Climate change and
Land-use in Moldova

CCLU-Moldova

1st Project Meeting:

Kick-Off Conference in Chisinau
Report

Traveling delegation from HAW Hamburg:
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Travel time:
January 27th to 30th, 2025

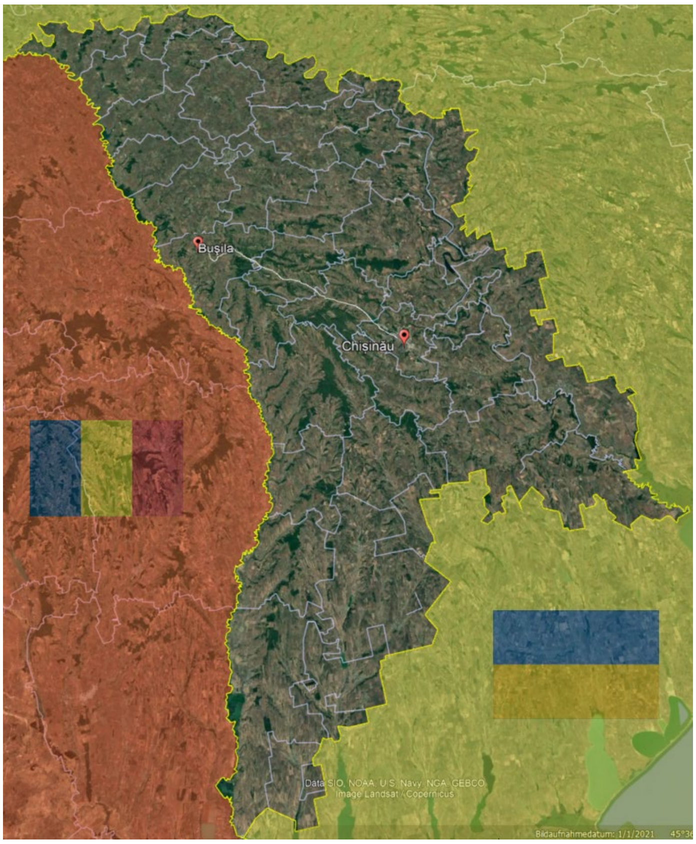


Figure 1: Map of Moldova with its neighbours (based on Google Earth Pro)

Moldova is a landlocked country in eastern Europe, with Ukraine and Romania as only neighbours. The country has a history as a post-soviet economy struggling to adapt to the current challenges of the world. It became candidate for EU – membership in June 2022 like its neighbour Ukraine and prepares to develop towards the standards of European Union. The country is named the poorest country in Europe, the economy is mostly agriculture based and is struggling with its own terrestrial conflict of Transnistria. As a result, the capacity for resilience is currently low, while the vulnerability is high.

CCLU-Moldova is a bilateral project on addressing the climate change (CC) and land-use (LU) topic in Moldova. Funded by the German and the Moldovan ministries of Science and Education, it focuses on knowledge exchange and evaluation of opportunities in the field of land-use in Moldova. The expected output is a set of recommendations for various stakeholders and target groups to further proceed to increase resilience with best practice examples of sustainable land-use, water management systems as well as disaster risk reduction and climate change adaptation in preparation for extreme weather events.

Day 1: January 27th, 2025

Departure at Hamburg Airport in the morning, via Vienna Airport to Chisinau Airport. Arrival at the airport around 3 pm. Pick up at the airport by Moldova delegation, car travel to the hotel in Chisinau central area. Relaxation time, preparation of presentations, etc.

First impressions: Moldova is supposed to ha covered with snow during winter, but on the first day we had +8 °C. There was no snow to see and light wind created small sand clouds. Climate Change and especially the current El Niño have an impact on the weather conditions.

Day 2: January 28th, 2025

Departure at Hotel around 8 am, travel to Ion Creangă State Pedagogical University of Chișinău. Meeting with the university president, introduction to the universities smart learning centre. Project meeting from 11 – 12:30 am. Departure for field visit to Busila. Late lunch at field site, return to hotel. Arrival back at hotel around 8 pm.

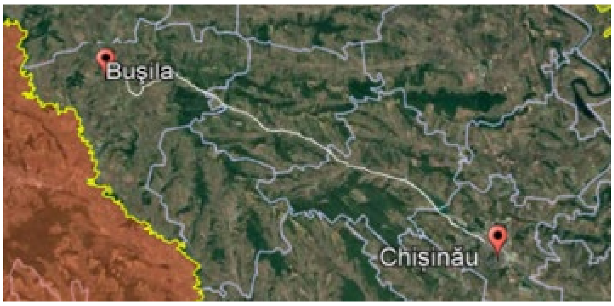


Figure 2. Travel way for the field visit in Busila.

Impressions: We see agricultural land in very different conditions. Some are well taken care of; others are not in actual use (even though probably owned by someone). Grapes / wine and plums are recognizable industries of the region. Walnut trees are everywhere in the country. Some farmers use solar cells and small-scale windmills for energy production, but mostly not located on agricultural land but closer to the buildings (no land-use competition recognizable). The route of approx. 100 km distance from Chisinau to Busila (see figure 2) brought us into a mountainous area, with a steep slope around the 78th km (see figure 3).

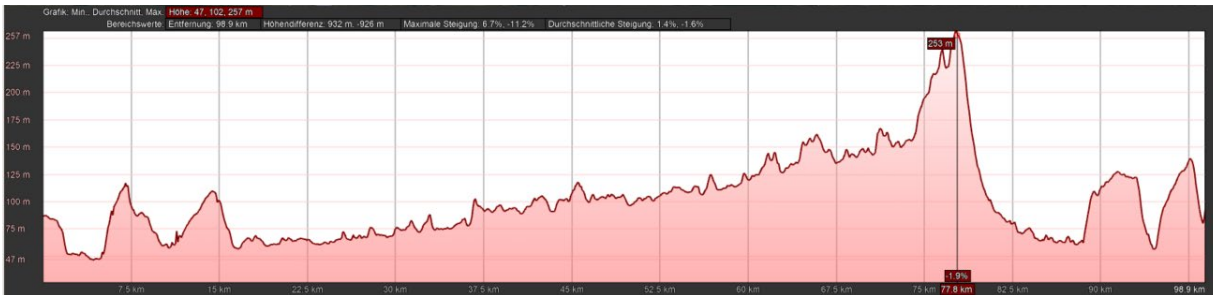


Figure 3: Elevation profile of the travelled route (path planning with Google Earth Pro).

Field site: The site revealed one of the biggest agricultural challenges in the country. Valleys in the mountains used to have smaller lakes that could act as a reserve for water supply, but many lakes have completely dried out or lost most of their volume. A snow layer was supposed to protect the area from soil degradation and water evaporation as well as providing first means of irrigation in spring. But we experienced +11 °C on that day, whereas -11°C should be normal for that period. This means the pressure on the soil has been strong and the fields and grass has been in different shades of brown on land-use sites where the farmers could not afford irrigation systems (see figure 4).

Figure 4: Field visit at the site in Busila in north-western Moldova.

Day 3: January 29th, 2025

Departure at Hotel around 7:30 am, travel to Ion Creangă State Pedagogical University of Chișinău. Preparing the room for the kick-off conference, official start at 9:30 am. Welcome message from the project teams, short introduction into the plans. 11 – 12 am joining the Europe-LAND online webinar on the interactive toolbox for land-use in Europe (https://europe-land.eu/event/webinar-towards-an-nteractive-digital-toolbox/; Moldova is located in UTC+2).

Impressions: The interest in the bilateral project is big within academia, several kick-off participants are from this target group. Also, a member from the Moldovan funding agency participated the kick-off event. The potential cross-over with the Europe-LAND project is of high interest, the toolbox could provide a better access for farmers in terms of land-use planning. It is generally accepted that the overall population of Moldova should be another target group to raise awareness of the necessary adaptations due to climate change. In terms of climate change mitigation there are ongoing efforts within the country and the Greenhouse gas emissions of the country has been going down by about 64% since 1990 (see appendix 1).

Day 4: January 30th, 2025

Final Meeting, post processing of the Meeting, development of a project handbook and planning for the following months. Departure to Airport around 12 am, flight back to Hamburg via Vienna airport.

Remarks on the trip:

Moldova is a country with about the size of Odessa Oblast (which is the eastern neighbour). The western border with Romania is based on the Prut River, due to an agreement with Romania it is not allowed to take water out of this river. Apart from the Dniester River, all water within the country comes from precipitation within its own borders. This makes ***water management*** an important aspect in climate change adaptation, because the total amount of rainfall in the area has been declining. Additionally with the numbers of rainy days decreasing while heavy rain events are increasing, water management is also an important aspect in disaster risk reduction.

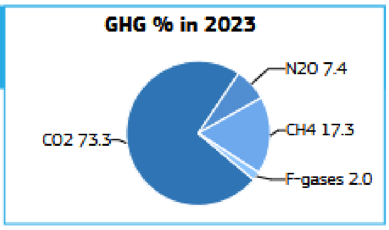
Land-use and land-cover (LU/LC) are important indicators of the way, land is being used within the own borders. Further analysis steps can be the ***change in Land-use and land cover (LULCC)*** to recognize changes in land-use behaviour, that can have an impact on agriculture and economy but can also happen due to climate change impacts. Moldova has an own Geoportal with Corine Land Cover (CLC) data (see Appendix 2), as well as cadastre, elevation maps etc. Modelling of land-use changes are important for the predictions of future land-use, taking soil quality, precipitation, elevation and market demand into account. Further collaboration with the team of Europe-LAND is welcomed while preparing guidance for the preparation of required documentation and standardization within Moldova to fit with the structure of the European Union, which is mandatory for membership candidates to proceed in the application process.

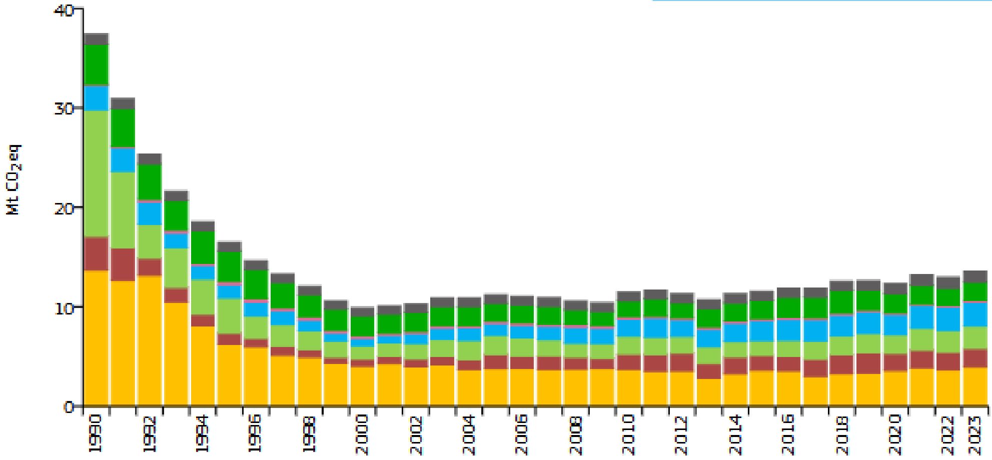
Europe-LAND held a specific workshop at HAW Hamburg in February 2025 about the Integrated Administration and Control System (IACS) of the European Union to manage geo-based data for agricultural and environmental management. Taking this into account, an important step for Moldova would be to use the knowledge about this structure to compare available data structures within the country and adapt them for an IACS setting. For that, one of the IACS workshop moderators will be asked to join the second project Meeting in March/April 2025 in Hamburg as an expert.

Appendix 1: Greenhouse gas emissions of all World countries, 2024 report – page 177

EDGAR

Moldova





Year	GHG emissions Mt CO_2eq/yr	GHG emissions per capita t $CO_2eq/cap/yr$	GHG emissions per unit of GDP PPP t $CO_2eq/kUSD/yr$	Population
2023	13.542	3.405	0.348	3.977M
2015	11.559	2.843	0.349	4.066M
2005	11.214	2.697	0.476	4.158M
1990	37.384	8.566	0.789	4.364M

	2023 vs 1990	2023 vs 2005	2023 vs 2022
Power Industry	-71%	+5%	+9%
Industrial Combustion and Processes	-46%	+27%	+4%
Buildings	-82%	+20%	+4%
Transport	-2%	+97%	+1%
Fuel Exploitation	-7%	-47%	-6%
Agriculture	-54%	+4%	+5%
Waste	+11%	+26%	+1%
All sectors	-64%	+21%	+5%

Figure 5: Crippa, M.; Guizzardi, D.; Pagani, F.; Banja, M.; Muntean, M.; Schaaf, E.; Monforti-Ferrario, F.; Becker, W.E.; Quadrelli, R.; Risquez Martin, A.; Taghavi-Moharamli, P.; Köykkä, J.; Grassi, G.; Rossi, S.; Melo, J.; Oom, D.; Branco, A.; San-Miguel, J.; Manca, G.; Pisoni, E.; Vignati, E.; Pekar, F. (2024). "GHG emissions of all world countries – 2024". Luxembourg: Publications Office of the European Union.

Appendix 2: Corine Land Cover (CLC) map of Moldova

Figure 6: Corine Land Cover dataset for Moldova from the Geo Database of Moldova.

Corine Land Cover is a system for analysis of land cover within certain areas. Based on the Copernicus satellite data, an automated detection on land cover takes place, using different colour codes e.g. red for cities, factories, settlements etc. Moldova is not officially included in the European maps provided by Copernicus, but the dataset is within the geo database of Moldova available and complements to the data of the neighbouring EU member state Romania.

https://land.copernicus.eu/en/products/corine-land-cover