oil, minerals, hydropower).
- Replacement cost (water purification, erosion control).
- Benefit transfer (biodiversity).
- Convert all physical flows to ALL/year.
- Compute asset values using present-value formula.

Phase 5 — Integration into Governance (4–8 weeks)

- Present results to Working Group.
- Integrate into MTBP and local plans.
- Prepare council briefing.
- Upload to national system (MoI-ASLGS).

TIMING

Phase | Duration

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Institutional setup | 1–2 weeks

Asset register | 3–4 weeks

Physical flows | 4–6 weeks

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Total: 18–28 weeks per municipality (8–12 weeks after scaling)

TROUBLESHOOTING

Problem | Possible cause | Solution

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Missing data on water flows | Incomplete AMBU records | Use basin averages + municipal checks

Agricultural data inconsistent | Multiple registries | Cross-verify with INSTAT + field-based expert opinion

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ANTICIPATED RESULTS

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- Physical flow accounts for all major ecosystem services
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- Long-term natural-capital asset valuation
- Integration into budgeting and planning
- Councils adopting NCA-based decisions
- National NCA consolidation across 61 municipalities