European Commission

VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

N°63
JULY 2026

Value chain analysis of maize in Moldova

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders, businesses, society and environment.

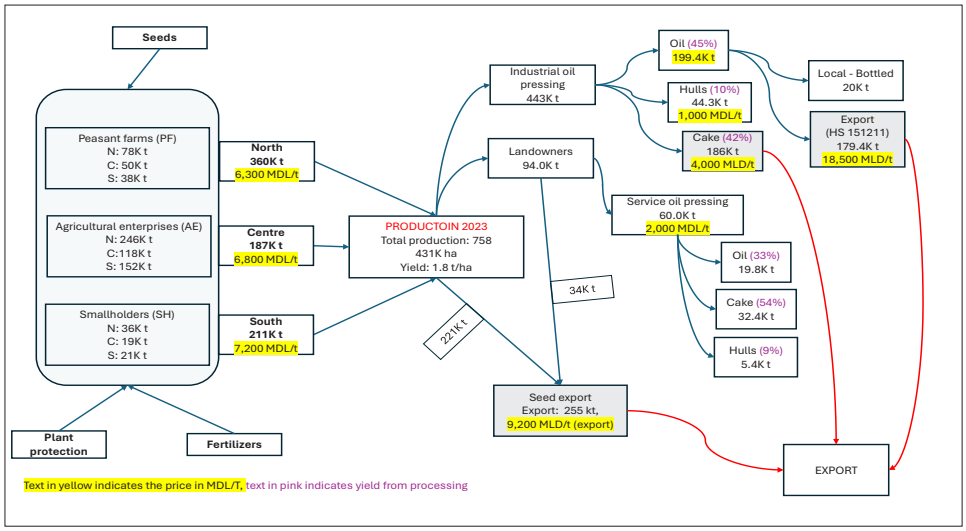
The European Commission has developed a standardised methodological framework for analysis (https://europa.eu/capacity4dev/valuechain-analysis-for-development-vca4d-/documents/methodological-brief-eng). It aims to understand to what extent the value chain allows for inclusive economic growth and whether it is both socially and environmentally sustainable.

The value chain context

Maize is a strategic crop in Moldova, representing 52.9% of the total cereal area and contributing 1.2% to national GDP. It is critical for both export revenues and domestic food security, serving as livestock feed and a traditional staple for rural households. The agricultural structure is highly dualistic, where 95% of holdings are smallholders operating on fragmented plots, while 0.3% are large agricultural enterprises controlling roughly 63% of the utilised agricultural area. Land ownership is heavily fragmented, relying on widespread leasing agreements. The value chain (VC) is structurally oriented towards raw grain exports, with a very limited domestic processing sector. Key constraints include severe vulnerability to climatic shocks like droughts, a near-absence of irrigation infrastructure, heavy reliance on imported agrochemical inputs, and significant logistical bottlenecks.The European Union intervention.

European Union Intervention

The European Union (EU) actively supports the Moldovan maize VC through multiple avenues. Moldova benefits from preferential trade access to the EU market via the Deep and Comprehensive Free Trade Area (DCFTA) agreements. Policy alignment is driven by efforts to harmonize with the EU environmental acquis, including Natura 2000 biodiversity standards and organic production regulations. Financial support is channelled through EU and funds, which assist national agricultural policy implementation and institutional capacity building. The EU has also supported strategic initiatives to revitalize the livestock sector, aiming to strengthen domestic feed supply chains. Furthermore, EU funding has been instrumental in advancing sustainability, particularly through grants supporting the National Program of Conservation Agriculture to enhance climate resilience.



Note: Text in yellow indicates the price in MDL/t, text in pink indicates yield from processing

Figure 1: Flow chart of maize VC in Moldova (2023)

Functional analysis

Production

In 2023, national maize production reached 1.35 million tonnes with an average yield of 2.8 tonnes per hectare. Yields exhibit extreme inter-annual variability due to climate shocks, dropping from 5.74 t/ha in 2021 to 1.74 t/ha in 2022 due to severe drought. Production is structurally divided: Agricultural Enterprises (AEs) achieve the highest conventional yields (3.3 t/ha), while smallholders struggle with low productivity (2.2 t/ha). Significant regional disparities exist, with the North region dominating production (48.5%) and achieving the highest yields (4.02 t/ha), whereas the arid South faces chronic water deficits and much lower outputs (2.88 t/ha). Climate constraints are the sector's primary threat, driving soil degradation and heat stress. Technologically, conventional tillage prevails, but no-till conservation agriculture covers approximately 21,400 hectares, successfully lowering diesel consumption and matching the highest yields (3.8 t/ha).

Processing, Marketing and Trade

The post-harvest sector is dominated by raw grain exports, with a poorly developed domestic processing industry. Processing is divided into small, outdated rural mills providing service milling for landowners, and limited industrial milling producing flour, starch, and bran. Trade flows are heavily export-oriented, with maize generating € 133.1 million in export value in 2023. Export markets are highly concentrated; Romania absorbed 56.2% of Moldovan maize exports in 2023, acting as a primary transit hub. Logistics depend heavily on road transport to regional ports. Price competitiveness is constrained by structural disadvantages, as Moldovan export prices typically face a 6.3% to 7.5% discount compared to Romanian Constanta Free on Board (FOB) prices due to transport costs and limited bargaining power.

Sub-chains

The Moldovan maize VC operates through two principal segments: an export-oriented sub-chain which handles the vast majority of volume, involving input providers, large commercial farmers, and traders. This segment serves as a crucial source of foreign exchange but suffers from low, volatile margins due to international price fluctuations and high logistics costs. The processing sub-chain for domestic utilisation is significantly smaller in relative size but creates substantially higher value-added. It involves rural households receiving in-kind land rents, small service mills, industrial processors, and livestock feed manufacturers. Economically, the domestic segment achieves superior value retention and more stable returns, with industrial milling capturing a 31.6% net profit margin compared to the 5% margin of grain traders.

Governance

Institutional governance is led by the Ministry of Agriculture and Food Industry (MAFI) for policy design, the Agency for Intervention and Payments in Agriculture (AIPA) for subsidy administration, and the National Food Safety Agency (ANSA) for sanitary oversight. The overarching policy framework is the National Strategy for Agricultural and Rural Development (NSARD 2023–2030), which aligns with EU standards. Regulatory oversight focuses on modernising land management, with recent Land Code updates mandating soil conservation measures. Financial governance is hampered by a rigid taxation system where accumulated, unrefunded VAT credits severely restrict farm liquidity. Strategic reforms are currently targeting CAP-style subsidy mechanisms, the digital formalisation of day labourers through the "e-Zilieri" registry, and the promotion of conservation agriculture systems.

Farm types			Total Maize production (K t)	Total maize area (K ha)	Yields (t/ha)	Farm maize area (ha)	Per farm production (t)	Number of Farms
Conventional	North	PF	203	52.1	3.9	65.7	256	792
		AE	231	49.4	4.7	70.8	331	697
		SHs	202	67.6	3.0	1.2	3.5	57,190
	Central	PF	140	46.7	3.0	112.7	338	414
		AE	130	36.1	3.6	77.5	279	466
		SHs	140	60.9	2.3	2.0	4.7	29,899
	South	PF	57	38.0	1.5	62.5	94	608
		AE	97	53.9	1.8	87.9	158	613
		SHs	57	49.6	1.2	1.1	1.3	43,911
Organic			13	4.8	2.7	320.0	864	15
No-Till			81.3	21.4	3.8	184.5	701	116
Total | Average			**1,351.3**	**480.3**	**2.8**		**2.8**	**134,721**

AE: Agricultural enterprises

PF: Peasant farms

SHs: Smallholders

Figure 2: Distribution of maize production among farm types (2023)

What is the contribution of the value chain to economic growth?

Financial viability for the actors

Profitability across the VC is highly uneven. In 2023, conventional primary producers faced negative net margins, with Peasant Farms at -35% and Agricultural Enterprises at -9%. However, farmers utilizing no-till and organic practices maintained profitability with margins of 9% and 1%, respectively. **Downstream actors capture higher margins**: industrial processors achieved a 31.6% net margin, rural service mills 44%, and traders 5%. Landowners capture 83% of the sector's net operating profit through stable in-kind rents, insulating them from production costs.

Structural financial constraints heavily impact farmers, primarily through the accumulation of negative VAT balances that immobilise working capital and induce severe liquidity issues. To manage liquidity, approximately 95% of farmers rely on "technical credit" from input providers, limiting their market bargaining power. Producers face intense cost pressures from imported fertilisers, diesel fuel, and seed inputs, which together squeeze farm-level viability during climate shocks.

Impacts of the national economy

The maize VC generated an estimated 3.73 billion MDL (€ 189.8 million) in total value added (VA) in 2023. It plays a **significant macroeconomic role**, contributing approximately 8.2% to the agricultural GDP and 1.2% to the total national GDP.

Wages represent the largest component of total VA (46%), followed by net operating profit (NOP) (24%) and depreciation and land fees (11%). This distribution highlights the importance of labour, capital investment, and payments to landowners in value creation (Figure 3). Taxes and financial charges account for a relatively small share of total VA.

The sector positively impacts the fiscal balance, providing a net public funds contribution of approximately 340 million MDL (€ 17.3 million). Exports are critical to the economy, generating a trade surplus of nearly 2 billion MDL (€ 101.8 million) for the VC in 2023. Domestic economic integration is strong, with an integration rate of around 77%, indicating that the majority of VA originates domestically. Backward linkages with the domestic economy are particularly strong for NOP and depreciation, reflecting substantial indirect effects on upstream and supporting sectors. However, the predominance of raw grain exports limits the potential to generate greater domestic economic benefits through higher-value local processing.

The industrial milling (processing maize into flour and other products) achieves the highest direct VA relative to production (47%). Peasant and smallholder farms exhibit similar performance levels, with conventional production generating approximately 15% VA. In contrast, conservation agriculture and larger agricultural enterprises achieve higher values, ranging between 28% and 30%.

Viability in the international economy

Moldovan maize VC demonstrates robust international competitiveness, evidenced by a Domestic Resource Cost (DRC) ratio of 0.14—well below the efficiency threshold of 1.0—and a Nominal Protection Coefficient (NPC) of 1.01. **Despite this comparative advantage**, export pricing is structurally disadvantaged. Moldovan maize is consistently sold at a 6.3% to 7.5% discount relative to international benchmarks (Constana FOB).

This discount is driven by structural disadvantages, including high transit costs, lack of direct maritime infrastructure, and low bargaining power in regional supply chains. Furthermore, the sector is exposed to high counterparty risk due to extreme export concentration, with over 56% of exports directed solely to Romania. Macroeconomic distortions further erode viability; an overvalued Moldovan Leu, driven by remittance inflows, acts as a direct tax on exports, artificially inflating domestic costs relative to international revenues.

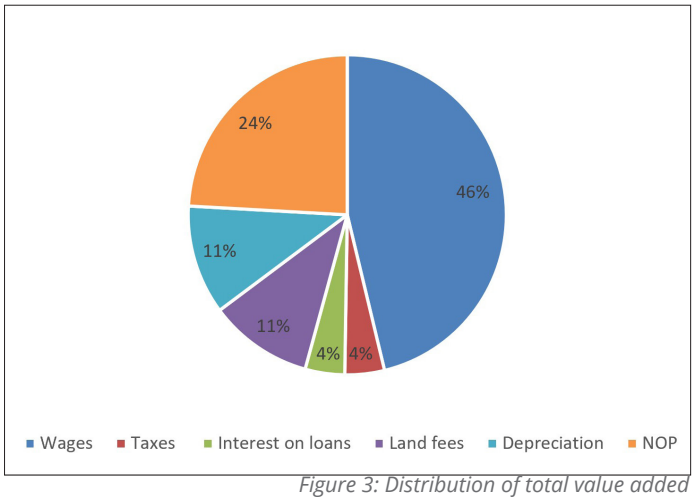


Figure 3: Distribution of total value added

The maize value chain is dominated by smallholder subsistence farming and large, export-oriented agricultural enterprises. Despite its significant contribution to the national economy, the sector faces persistent structural weaknesses—including high climate vulnerability, near-total dependence on imported inputs, fragmented land ownership, and underdeveloped processing infrastructure—that constrain domestic value creation and resilience, even though maize remains critical for both trade and food security.

Is the economic growth inclusive?

Distribution of income among the actors

Economic growth within the maize VC is highly asymmetrical, characterised by a **disproportionate distribution of VA** and profits. Primary producers generated the vast majority of direct VA (78%) and wages, while downstream actors contributed significantly less to VA but captured disproportionate financial returns.

Profits (NOP) are concentrated downstream and among landowners. Traders capture 35% of total NOP despite generating only 21% of VA, while landowners receive 83% of total NOP through in-kind lease payments. In contrast, primary farming records negative NOP (-22%) due to climate shocks, high input costs, and liquidity constraints.

Structural inequalities are pronounced. Land ownership is highly concentrated (**Gini coefficient: 0.58**), with 0.3% of holdings controlling 63% of agricultural land. Large Agricultural Enterprises benefit from storage capacity and capture 80% of public subsidies (averaging 3.3 million MDL per farm, € 167.9 thousand), while smallholders have little storage, sell 37% of their harvest at low harvest-time prices, and receive only 3% of subsidies.

Job creation and employment

The maize VC is a key source of rural livelihoods, generating about 8,110 Full-Time Equivalent (FTE) jobs, with 89% (7,282 FTEs) concentrated in farming. Downstream employment is limited due to capital-intensive operations, with trading and milling supporting 1,588 and 822 FTEs, respectively.

Agricultural labour is among Moldova's lowest-paid sectors, with average gross monthly earnings (7,952 MDL≈€405) well below the national average (12,209 MDL≈€622). Most workers are employed informally in seasonal or day labour, often paid in cash (~50 MDL/hour≈€2.5) without social or health insurance, while permanent contracts are largely limited to skilled workers on large farms.

The workforce is ageing rapidly, with 2.5 times more workers aged 65+ than 15–24, reflecting rural out-migration and the physical demands of farm work. Employment is also strongly gendered: men dominate skilled, higher-paid roles, while women (42% of the workforce) are concentrated in lower-paid informal work and unpaid family labour.

Economic growth in the maize value chain remains only partially inclusive. While farming activities generates the vast majority of rural employment and value added, profits are captured by downstream traders and landowners. Severe land concentration, an ageing informal workforce, and entrenched gender disparities restrict vulnerable groups from capitalising on market opportunities.

Is the value chain socially sustainable?

The following graph and table provide an image of the main social consequences of the VC activities in six strategic domains.

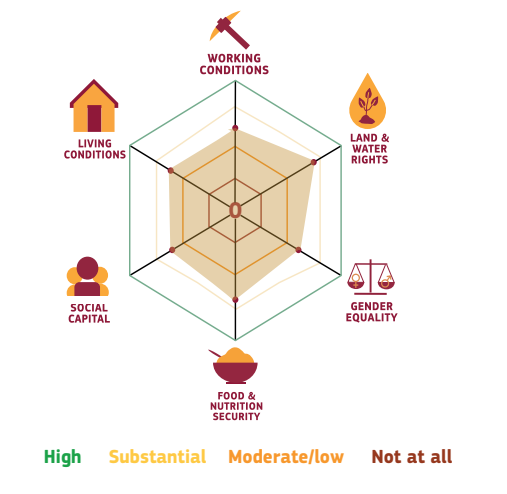


Figure 4: Social profile of the maize value chain in Moldova

The value chain demonstrates moderate social sustainability. It guarantees rural food security and secure land tenure through stable lease agreements. However, deep-rooted gender inequalities, pervasive informal labour, inadequate occupational safety, and deficient rural infrastructure significantly undermine overall social well-being, demanding stronger institutional protections and cooperative frameworks.

Working conditions	▪ Predominance of informal seasonal employment (66% of agricultural employment) despite formal contracts for mechanisers ▪ Weak occupational safety enforcement with limited protective equipment during pesticide application ▪ Extended working hours with wage delays during drought years
Land and water rights	▪ Secure lease-based land tenure alongside highly polarised ownership Critically deficient irrigation (covering 10–12% of arable land) ▪ Smallholder dependence on vulnerable wells under recurrent drought-induced water scarcity
Gender equality	▪ Women's concentration in unpaid family farm labour (75%), alongside limited agricultural land management (19%) ▪ Exclusion of women from high-paying mechanised roles, concentration in lower-paid auxiliary work ▪ Low female ownership of agricultural machinery (less than 12%)
Food and nutrition security	▪ Domestic caloric sufficiency from maize and grain-based land lease payments as a rural safety net ▪ Inadequate protein intake due to cereal-heavy diets ▪ Climate-induced mycotoxin contamination threatening food safety and household resilience
Social capital	▪ Weak producer cooperation driven by low institutional trust ▪ Vertical dependence on local farm leaders over horizontal cooperatives ▪ Low civic participation, and minimal trade union influence on collective bargaining
Living conditions	▪ Dependence of rural housing on wood/coal stoves (94%) ▪ Limited modern sanitation (42% with piped water) ▪ Expanded health coverage constrained by rural staff shortages, out-of-pocket costs, and inadequate local infrastructure.

Is the value chain environmentally sustainable?

The environmental profile of the VC is examined through a Life Cycle Assessment (LCA) inventory, providing insights into potential impacts across three areas of protection: resource depletion, ecosystem quality, and human health. The LCA inventory also identifies the VC's potential contribution to climate change. In addition, a qualitative biodiversity assessment was conducted to identify potential risks to biodiversity associated with the VC.

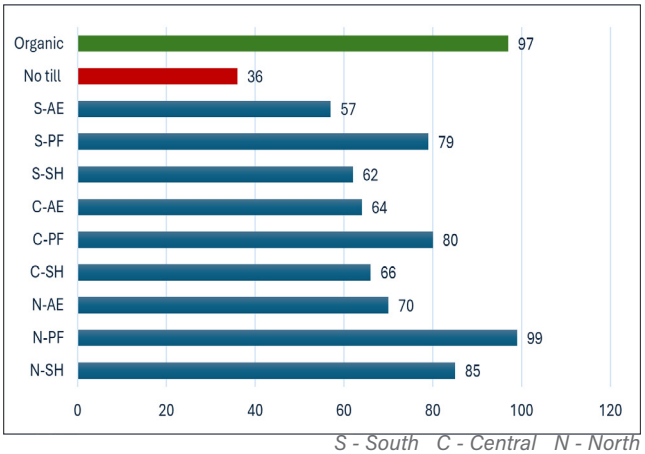


Figure 5: Diesel consumption at the cultivation stage of maize, l/ha

Total impact on areas of protection

The maize VC exhibits a moderate dependence on fossil fuels, heavily concentrated in the cultivation stage where conventional tillage can consume up to 99 litres of diesel per hectare (Figure 5).

Nutrient removal via grain harvests consistently exceeds fertiliser inputs across all zones, causing chronic negative nutrient balances and the progressive mining of soil nitrogen, phosphorus, and potassium. Ecosystem quality is severely threatened by soil degradation, as over 80% of arable land is located on slopes where conventional intensive tillage accelerates soil organic matter mineralisation and increases vulnerability to water and wind erosion. Human health impacts associated with the acute toxicity of agricultural inputs are relatively low, as the plant protection products used belong mainly to lower toxicity classes and are applied in relatively small quantities. However, substantial occupational health risks arise from the inadequate use of personal protective equipment during the handling and application of chemical plant protection products. Finally, cultivation drives climate change impacts, primarily through greenhouse gas emissions (GHG) from nitrogen fertilisers and diesel combustion. Recurrent severe droughts drastically reduce yields, which significantly increases the climate footprint per unit of produced maize.

Impact per value chain stages

Cultivation is the primary environmental hotspot of the VC. Conventional farming dominates fossil energy use, drives severe soil erosion, and generates the bulk of GHG emissions through fertiliser application and heavy diesel usage, which averages 74 litres per hectare. In contrast, the no-till conservation agriculture drastically reduces mechanical passes, halving diesel consumption to approximately 36 litres per hectare while preserving soil moisture and mitigating erosion. Transport impacts are secondary compared to cultivation, but logistics rely heavily on road freight to regional export hubs like Constan~a, contributing to fossil fuel depletion and transit emissions. Milling generates minor environmental burdens relative to primary production, primarily relying on electricity usage of around 150 watt-hours per kilogram of grain. The export sub-chain is logistics-intensive due to a lack of direct maritime infrastructure, which increases transit emissions, yet these downstream stages do not fundamentally alter the core environmental footprint established at the farm level.

Biodiversity

Direct land use pressure from maize cultivation on protected natural areas is low. Moldova's Emerald Network covers 8.1% of the territory and consists mostly of forests and wetlands, with minimal agricultural encroachment from arable land. The primary threat to biodiversity is ecosystem fragmentation caused by landscape simplification in intensive farming. The removal of natural vegetation patches and boundaries severely fragments ecosystems, degrading habitats that are essential for pollinators, natural pest enemies, and farmland bird populations. Regarding conservation frameworks, Moldova is progressively aligning with the EU environmental acquis, transitioning Emerald sites to Natura 2000 standards to improve management strategies. However, within arable lands, efforts to integrate conservation agriculture into core soil management remain fragmented and inconsistent. Mitigation strategies require restoring functional ecological connectivity within cultivated zones. This relies on maintaining and expanding landscape features such as hedgerows, grass strips, riparian buffers, and tree belts, alongside the adoption of diversified crop rotations and no-till practices.

Environmentally, the value chain faces critical sustainability risks. Cultivation acts as the primary hotspot, driving severe soil erosion, nutrient mining, and GHG emissions. While biodiversity overlap with protected areas is minimal, agricultural landscape fragmentation is high. Transitioning to conservation agriculture is essential to build climate resilience and halt degradation.

Main findings and recommendations

The maize VC remains strategically important to Moldova due to its contribution to exports, public revenue, value added (VA), and rural employment. However, its long-term sustainability is threatened by pressure on natural resources, particularly soil, and by the social vulnerabilities of rural communities. To strengthen the sustainability of the maize VC, the following recommendations should be prioritised.

Financial Stability and Market Structure

- Reform the VAT refund mechanism to ensure prompt reimbursements, reducing the accumulation of negative VAT balances that immobilise farmers' working capital and constrain farm liquidity.
- Enhance VA by investing in post-harvest infrastructure (drying, storage, milling, and feed production) to increase domestic processing and reduce exposure to global price volatility.
- Improve access to affordable finance through low-interest credit and tax incentives for reinvested profits to reduce smallholders' reliance on exploitative "technical credit" from input suppliers.

Social Inclusion and Labour Conditions

- Formalise agricultural labour by expanding the e-Zilieri registry and ensuring seasonal workers have access to health insurance and social protection.
- Address youth and gender gaps by strengthening dual vocational training and expanding women's access to mechanisation and precision agriculture skills.
- Strengthen occupational safety by enforcing mandatory use of personal protective equipment (PPE) during agrochemical applications.

Environmental Sustainability and Climate Adaptation

- Scale up conservation agriculture by linking subsidies to no-till farming, cover cropping, and residue retention.
- Modernise irrigation systems by investing in irrigation infrastructure and expanding Water Users' Associations (WUAs).
- Promote biodiversity by supporting ecological corridors, hedgerows, and buffer strips in line with EU Natura 2000 standards.

Governance

- Strengthen producer cooperatives through capacity building and targeted incentives (e.g., +25% subsidy bonuses) to improve storage, market access, and bargaining power.
- Digitalise the Agency for Intervention and Payments in Agriculture (AIPA) to ensure transparent and more equitable distribution of public subsidies.

Modernization, Capacity and Value Addition

- Promote digitalisation and innovation across the maize VC by supporting investments in precision agriculture, digital farming technologies, and smart irrigation to improve productivity, resource efficiency, and climate resilience.
- Strengthen agricultural knowledge and innovation systems through integrated e-agriculture platforms, enhanced extension services, and digital decision-support tools that provide timely market, weather, and technical information.

Value Chain Analysis for Development (VCA4D) is a tool funded by the European Commission / INTPA and is implemented in partnership with Agrinatura. Agrinatura (http://agrinatura-eu.eu) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development. The information and knowledge produced through the value chain studies are intended to support the Delegations of the European Union and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions. VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d-

This document is based on the report Value Chain Analysis of maize in Moldova by Litvin, A., Negura, P., Rurac., M., Kotyza, P., Bajan, B., Shubitidze, B., Villani, R. 2025 for the European Union, DG-INTPA Value Chain Analysis for Development Project (VCA4D CTR 2018/392-416), 146 p + annexes. Only the original report binds the authors.