

Post-Soviet land use change in the Eastern Bloc

Theory

- Under the Soviet system, agricultural production was amalgamated into state-owned farms (sovkhoz) and collective-owned farms (kolkhoz).
- Agricultural products were redistributed by the state throughout the USSR.
- With the collapse of the USSR in 1992, the agricultural system collapsed and workers returned to their native homelands or moved to urban areas in search of work.
- Lead to large-scale land abandonment throughout the Eastern Bloc.
- Natural land reclamation and succession from fields into grassland, into forests.

Existing literature

- Agrees that since the dissolution of the USSR, agricultural land abandonment has led to an increase in forest cover.
- Abandonment occurring first in marginal lands, e.g., less fertile, poor accessibility and rough terrain (Taff et al. 2009).
- Rates of deforestation and reforestation linked to the the state's post-Soviet economic development (forest transition model) (Taff et al. 2009).
- Also lead to a change in fire regimes - increase in fire extent, occurrence and mean size in Kazakhstan's steppeland (Dara et al. 2020).
- Potential for increased carbon sink strength with forest expansion (Kuemmerle et al. 2011).
- Very little research into the subject.

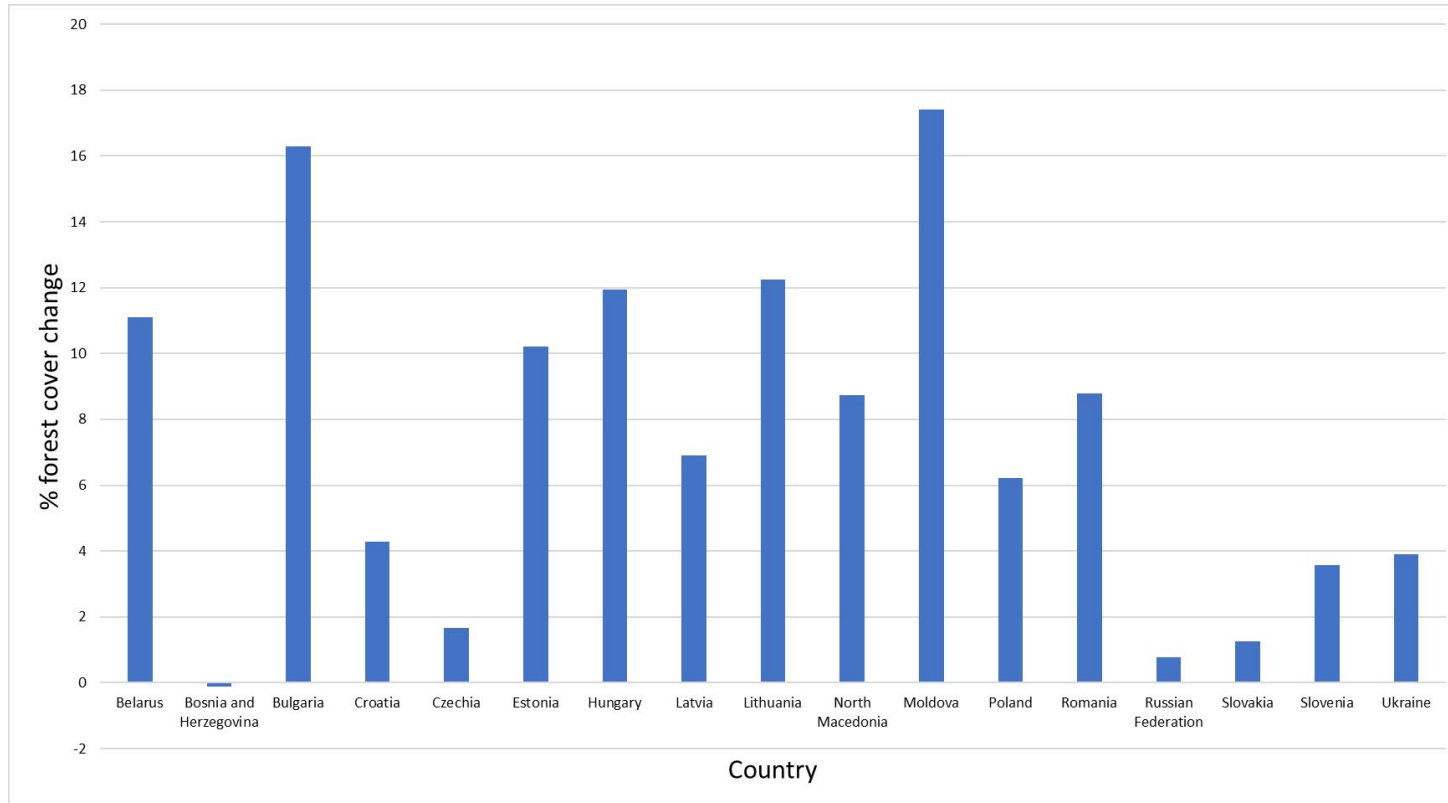
Existing literature: Potapov et al., 2014

- Land cover classification of Landsat archive for 1985-2012 independent to Hansen's map

Forest cover change and annual gross forest cover loss in each country.

Country	Forest cover, (thousand ha)		Net forest cover change (% of 1985 forest)	Annual forest loss (thousand ha)			
	1985	2012		1986–1988	1989–2000	2001–2006	2007–2012
Belarus	7771	8253	6.2	30.6	37.7	48.0	44.1
Bosnia and Herzegovina	2299	2570	11.8	2.6	3.8	3.4	2.2
Bulgaria	3508	3902	11.2	9.8	6.7	12.1	9.9
Croatia	1954	2229	14.1	3.3	3.7	5.6	4.9
Czech Republic	2689	2801	4.2	13.7	10.6	17.1	27.1
Estonia	2409	2361	-2.0	7.2	11.2	22.1	26.3
Hungary	1411	1791	26.9	7.3	7.7	13.6	11.5
Kosovo	335	349	4.0	1.8	1.1	1.6	1.4
Latvia	3292	3164	-3.9	9.9	20.3	39.7	46.7
Lithuania	2008	2083	3.7	8.7	11.3	16.9	20.6
Macedonia	694	689	-0.7	2.3	1.8	3.1	3.7
Moldova	241	310	28.9	0.4	0.2	0.5	0.4
Montenegro	561	569	1.5	1.7	1.1	1.3	1.1
Poland	8470	9235	9.0	26.1	31.6	57.5	71.1
Romania	6978	7270	4.2	16.1	16.8	28.7	29.7
Russia (European Russia only)	156,996	163,289	4.0	704.4	536.6	600.5	687.2
Serbia	2246	2493	11.0	3.6	2.7	4.2	3.8
Slovakia	2176	2221	2.1	4.2	6.1	10.9	18.1
Slovenia	1214	1233	1.6	0.8	1.1	1.9	2.4
Ukraine	8671	9182	5.9	28.1	32.8	58.8	61.3

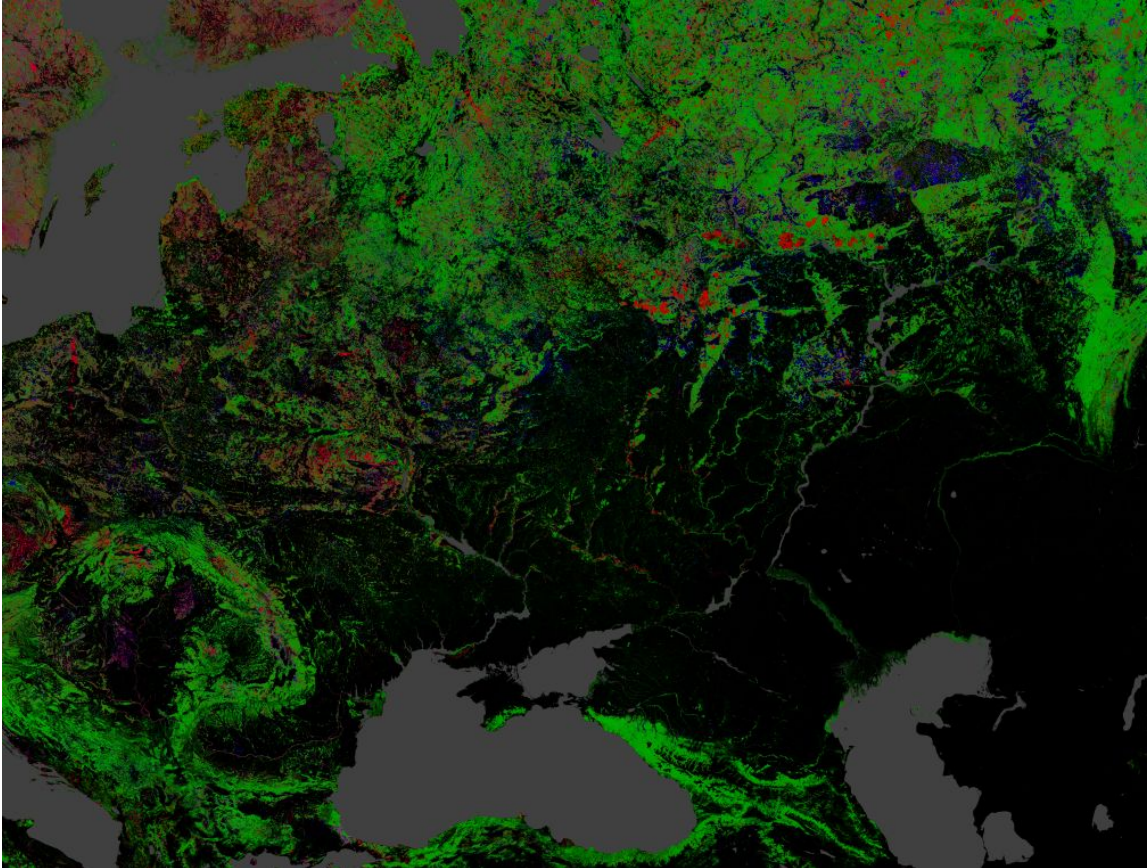
FAO stats



Period 1992-2019

Czechia &
Slovakia -
1993-2019

Hansen's map - Loss/Extent/Gain (Red/Green/Blue)



- Overall picture is mixed
- Logging in Baltic states
- Larger areas of reforestation in deeper Russia

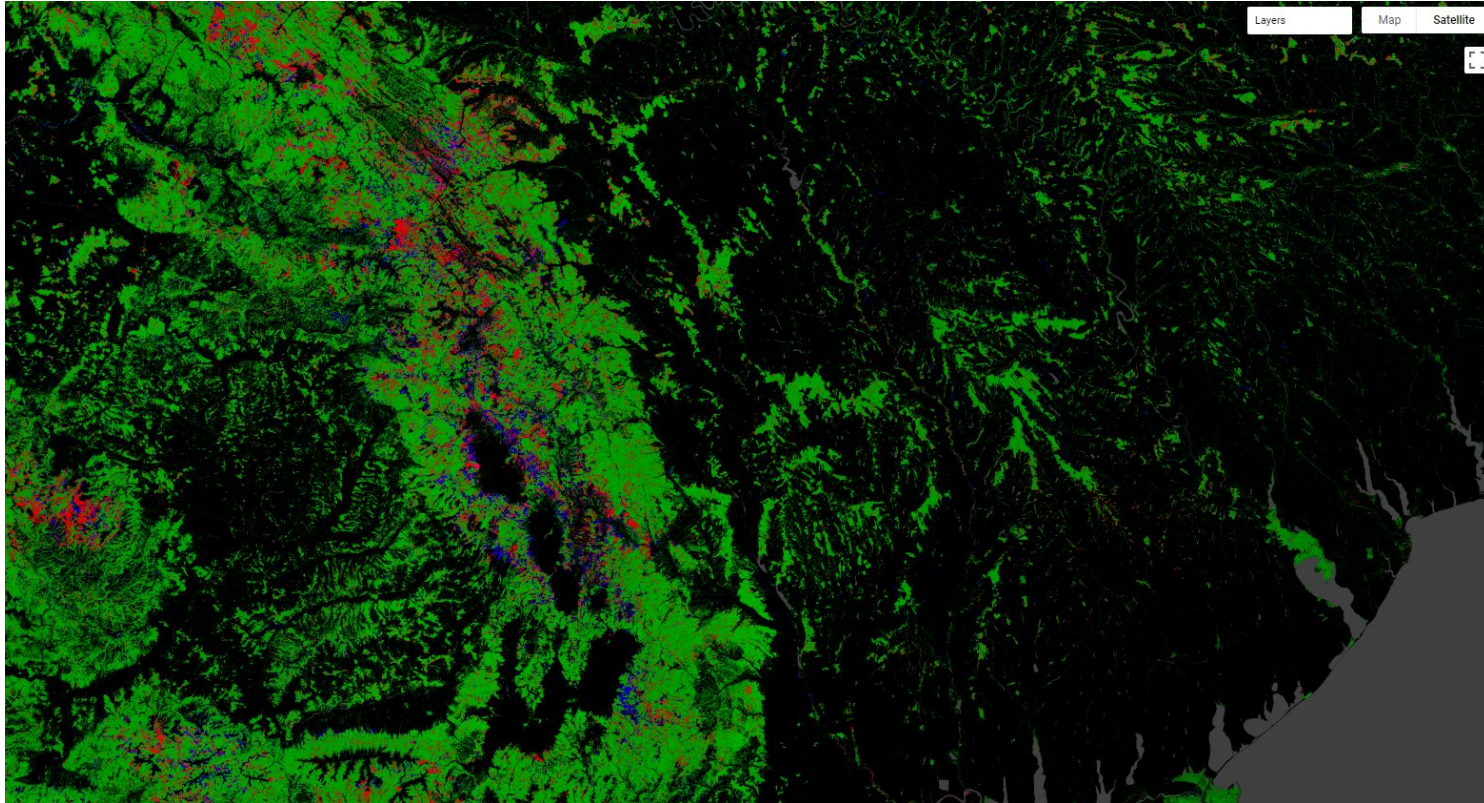


Hansen's
map -
Forest
cover gain
2000-2012

Moldova

- 28.9% gain in forest cover 1985-2012 (Potapov et al. 2015)
- 17.4% gain in forest cover 1992-2019 (FAO)
- More than any other post-Soviet state

Moldova - Hansen's map

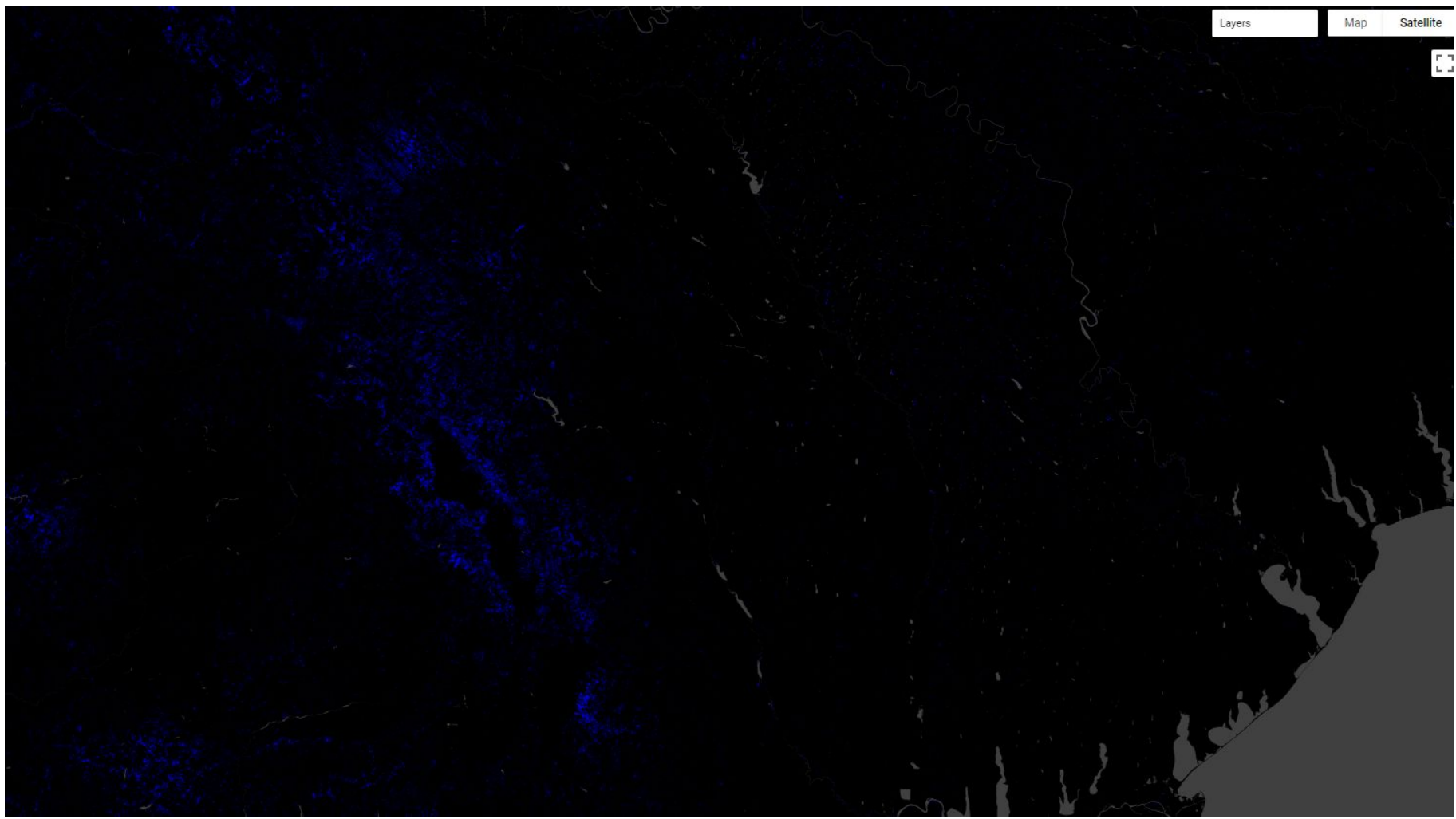


- Appears to have little change

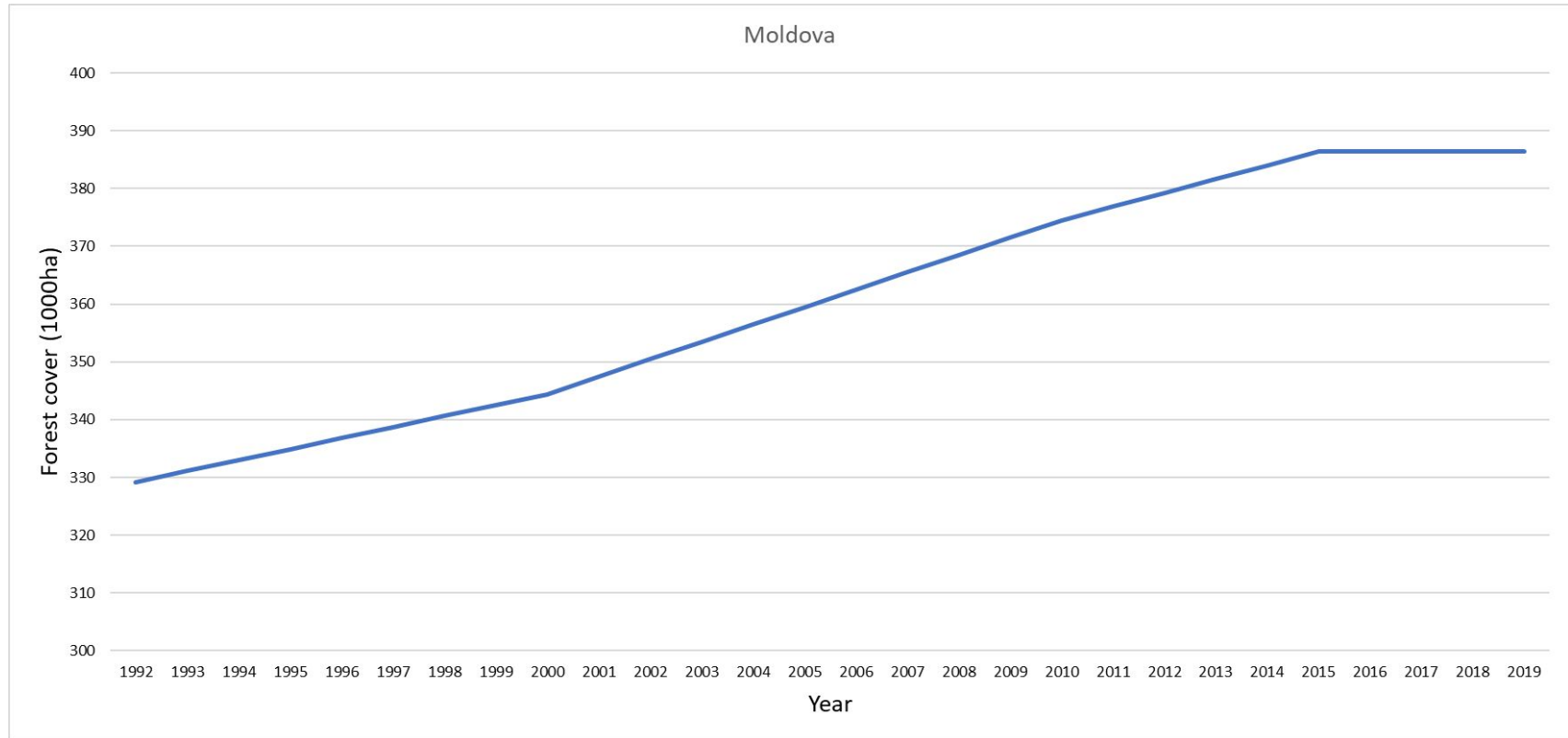
Layers

Map

Satellite



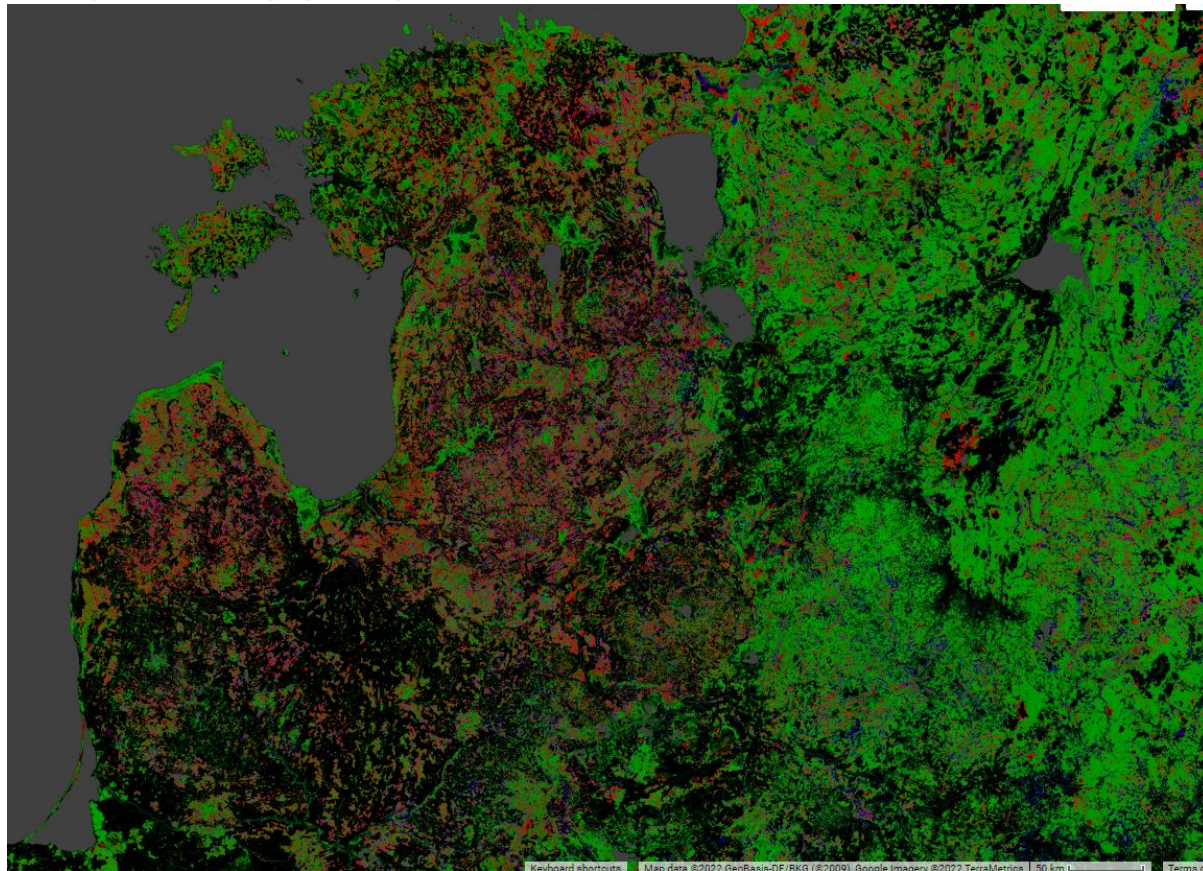
Moldova - FAO



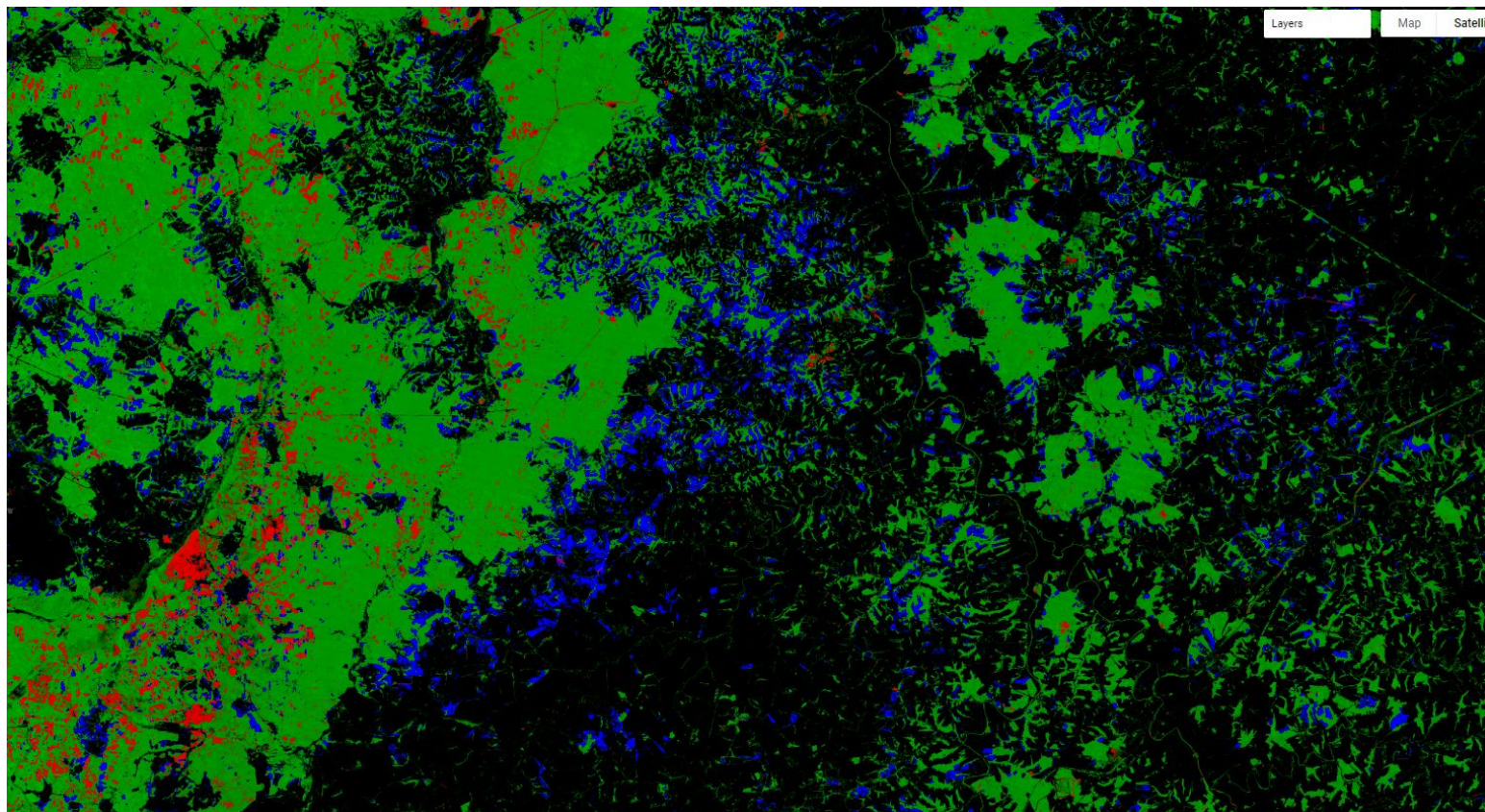
Discretions between data sets

- Different methods (classification techniques and definition)
- FAO data mainly from manual estimations and official data reported to FAO questionnaires by countries
- Different time periods - Hansen's map begins 8 year after the fall of the USSR, classification shift from arable fields to "forest" occurring during this period

Forestry & logging in the baltics



Farmland abandonment in Russia - near Bryansk



References

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- Kuemmerle, T., Olofsson, P., Chaskovskyy, O., Baumann, M., Ostapowicz, K., Woodcock, C. E., Houghton, R. A., Hostert, P., Keeton, W. S. and Radeloff, V. C., 2011. Post-Soviet farmland abandonment, forest recovery, and carbon sequestration in western Ukraine. *Global Change Biology*, 17 (3), 1335–1349.
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- Taff, G., Müller, D., Kuemmerle, T., Ozdeneral, E. and Walsh, S., 2009. Reforestation in Central and Eastern Europe After the Breakdown of Socialism. *In: .* 121–147.