Project Title: Land Cover Comparison in Ukraine, 1992 vs 2020

Overview

This project analyzes how Ukraine's land cover changed between 1992 and 2020 using Esri's Global Land Cover 1992–2020 imagery layer in ArcGIS Pro. Following the change-detection workflow from Esri's GIS for Climate Action MOOC, the analysis compares major land cover classes to identify shifts in agriculture, forests, urban areas, and natural vegetation. The resulting maps and statistics highlight long-term landscape trends and support climate-related monitoring and land-use planning.

Context & Problem

I was interested in understanding how much Ukraine's land cover had changed over the past few decades and wanted to learn a reliable method for measuring those shifts. Using Esri's Global Land Cover 1992–2020 layer in ArcGIS Pro, I followed the workflow from the GIS for Climate Action MOOC to explore long-term landscape change and learn how to use the land-cover comparison tools effectively.

Objectives

- To measure how much Ukraine's land cover changed between 1992 and 2020 using Esri's Global Land Cover 1992–2020 layer.
- To learn and apply the land-cover comparison and change-detection workflow taught in Esri's GIS for Climate Action MOOC.
- To create clear maps and basic statistics that highlight major land-cover shifts across the country.

Tools & Technologies

- **ArcGIS Pro** — used for land-cover comparison, raster analysis, and map creation.
- **Esri Global Land Cover 1992–2020 imagery layer** — primary dataset for analyzing long-term land-cover change.
- **GIS for Climate Action MOOC workflow** — guided the land-cover comparison and change-detection process.
- **ArcGIS Online** — for accessing the imagery layer and related resources.
- **Microsoft Excel** — used to organize, review, and summarize attribute tables and change-detection statistics.
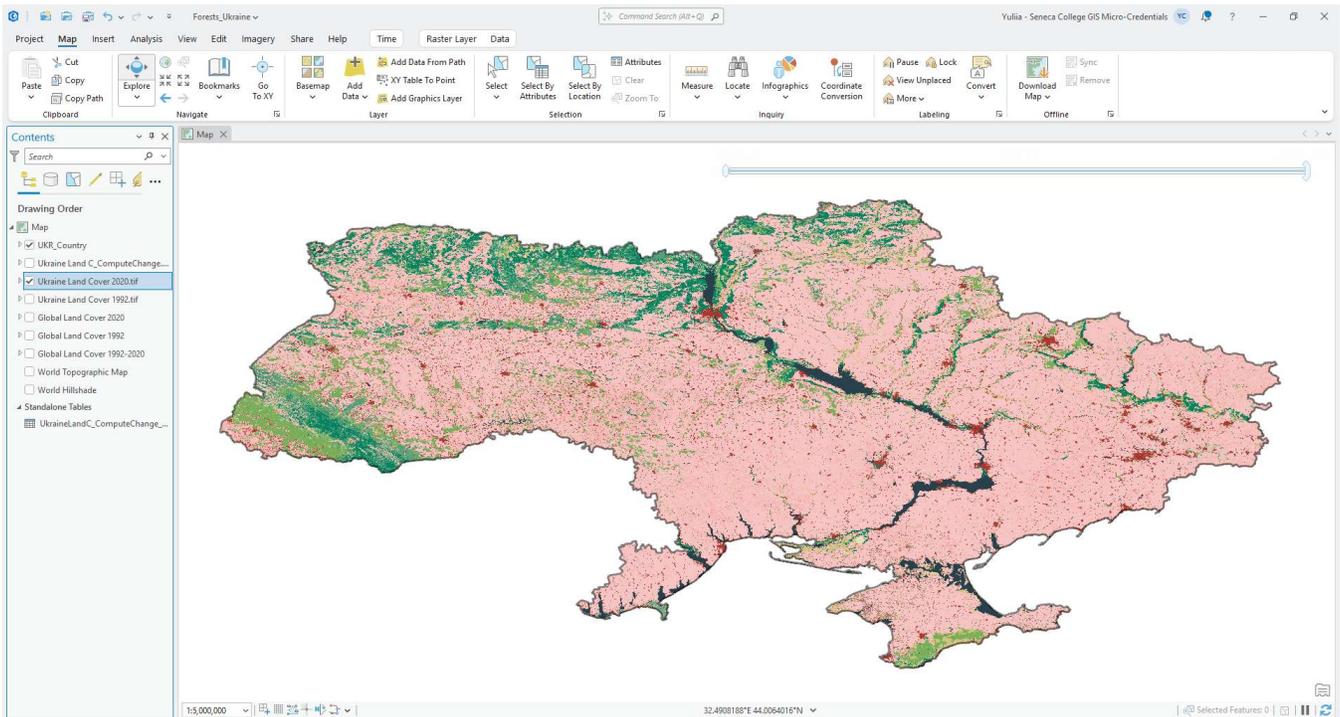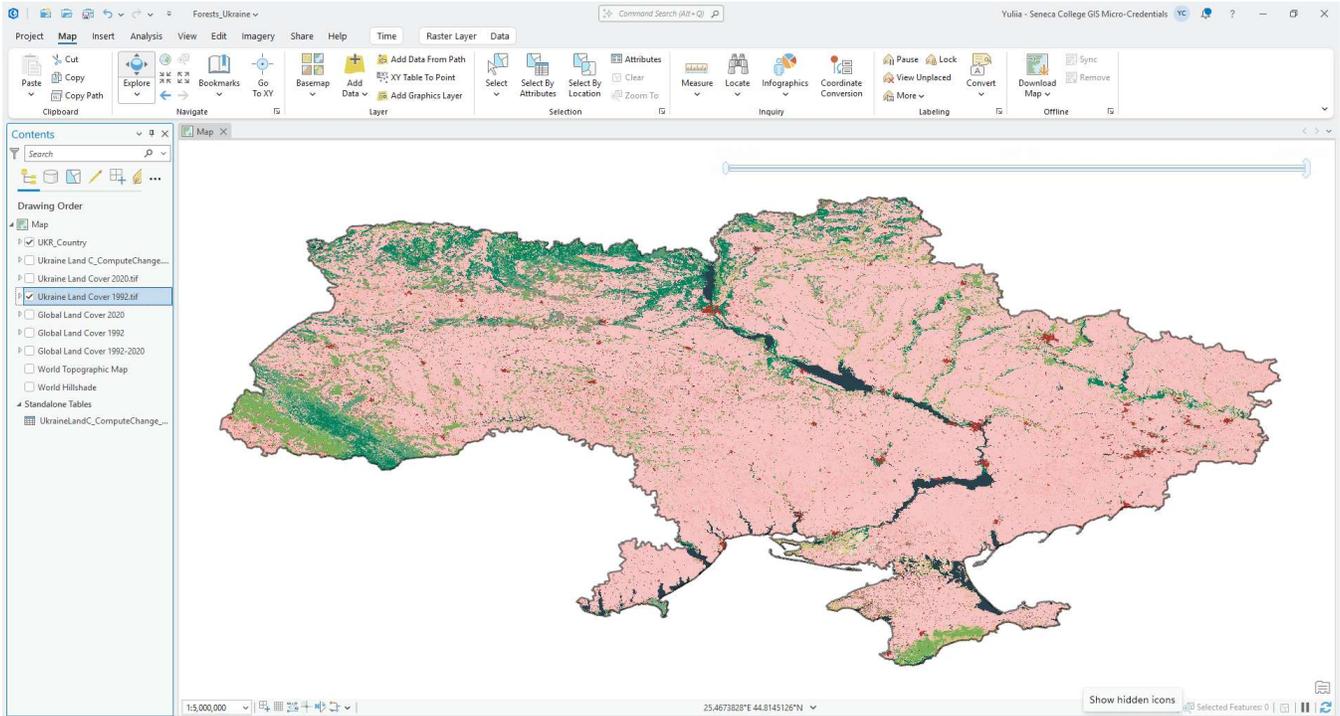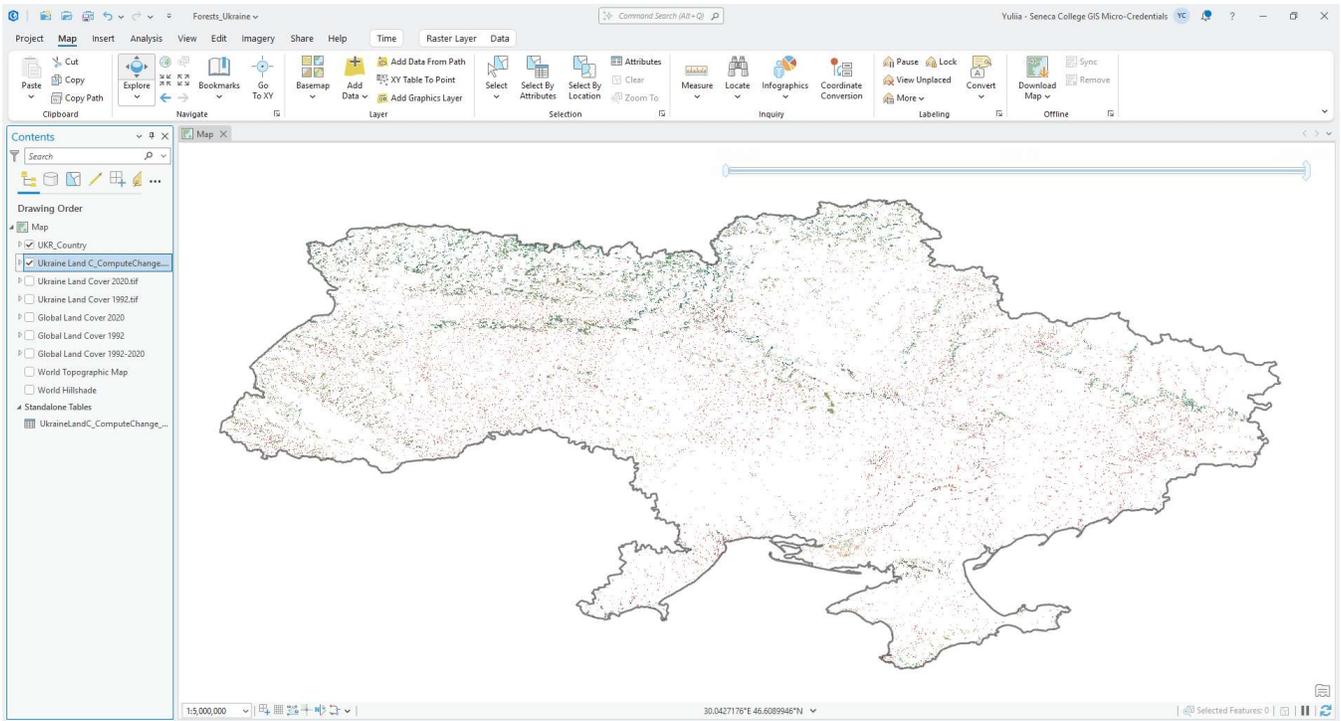
Process

- Added the Global Land Cover 1992–2020 layer from ArcGIS Living Atlas of the World into ArcGIS Pro.
- Duplicated the layer and applied Definition Queries to create separate views for 1992 and 2020.
- Converted the land-cover layers to raster images because the original format could not be clipped.
- Clipped the converted rasters to the boundary of Ukraine to focus the analysis.
- Ran the Compute Change Raster tool (Image Analyst Tools) to identify land-cover transitions between 1992 and 2020.
- Exported results to Excel to calculate and summarize the amount of change across land-cover classes.
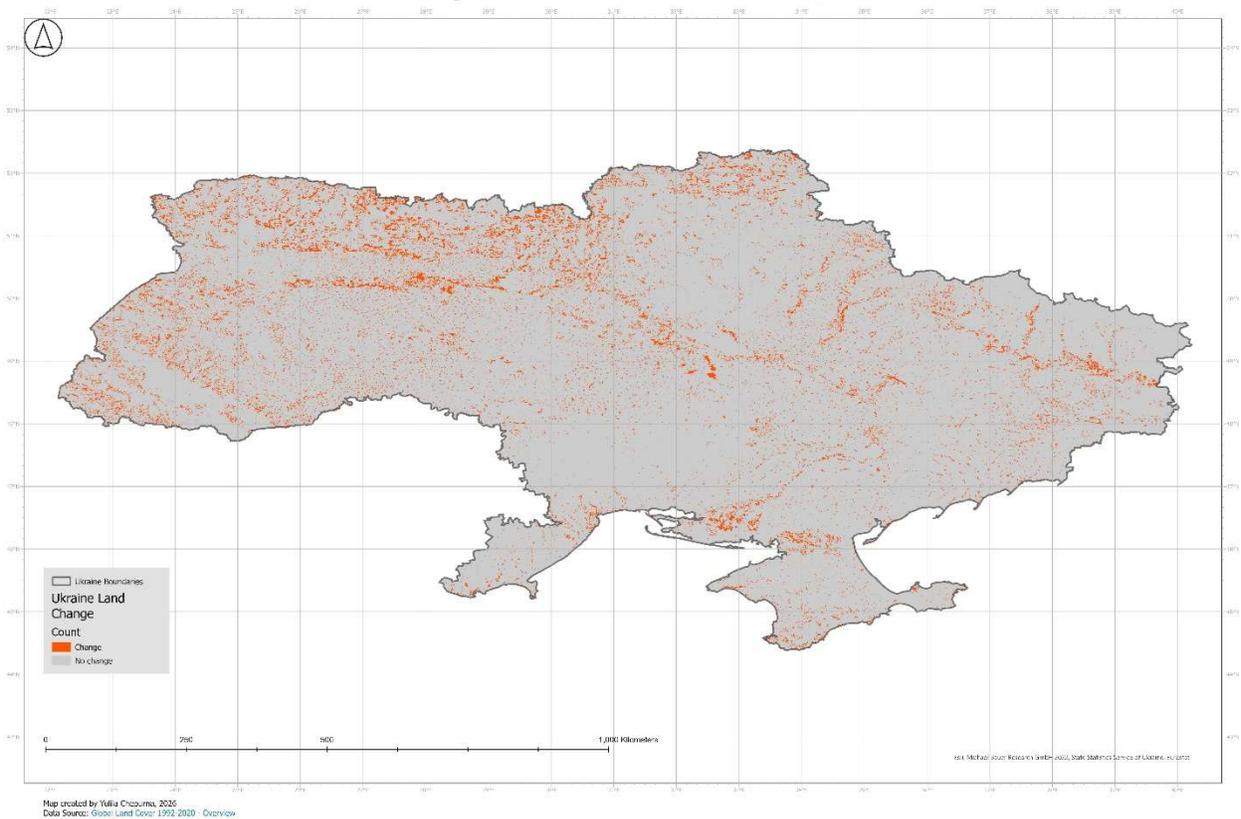
Links

- [Global Land Cover 1992-2020 - Overview](#)
- [GIS for Climate Action | Esri Training MOOC Course](#)

Map Preview (Static Screenshots)

Land Cover Comparison in Ukraine, 1992 vs 2020

Ukraine Boundaries

Ukraine Land Change

Count
- Change
- No change

Map created by Yuliia Chepurna, 2026
Data Source: Global Land Cover 1992-2020 - Overview

Results

- ⬚ ~94% of Ukraine's land cover remained unchanged between 1992 and 2020.
- Cropland was the most dynamic class, showing the largest shifts.
- Urban expansion was the most significant change, with over 14,000 km^2 of cropland converting to urban areas.
- Several regions showed vegetation recovery and reforestation, where mosaic vegetation transitioned into tree cover.
- Water-related and bare-area changes were minimal, indicating stable hydrological and exposed-soil zones.
- Overall, Ukraine's landscape remained largely stable, with localized urban growth and moderate forest increases shaping the main patterns of change.

Grouping	Sum of Area km2	Sum of Area, %
Same	566,415	93.85%
Cropland to Tree Cover	16,189	2.68%
Cropland to Urban Areas	14,400	2.39%
Tree Cover to Cropland	2,519	0.42%
Grass and other to Cropland	856	0.14%
Tree Cover to Grass and other	658	0.11%
Cropland to Bodies of Water	424	0.07%
Tree Cover to Urban Areas	322	0.05%
Bare Areas to Bodies of Water	255	0.04%
Grass ans other to Urban Areas	247	0.04%
Cropland to Grass ans other	245	0.04%
Grass ans other to Tree Cover	218	0.04%
Bodies of Water to Cropland	179	0.03%
Tree Cover to Bodies of Water	161	0.03%
Grass ans other to Bodies of Water	109	0.02%
Bodies of Water to Tree Cover	104	0.02%
Bodies of Water to Grass ans other	101	0.02%
Bare Areas to Cropland	37	0.01%
Bodies of Water to Urban Areas	32	0.01%
Bodies of Water to Bare Areas	31	0.01%
Grass ans other to Bare Areas	22	0.00%
Bare Areas to Urban Areas	11	0.00%
Cropland to Bare Areas	8	0.00%
Bare Areas to Grass ans other	5	0.00%
Bare Areas to Tree Cover	2	0.00%
Tree Cover to Bare Areas	1	0.00%
Grand Total	**603,550**	**100.00%**

From:

Classgroup_From	Sum of Area km2	Sum of Area, %
Cropland	31,266	5.18%
Bodies of Water	447	0.07%
Bare Areas	309	0.05%
Tree Cover	3,661	0.61%
Grass ans other	1,452	0.24%
Grand Total	**37,135**	**6.15%**

To:

Classgroup_To	Sum of Area km2	Sum of Area, %
Tree Cover	16,513	2.74%
Urban Areas	15,012	2.49%
Cropland	3,591	0.59%
Grass ans other	1,009	0.17%
Bodies of Water	949	0.16%
Bare Areas	62	0.01%
Grand Total	**37,135**	**6.15%**