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CROSS-BORDER SUSTAINABLE RENEWABLE
ACCELERATION AREAS IN UKRAINE – PHASE II

Approaches used for considering agricultural lands as a criterion in RAAs planning at the regional level

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Legislative framework



The issue of degraded agricultural land in Ukraine is primarily regulated by the Land Code of Ukraine, the Law of Ukraine “On Land Protection”, the Law of Ukraine “On Land Management”, and the Procedure for Land Conservation approved by Resolution of the Cabinet of Ministers of Ukraine No. 35 of 19 January 2022.

At the same time, for spatial planning purposes, it is important to distinguish between actual soil degradation and the legally formalized status of land for which a decision on conservation has been adopted.

What the Law Considers Degraded Land

The main definition is provided in Article 171 of the Land Code of Ukraine. In its current version dated 22 July 2026, the Code classifies as degraded land, in particular, land plots:

- whose surface has been disturbed as a result of landslides, karst processes, flooding, mineral extraction, and other processes;
- with eroded soils;
- with waterlogged soils;
- with increased soil acidity;
- with saline soils;
- with soils contaminated by chemical substances, among others.

The Code separately defines low-productivity land as agricultural land whose soils have adverse natural properties, low fertility, and whose use for the designated agricultural purpose is economically inefficient.

Therefore, the concepts of “degraded land” and “low-productivity land” are not identical, although they are often regulated together under Ukrainian legislation.

Main Data Sources

Source	What It Contains	GIS / Spatial Data
1. State Land Cadastre (SLC)	Information on land protection measures, including the conservation of degraded, low-productivity, and technogenically contaminated land	Yes
2. Public Cadastral Map layer “Land Requiring Conservation”	Identified degraded, low-productivity, and technogenically contaminated land	Yes, cartographic layer
3. State Fund of Land Management Documentation	Land management projects and working land management projects, including those related to land conservation	Documentation often contains plans and coordinates
4. Information Database on the Condition of Agricultural Soils	Soil fertility, pH, humus content, NPK, microelements, contamination	Mainly tables and aggregated data
5. Soil Monitoring System Data	Agrochemical and environmental characteristics of soils	Mainly tabular data
6. Agrochemical Passports of Fields / Land Plots	Detailed indicators for a specific field or land plot	Linked to individual fields or land-use units

Executive message

Agricultural lands were considered, but degradation could not be mapped with planning-grade certainty.

What worked

Agricultural land could be represented as a broad LULC criterion using 10 m GeoTIFF data.

What failed

“Degraded agricultural land” lacked an authoritative and legally valid spatial definition at regional scale.

Decision

Do not include the degraded agricultural land layer in the scoring model until it is validated by official land/cadastral data and field evidence.



How agricultural land was used as a criterion

The available agricultural layer was treated as a land-use screening layer rather than a degradation or productivity layer.

Input representation

LULC

GeoTIFF

WGS-84

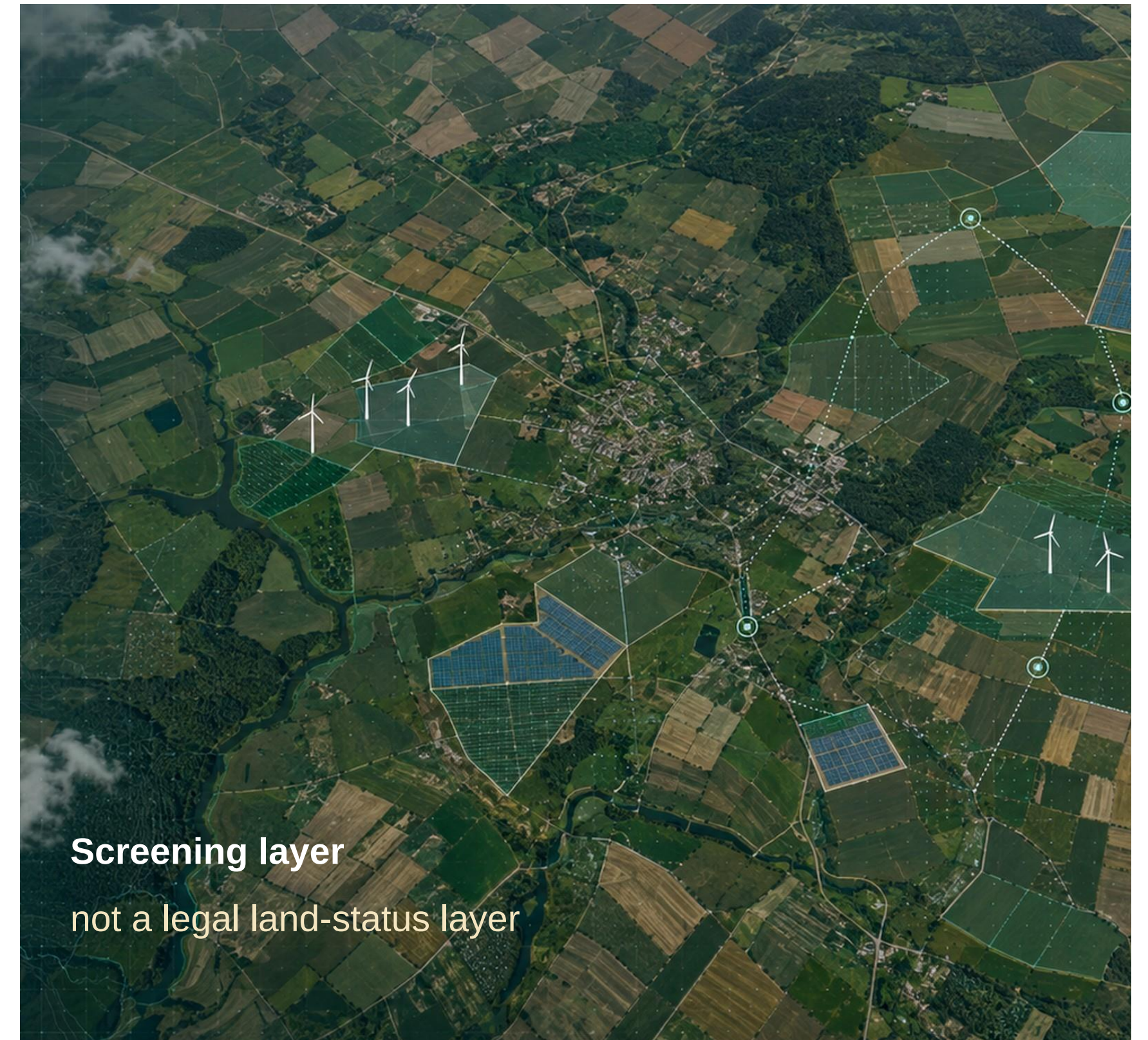
10 m

Agricultural lands were identified from global land use / land cover data derived from ESA Sentinel-2 imagery.

The source provides a consistent cross-regional raster basis, useful for screening in all five oblasts.

The layer helps flag where renewable energy siting may interact with agricultural land protection and land-use priorities.

Key limitation: LULC tells us “agricultural land exists here”; it does not prove that a parcel is legally degraded, low-productivity, or not usable for agriculture.



Data quality test applied to all layers

Suitability was not based only on data availability; it was tested against six quality dimensions.

Relevance

Does it answer the criterion?

Type

Is the data digital and usable?

Format

Is it spatial / geoprocessable?

Completeness

Does it cover the target regions?

Currentness

Is it recent enough?

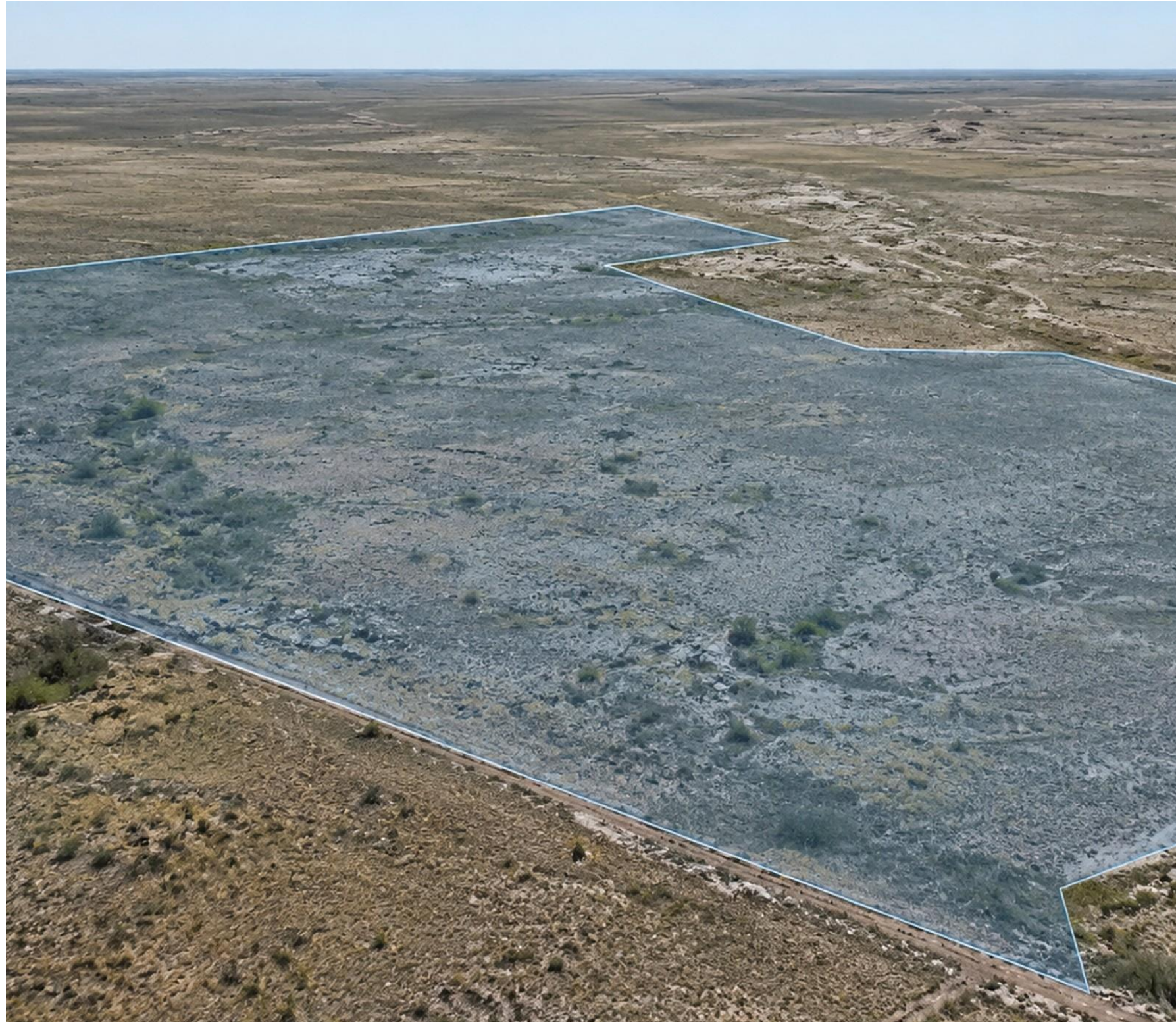
Accuracy

Is positional and thematic accuracy adequate?

Agricultural lands passed the general suitability test as “acceptable,” but with medium accuracy – enough for screening, not enough for assigning degradation status.

Data quality test applied to all layers

The proposed layer started from OpenStreetMap natural-land-cover tags, not from official agricultural degradation records.



Input tags used as proxies

natural=heath

natural=bare_rock

natural=scree

natural=sand

OSM features were merged, dissolved, and geometry-fixed to create a composite degraded-land base layer.

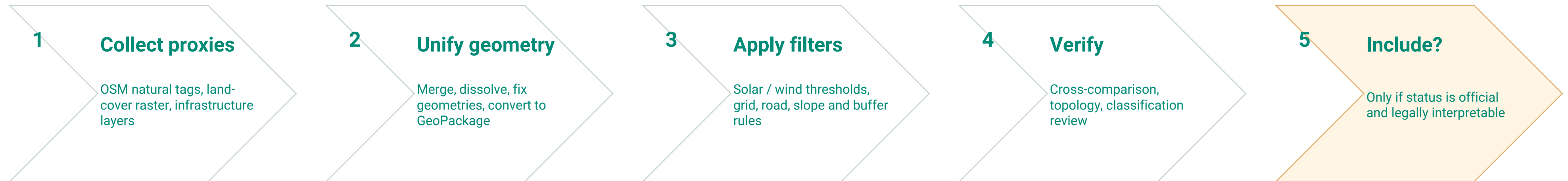
Solar suitability then used $GHI \geq 1100 \text{ kWh/m}^2$, area $> 100 \text{ m}^2$, and grid distance from 20 m to 30 km.

Wind suitability used wind speed $\geq 5.0 \text{ m/s}$ at 100 m, area $> 1.7 \text{ ha}$, slope $\leq 15^\circ$, road distance $\leq 5 \text{ km}$, and infrastructure buffers.

Problem: these natural tags describe surface cover, not the legal category “agricultural land” or an official degradation status.

Mapping workflow that was explored

The proposed layer started from OpenStreetMap natural-land-cover tags, not from official agricultural degradation records.



Critical break point

The workflow could locate dry/bare/natural surfaces, but could not prove that these surfaces are legally degraded agricultural parcels.

Why the degraded agricultural land layer was not included

Three conditions were missing at the same time.

1

No authoritative layer

Available open layers did not contain official geospatial records of degraded agricultural land.

2

No agreed method

Land-cover classes and OSM tags could not reliably separate low productivity, abandonment, erosion, contamination, or natural bare surfaces.

3

No legal bridge

A planning layer must connect spatial evidence to legal land status, permitted use, restrictions, and parcel-level decisions.

Methodological constraints

Proxy mismatch: OSM “natural” features and LULC classes describe surface cover, not soil degradation or agricultural productivity.

Spatial resolution: 10 m land-cover data is suitable for regional screening but not sufficient for parcel-level degradation decisions.

Thematic ambiguity: bare rock, scree, sand and heath may represent natural habitats, protected areas, slopes, riverbanks, quarries or dunes—not necessarily agricultural degradation.

Temporal uncertainty: a single layer may miss rotation, fallow cycles, seasonal bare soil, war-related disturbance, or recent land-use change.

Validation burden: classification would require field verification, cadastral linkage, soil/erosion data, and cross-checking with local authorities.



Methodological conclusion: do not confuse “land cover resembles degraded land” with “agricultural land is legally degraded and suitable for RE development.”

Decision logic for inclusion of a degraded agricultural layer

The layer must pass both a GIS test and a governance test.

- ✓

Official source

National / regional authority or accepted register
- ✓

Clear definition

Degradation type, productivity threshold and exclusions
- ✓

Spatial validity

Parcel-level or high-resolution boundaries with metadata
- ✓

Legal actionability

Consistent with land category, land-use regime and planning procedures
- ✓

Verification

Documented checks with local authorities and field/remote evidence



If any box fails, the layer should remain a candidate evidence layer and not enter weighted scoring.

Key Challenges

- ✓ Lack of a single, comprehensive data source on degraded land
- ✓ Limited access to official State Land Cadastre data
- ✓ Lack of sufficient and reliable data in open sources
- ✓ Lack of up-to-date methodologies for identifying degraded land and developing corresponding geospatial databases
- ✓ Lack of legal mechanisms for integrating degraded land into Renewable Acceleration Areas (RAAs)

If any box fails, the layer should remain a candidate evidence layer and not enter weighted scoring.



THANK YOU FOR YOUR KIND ATTENTION!



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