



THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP
FOR OFFICIAL USE ONLY

Report No: PAD5158

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF EUR50.1 MILLION
(US\$55.0 MILLION EQUIVALENT)

TO THE

REPUBLIC OF MOLDOVA

FOR A

AGRICULTURE GOVERNANCE, GROWTH AND RESILIENCE INVESTMENT PROJECT

May 8, 2023

Agriculture And Food Global Practice
Europe And Central Asia Region

This document is being made publicly available prior to Board consideration. This does not imply a presumed outcome. This document may be updated following Board consideration and the updated document will be made publicly available in accordance with the Bank's policy on Access to Information.

CURRENCY EQUIVALENTS

Exchange Rate Effective April 30, 2023

Currency Unit = Moldovan Leu (MDL)

MDL 18.0155 = US\$1.00

MDL 19.88972 = EUR1.00

US\$ 1.00 = EURO 0.91049804

FISCAL YEAR

January 1 - December 31

Regional Vice President: Antonella Bassani

Country Director: Arup Banerji

Regional Director: Sameh Naguib Wahba Tadros

Practice Manager: Frauke Jungbluth

Task Team Leader(s): Anatol Gobjila

ABBREVIATIONS AND ACRONYMS

| | |
|----------|---|
| AGGRI | Agriculture Governance, Growth and Resilient Investment Project |
| AIPA | Agency for Interventions and Payments in Agriculture |
| CAPMU | Consolidated Agriculture Project Management Unit |
| ARAC | Agricultural and Rural Advisory Center |
| CERC | Contingency Emergency Response Component |
| COVID-19 | Coronavirus disease of 2019 |
| CIS | Central Irrigation System |
| CPF | Country Partnership Framework |
| DFIL | Disbursement and Financial Information Letter |
| DA | Designated Account |
| EIRR | Economic Internal Rate of Return |
| ESF | Environmental and Social Framework |
| ESMF | Environmental and Social Management Framework |
| EU | European Union |
| EUR | Single European Currency |
| FM | Financial Management |
| GCRF | Global Crisis Response Framework |
| GDP | Gross Domestic Product |
| GHG | Greenhouse Gases |
| GOM | Government of Moldova |
| GRS | Grievance Redress Service |
| HDI | Human Development Index |
| HVCs | High Value Crops |
| IBRD | International Bank for Reconstruction and Development |
| IDA | International Development Association |
| IFC | International Finance Corporation |
| IFR | Interim Financial Report |
| MACP | Moldova Agriculture Competitiveness Project |
| MAFI | Ministry of Agriculture and Food Industry |
| MCC | Millennium Challenge Corporation |
| MFD | Maximizing Finance for Development |
| MCM | Million Cubic Meters |
| MOF | Ministry of Finance |
| NFSA | Food Safety Agency |
| NPV | Net Present Value |
| O&M | Operation and Maintenance |
| OP | Operational Policy |
| PDO | Project Development Objective |
| POM | Project Operations Manual |
| PPSD | Project Procurement Strategy for Development |
| RPF | Resettlement Policy Framework |
| SEP | Stakeholder Engagement Plan |
| STEP | Systemic Tracking of Exchanges in Procurement |
| US\$ | United States Dollar |
| WB | World Bank |
| WBG | World Bank Group |
| WGM | Worker Grievance Mechanism |
| WUA | Water User Association |

**TABLE OF CONTENTS**

| | |
|--|-----------|
| DATASHEET | 1 |
| I. STRATEGIC CONTEXT | 6 |
| A. Country Context..... | 6 |
| B. Sectoral and Institutional Context..... | 8 |
| C. Relevance to Higher Level Objectives..... | 12 |
| II. PROJECT DESCRIPTION..... | 13 |
| A. Project Development Objective | 13 |
| B. Project Components | 13 |
| C. Project Beneficiaries | 23 |
| D. Results Chain | 23 |
| E. Rationale for Bank Involvement and Role of Partners | 24 |
| F. Lessons Learned and Reflected in the Project Design | 25 |
| III. IMPLEMENTATION ARRANGEMENTS | 26 |
| A. Institutional and Implementation Arrangements | 26 |
| B. Results Monitoring and Evaluation Arrangements..... | 27 |
| C. Sustainability..... | 27 |
| IV. PROJECT APPRAISAL SUMMARY | 28 |
| A. Technical, Economic and Financial Analysis (if applicable) | 28 |
| C. Legal Operational Policies..... | 33 |
| D. Environmental and Social | 33 |
| E. Citizen Engagement, Gender, Climate Change Co-Benefits, and Maximizing Finance for Development..... | 35 |
| V. GRIEVANCE REDRESS SERVICES | 39 |
| VI. KEY RISKS | 40 |
| VII. RESULTS FRAMEWORK AND MONITORING | 41 |
| ANNEX 1: Implementation Arrangements and Support Plan | 49 |
| ANNEX 2: Gender Gaps in Entrepreneurship, Access to Finance and Employment | 54 |
| ANNEX 3: Strengthening Resilience through Irrigation Services | 57 |
| ANNEX 4: GHG Analysis..... | 72 |



DATASHEET

BASIC INFORMATION

| | | |
|--------------|--|--|
| Country(ies) | Project Name | |
| Moldova | Agriculture Governance, Growth and Resilience Investment Project | |
| Project ID | Financing Instrument | Environmental and Social Risk Classification |
| P170035 | Investment Project Financing | Substantial |

Financing & Implementation Modalities

| | |
|---|--|
| <input type="checkbox"/> Multiphase Programmatic Approach (MPA) | <input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC) |
| <input type="checkbox"/> Series of Projects (SOP) | <input type="checkbox"/> Fragile State(s) |
| <input type="checkbox"/> Performance-Based Conditions (PBCs) | <input type="checkbox"/> Small State(s) |
| <input type="checkbox"/> Financial Intermediaries (FI) | <input type="checkbox"/> Fragile within a non-fragile Country |
| <input type="checkbox"/> Project-Based Guarantee | <input type="checkbox"/> Conflict |
| <input type="checkbox"/> Deferred Drawdown | <input type="checkbox"/> Responding to Natural or Man-made Disaster |
| <input type="checkbox"/> Alternate Procurement Arrangements (APA) | <input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS) |

| | |
|------------------------|---|
| Expected Approval Date | Expected Closing Date |
| 31-May-2023 | 01-Sep-2029 |
| Bank/IFC Collaboration | Joint Level |
| Yes | Historical Project/Activity implemented in sequence with an IFC activity(Loan/Credit/Guarantee/AAA) |

Proposed Development Objective(s)

Improve delivery of public agricultural services, foster market-oriented growth and increase resilience of targeted beneficiaries, and in case of an eligible crisis or emergency, respond promptly and effectively to it.

**Components**

| Component Name | Cost (US\$, millions) |
|--|-----------------------|
| Enhancing Sector Governance and Agriculture Knowledge Management | 6.50 |
| Fostering Growth in Underperforming Sub-Sectors | 21.00 |
| Strengthening Resilience through Irrigation Services | 25.00 |
| Contingent Emergency Response Component | 0.00 |
| Project Management | 2.50 |

Organizations

| | |
|----------------------|---|
| Borrower: | Ministry of Finance |
| Implementing Agency: | Ministry of Agriculture and Food Industry |

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

| | |
|--------------------|-------|
| Total Project Cost | 55.00 |
| Total Financing | 55.00 |
| of which IBRD/IDA | 55.00 |
| Financing Gap | 0.00 |

DETAILS**World Bank Group Financing**

| | |
|--|-------|
| International Bank for Reconstruction and Development (IBRD) | 55.00 |
|--|-------|

Expected Disbursements (in US\$, Millions)

| WB Fiscal Year | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|----------------|------|------|------|-------|-------|-------|-------|-------|
| Annual | 0.00 | 2.22 | 3.29 | 6.40 | 8.36 | 11.20 | 13.84 | 9.69 |
| Cumulative | 0.00 | 2.22 | 5.51 | 11.91 | 20.27 | 31.47 | 45.31 | 55.00 |



INSTITUTIONAL DATA

| Practice Area (Lead) | Contributing Practice Areas |
|----------------------|-----------------------------|
| Agriculture and Food | Water |

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

| Risk Category | Rating |
|---|---------------|
| 1. Political and Governance | ● Substantial |
| 2. Macroeconomic | ● High |
| 3. Sector Strategies and Policies | ● Moderate |
| 4. Technical Design of Project or Program | ● Moderate |
| 5. Institutional Capacity for Implementation and Sustainability | ● Substantial |
| 6. Fiduciary | ● Moderate |
| 7. Environment and Social | ● Substantial |
| 8. Stakeholders | ● Moderate |
| 9. Other | |
| 10. Overall | ● Moderate |

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[] Yes [✓] No



Does the project require any waivers of Bank policies?

[] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

| E & S Standards | Relevance |
|---|------------------------|
| Assessment and Management of Environmental and Social Risks and Impacts | Relevant |
| Stakeholder Engagement and Information Disclosure | Relevant |
| Labor and Working Conditions | Relevant |
| Resource Efficiency and Pollution Prevention and Management | Relevant |
| Community Health and Safety | Relevant |
| Land Acquisition, Restrictions on Land Use and Involuntary Resettlement | Relevant |
| Biodiversity Conservation and Sustainable Management of Living Natural Resources | Relevant |
| Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities | Not Currently Relevant |
| Cultural Heritage | Not Currently Relevant |
| Financial Intermediaries | Not Currently Relevant |

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

The Borrower shall carry out the Project in accordance with the Implementation Arrangements set out in Section I, Schedule 2 of the Loan Agreement.

Sections and Description

Section I.A.1.(c) of Schedule 2: no later than one hundred and twenty (120) days after the Effective Date, for purposes of carrying out Part 2 of the Project, MAFI shall establish, and thereafter, operate and maintain throughout Project implementation, a Grant Evaluation Committee, vested with the responsibility of announcing



competitive selection rounds, reviewing, and evaluating applications, and making award decisions, with functions and composition acceptable to the Bank, including representatives from MAFI, MOF, and the State Chancellery.

Conditions

| | | |
|-----------------------|------------------------------|--|
| Type Disbursement | Financing source IBRD/IDA | Description Section III.B.1.(b) of Schedule 2: no withdrawal shall be made under Category (2), unless the Grant Operations Annex referred to in Section I.C.2 of Schedule 2 to the Loan Agreement, has been prepared, adopted and incorporated to the Project Operations Manual in a manner acceptable to the Bank. |
| Type Disbursement | Financing source IBRD/IDA | Description Section III.B.1.(c) of Schedule 2: no withdrawal shall be made for Emergency Expenditures under Category (3), unless and until: (i) all of the following conditions have been met in respect of said expenditures: (A) the Borrower has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Bank a request to withdraw Loan amounts under Category 3; and (B) the Bank has agreed with such determination, accepted said request and notified the Borrower thereof; and (ii) the Borrower has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Bank. |
| Type Effectiveness | Financing source IBRD/IDA | Description Article V of the Loan Agreement: the Project Operations Manual, referred to in Section I.C.1 of Schedule 2 to the Agreement, has been prepared and adopted by the Steering Committee in a manner acceptable to the Bank. |



I. STRATEGIC CONTEXT

A. Country Context

1. Moldova is an upper-middle income country in the midst of economic transition. Strong but volatile economic growth over the past few decades has led to an improvement in the average standard of living. Between 2000 and 2019, per capita Gross Domestic Product (GDP) grew at an average annual rate of 4.9 percent, resulting in a cumulative increase of over 160 percent. This growth has had a positive impact on poverty reduction, with rates falling from 90 percent in 2000 to 10.9 percent in 2021. Non-monetary aspects of welfare, such as life expectancy and educational attainment, have also improved substantially. However, despite progress in economic growth and poverty reduction, Moldova still struggles with significant disparities in living standards between urban and rural areas, as well as high levels of inequality of opportunity across spatial dimensions. The majority of poverty remains a rural issue, with 80 percent of those living in poverty residing in rural areas¹ where agriculture is the primary economic activity. Therefore, increasing productivity and competitiveness in the agricultural sector is critical for boosting economic growth prospects and reducing poverty.
2. Moldova's economic growth model, which relied heavily on remittance-financed consumption, began to show signs of weakness and unsustainability² even before the COVID-19 pandemic and Russia's invasion of Ukraine. While the country's economic performance has been strong since the 2014 banking crisis³, with average annual growth at 4.3 percent, it was driven by temporary factors such as favorable financial and climate conditions. In contrast, the potential for long-term productive capacity in the economy has declined by 1 percentage point over the past decade. Income growth among the poor has been primarily driven by pensions and social assistance, while the incomes of non-poor households have been boosted by increasing wages and remittances.
3. The COVID-19 pandemic, severe droughts in 2020 and 2022, and the adverse impact of Russia's invasion of Ukraine have highlighted the vulnerability of Moldova's economic growth model. The combined impact of the COVID-19 pandemic and severe drought in 2022 resulted in a GDP decline of 7 percent, one of the most significant in Europe. This shock had a significant and varied impact on households, firms, sectors, and geographic areas. However, economic activity recovered by 13.9 percent in 2021, particularly in agriculture. Additionally, the labor market has bounced back from COVID-19 lows, with the employment rate in 2021 standing at 43 percent, the same level as in 2019. Poverty, which had increased due to the pandemic, decreased from 13.7 percent in 2020 to 10.9 percent in 2021 due to growing wages and pensions.
4. Unfortunately, just as Moldova was recovering from these severe shocks, its short-term economic recovery and long-term economic prospects were significantly impacted once again. The country faced another devastating drought, socio-economic spillovers from Russia's invasion of Ukraine (including disrupted trade, refugees, and delayed investments), and a massive increase in energy prices (natural gas, electricity, gasoline, and diesel fuel). These factors led to a reversal of gains in economic growth and poverty reduction, with GDP conservatively estimated to have dropped by 7.0 percent in 2022. Even before Russia's invasion of Ukraine, sharp increases in energy costs and resulting food inflation were already negatively affecting livelihoods and poverty reduction efforts. In 2022, the country faced even greater

¹ Fifty percent of the population lives in rural areas.

² The country's growth model is increasingly confronted by structural issues such as declining remittances and unfavorable demographic trends.

³ In 2014, three Moldovan banks, Banca de Economii, Unibank, and Banca Socială were involved in a fraud with a total loss from the scheme equivalent to about 12 percent of Moldova's GDP.



increases in the cost of living, leading to some of the highest inflation rates in the world and making it one of the top ten countries globally for food price inflation.

5. Russia's invasion of Ukraine has affected Moldova's agriculture sector, hindering its ability to provide food for domestic use and exports to profitable markets. Rising input costs and physical availability of fuel, fertilizers, and seeds posed a significant risk to production earlier in 2022. Although importers had to scramble to find alternative supply channels for essential food items such as flour, dairy, salt, and meat, the country managed to avert food shortages. However, the disruption caused food prices to rise, and the food industry in Moldova faced a considerable setback due to the disruption of supply chains for essential production inputs from Ukraine, Belarus, and Russia.

6. In addition to these events, Moldova is grappling with the effects of climate change, with two recent droughts affecting agricultural production at national scale in 2020 and 2022⁴. Moldova is among the most climate-vulnerable countries in Europe, and the ND-GAIN⁵ vulnerability assessment ranks it 91st on a global vulnerability rank (lower middle). The country also ranks 85th on the NG-GAIN readiness indicator (lower middle), showcasing a lack of ability to leverage investments and convert them into adaptation actions. The country has witnessed one significant negative climate-related event on average every three years since 2000. The cost of inaction on climate adaptation is estimated to be around US\$600 million, and it is projected to more than double to US\$1.3 billion by 2050⁶.

7. Moldova is committed to achieving the objectives of the Paris Agreement and has taken appropriate measures to reduce greenhouse gas emissions. The country aims to reduce greenhouse gases (GHG) emissions by 70 percent by 2030, in line with the emissions pathways towards 2050 that aim to keep global warming below 2 degrees Celsius. The country's long-term adaptation goal is sustainable social and economic development resilient to the impact of climate change by integrating climate risk into investment decision-making and business planning, while remaining socially inclusive and sensitive to gender impacts of climate change. The country's adaptation framework aligns with national development strategies, the updated Nationally Determined Contributions, and the goals of the Paris Agreement to enhance adaptive capacity, resilience, and reduce vulnerability to climate risks.

8. In the short and medium term, Moldova's economic recovery relies on several factors, including containing the aftermath of the pandemic, managing the effects of the droughts, and navigating the challenges arising from the regional security situation. Effective support to both the private sector and households is crucial in this context. However, to ensure long-term economic prospects, recovery measures must be complemented by structural reforms aimed at enhancing institutional support for inclusive and sustainable growth, reducing corruption, improving governance and service delivery, and eliminating political interference from vested interests and regulatory mandates.

9. Despite the complexity of the situation, the current moment presents a significant opportunity for Moldova to transition towards a more open and democratic society built on a resilient growth model that is inclusive of all citizens. In June 2022, the country was granted European Union (EU) Candidate Status, a significant milestone that will serve as a catalyst for aligning the agriculture and food sectors with EU requirements, building on the present framework of harmonization through the EU-Moldova Association Agreement⁷. While pre-accession support will offer Moldova outstanding opportunities for aligning sector development processes and institutional organization, the country must

⁴ Moldova's agriculture sector vulnerability to climate change is not highly regionalized, but the Southern and South-Eastern regions are the most prone to drought and heat stress (World Bank, 2014)

⁵ Notre Dame Global Adaptation Initiative, 2020.

⁶ World Bank, 2017

⁷ The Association Agreement was signed on May 14, 2017, and included a Deep and Comprehensive Free Trade Agreement, which contained multiple provisions for harmonization of Moldova's food production systems to the requirements of the EU.



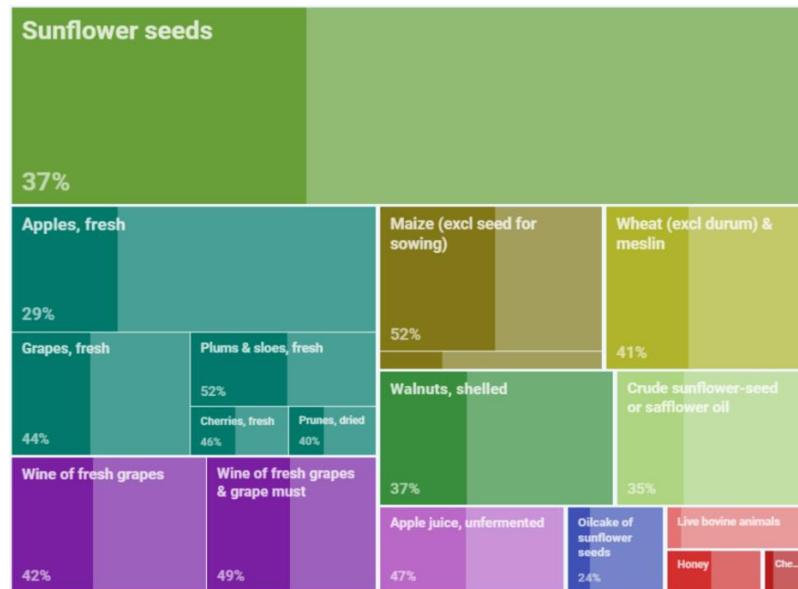
undergo profound legislative and institutional changes to adapt legislation, implementation, and enforcement to EU requirements.

B. Sectoral and Institutional Context

10. Moldova's agri-food sector is crucial for achieving economic and export growth, as well as social cohesion targets. The country's fertile soils and favorable climate make agriculture a vital occupation in rural areas, and one of the key pillars of the economy, with some of the highest shares of agricultural production and processing in the region. Given these economic and social considerations, developing the agricultural sector's growth and resilience are pressing development priorities. Moldova's undisputed agricultural potential gives it high comparative advantages, and its close proximity to the EU represents an excellent market opportunity. Over the past eight years, the country has made significant progress in harmonizing legislation and upgrading food and quality systems to increase its presence in EU markets. Meanwhile, although historic markets in the Eurasian space continue to serve as important outlets for Moldovan agricultural and food products, trade logistics towards these markets have been severely impeded by Russia's invasion of Ukraine, and their appeal may be declining.

11. With over 2 million people (57 percent) of the total population living in rural areas, Moldova is predominantly rural. The agricultural sector's comparatively high share of the economy partly reflects this, contributing 9.4 percent of GDP and employing 21 percent of the labor force. However, the sector demonstrates a low productivity equilibrium due to limited capital intensity, investment, and innovation. Agricultural labor productivity is only 40 percent of the national average productivity, resulting in modest household incomes from agricultural activity. Moldova's agricultural workforce is divided between low-productivity subsistence production, which typically engages in crop, livestock, or niche food production, and employment in scaled-up commercial operations.

12. There is a strong consensus among the country's leadership on the essential role of agriculture in socio-economic development, including GDP, jobs, exports, and food security. Agricultural growth has been driven by exports in recent years, and this trend is expected to continue. Moldova is a net exporter of agricultural and food products, with agricultural exports accounting for a significant share of total exports (44 percent). Cereals, sunflower seeds, fruits, and wine are the major export products. Agriculture's importance in international trade, in terms of exports, exceeds its share of GDP by a factor of four. However, its exports still fall short of their potential (Figure 1). The agri-food products with the greatest export potential include sunflower seeds (an estimated additional US\$342 million in revenue), fresh apples and grapes (US\$152 million), and wheat (US\$68 million). Additionally, most of the higher-value-added agri-food exports from Moldova, such as vegetables, fruits, nuts, fruit juices, and dairy, remain well below 50 percent of their potential.

**Figure 1: Moldova's export potential for selected agricultural commodities⁸**

13. Moldova's agri-food sector has been successful in exporting its products to the EU, making it the country's most significant trading partner. However, these exports have mainly consisted of low value-added commodities sold in bulk, such as oilseeds, cereals, fruits, and beverages, which accounted for a total value of US\$660 million in 2019. To maintain its market presence in the EU, Moldova's producers need to increase their exports of high-value produce, including fresh fruits and vegetables, or add more value to their current exports. On the other hand, the country's agri-food imports, which accounted for a value of US\$350 million, comprise eight product categories with higher value-added, such as miscellaneous food products, fish and crustaceans, dairy products, and eggs mainly for incubation. Unfortunately, the traditional Russian market's outlook has significantly worsened due to Russia's invasion of Ukraine, resulting in a ban on imports of food products of vegetable origin from Moldova since August 15, 2022.

14. Moldova's agricultural production is characterized by a dichotomy between small family farms and larger farms that operate as legal persons. From an organizational standpoint, the sector can be divided into three main categories of agricultural producers: agricultural enterprises, peasant farms, and rural households (FAO, 2020). Large corporate farms typically rely on land lease agreements with individual owners and employ labor, specializing in the production of commodities such as cereals, sunflowers, maize, and sugar beet. This specialization is driven by several factors, including low production costs, low labor requirements, availability of agricultural machinery, simple and cheap post-harvesting processes, and lucrative commodity markets. In contrast, small farms are more diversified and typically divide their land into several lines of production activities.

15. A land market has been gradually developing in Moldova since 1999. The share of agricultural land under private ownership constitutes 74.2 percent⁹. Only 2 percent of pastures and hayfields are in private ownership: they usually belong to the municipality and farmers must pay a modest annual tax proportional to the number of owned animals

⁸ FAO, 2021⁹ Moldova Statistical Yearbook, 2020

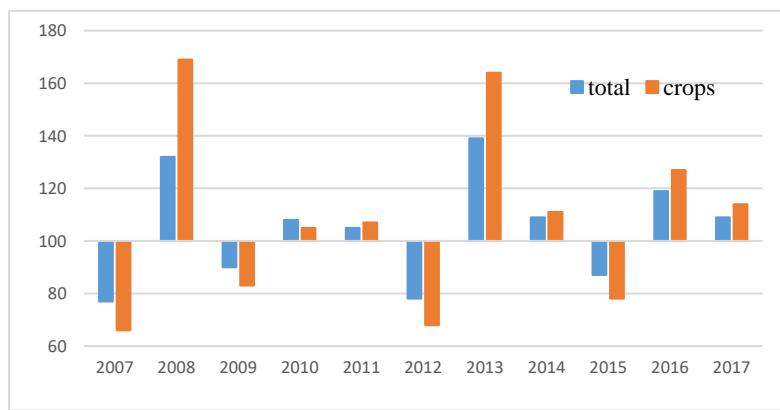


(cows, goats, sheep, and horses) to use them. In contrast, 94 percent of vineyards are owned by farm households whereas about 84 percent of the arable land is private (National Bureau of Statistics of the Republic of Moldova, 2015). In 2020, 42.1 percent of the total agricultural land was leased, of which 78.3 percent will be leased by limited companies, 5.7 percent by production cooperatives, 13.4 by peasant farms and 2.6 percent by joint-stock companies. Most of the leasing contracts have a duration of 1-3 years, limiting the possibility for the tenant to plan for the longer term.

16. Moldova has been gradually developing a land market since 1999, and currently, 74.2 percent of agricultural land is under private ownership. However, only 2 percent of pastures and hayfields are privately owned and usually belong to municipalities, with farmers paying a modest annual tax proportional to the number of animals they own to use them. On the other hand, 94 percent of vineyards are owned by farm households, while approximately 84 percent of arable land is private (National Bureau of Statistics of the Republic of Moldova, 2015). In 2020, 42.1 percent of the total agricultural land was leased, with limited companies leasing 78.3 percent, production cooperatives leasing 5.7 percent, peasant farms leasing 13.4 percent, and joint-stock companies leasing 2.6 percent. However, most leasing contracts have a short-term duration of 1-3 years, limiting the possibility for tenants to plan for the long term.

17. High output volatility is a serious threat to Moldova's agriculture sector development, due to climate change and the low adaptive capacity of most farmers to climate change, augmented by public and private sectors' underinvestment in irrigation and drainage and tepid proliferation of climate-smart and resilient agriculture practices. Crop production is particularly vulnerable to inclement weather. Droughts, floods, and soil erosion are among major climate-driven problems affecting the country. Severe weather events every two to three years since 2007 have had a devastating impact on most crops (Figure 2). The volatility is also partly caused by underdeveloped measures for mitigating weather-related risks, limited access to irrigation, low adoption of modern resilient agricultural technologies, and a lack of innovative financial and insurance products. Forecasts show that climate change will lead to further variations in temperature and rainfall patterns¹⁰, and that without decisive adaptation strategies yields for most crops are likely to plunge.

Figure 2: Agricultural output volatility, 2007–17 (percent on previous year)



Source: National Bureau of Statistics.

18. Access to irrigation is crucial for sustainable agricultural development, but in Moldova, only a small percentage of land is irrigated. Decades of underinvestment and mismanagement have resulted in a loss of functionality for centralized

¹⁰ World Bank, 2014



irrigation systems (CIS)¹¹, with only one large effort in the past 30 years - the Millennium Challenge Corporation (MCC) Compact Project¹² - which rehabilitated 10 CISs. The MCC Compact Project has also engendered vital reforms related to the establishment of Water User Associations (WUAs) and improved river basin management. At present, 35 WUAs are registered of which 27 manage state-owned irrigation infrastructure, but significant investments are still required to increase access to irrigation services for farmers and agriculture producers.

19. Moldova's agri-food sector has seen disparities in sub-sectoral performance, with some sub-sectors performing well and others underperforming. The dairy/beef and vegetable sub-sectors have been particularly problematic, leading to issues with rural jobs, food security, and energy security. Despite a growing demand for high-value agricultural products, domestic production only meets around 40 percent of the demand for dairy and beef. Market failures, economic constraints, safety, and quality requirements, shifting cultural and behavioral preferences, and a worsening rural demography have contributed to the decline in the dairy sector¹³. However, the dairy sector still represents a potential source of growth for Moldova, with untapped potential for niche exports and meeting domestic demand for fresh milk.

20. The Ministry of Agriculture and Food Industry (MAFI) is responsible for developing the agri-food sector. Public spending on agriculture has reached 0.6% of GDP, in line with regional averages¹⁴. However, most funds are allocated to direct farm payments, and support services like research, extension, and rural infrastructure are underfunded. In recent years, there has been a shift from market-distortive subsidies to investment subsidies with "green growth" conditions. To align with EU agriculture practices, support should focus more on rural development, essential public services, and enhancing sector competitiveness.

21. Governance remains a challenge in the agriculture and food sector, impeding the delivery of public services. Moldova has made progress in harmonizing its institutions and services with EU practices over the past decade. The country has a functional Paying Agency (handling US\$90 million in direct payments in 2022); a single National Food Safety Agency (NFSFA) covering food safety and quality mandates and managing all adjacent infrastructure and systems, such as laboratories, border inspection points, information systems; a functional land cadaster that includes agricultural land; and elements of knowledge management and advisory services. However, institutional functionality and effectiveness require further improvement. To advance on the pre-accession path Moldova must efficiently use public resources for agricultural development and prepare to make full use of expected EU support under the Instrument for Pre-Accession Assistance for Rural Development (IPARD). IPARD grants will support modernizing agricultural holdings and processors, improving the rural environment, and developing the rural economy. However, significant incremental development of institutional and administrative capacity is necessary to access and maximize these resources. Strengthening the sector's policy framework in areas such as input access, trade facilitation, public support efficiency, transparency, inclusiveness, and strategic grain reserve management is crucial to establish an effective enabling environment for growth.

22. The Government of Moldova (GOM) aims to transform its agriculture sector with an ambitious agenda outlined in the National Development Strategy "European Moldova 2023-2030"¹⁵. Challenges faced by the sector include low

¹¹ Built in the 1970-80s, the country's irrigation infrastructure commanded circa 290,000 hectares and included 88 centralized irrigation systems (276 multi-purpose pumping stations) and 20 centralized drainage systems (41 pumping stations).

¹² Transition to High Value Agriculture Project, 2010-1015.

¹³ The reasons for the decline are complex and are driven by a number of overlapping market failures including: the persistent legacy of post-soviet transition that fragmented dairy production into household units; economic constraints to establishing and growing commercial scale dairy operations, rigorous safety and quality requirements demanded in dairy processing; as well as, more recently, a worsening rural demography coupled with shifting cultural and behavioral preferences for animal husbandry (World Bank, 2021).

¹⁴ World Bank (2019).

¹⁵ The Strategy was adopted by the Parliament of Moldova on February 17, 2023.



productivity and competitiveness, inadequate human capital, rural depopulation, and climate change. The strategy calls for investment in agriculture, increased export opportunities, and actions to combat climate change through the adoption of resilient plant varieties, conservation agriculture, and water-efficient irrigation services. The National Agriculture and Rural Development Strategy 2030¹⁶ aims to enhance food security, improve living standards in rural areas, and create a competitive and sustainable food industry. Its goals include restructuring farms to meet EU standards, improving rural infrastructure and services, diversifying rural economic activities, and protecting the environment.

C. Relevance to Higher Level Objectives

23. The Agriculture Growth, Governance and Resilience Investment (AGGRI) Project is aligned with Moldova's the National Development Strategy "European Moldova 2030". As mentioned above, its objective is to enhance the quality of life of the people of Moldova, and its homocentric vision results from the country's alignment to the 2030 Global Development Agenda and conforms to the country's EU aspirations. The strategy recognizes the importance of the EU integration process as a framework for the country's modernization through alignment to the EU norms and standards in all fields, as these are considered amongst best international practices.

24. The project is aligned with the FY23-27 Country Partnership Framework (CPF)¹⁷, which supports the country's green, resilient, inclusive development and competitiveness, in contribution to the national goals. The CPF is based on three high-level objectives (HLOs): (i) increased formal employment; (ii) improved human capital; and (iii) increased green and resilient investments. Additionally, capacity-building and digitization efforts across all HLOs aim to strengthen systems and institutions at national and local levels. The project dovetails with all HLOs, as investments in selected agricultural and food industry sub-sectors are expected to result in enhanced competitiveness, associated higher wages, and formal employment; investments in improved agricultural knowledge management services are expected to result in an enhanced set of essential skills in the farming community; and investments in access to irrigation services will increase climate resilience and incentivize the transition to high-value crops in targeted command areas. The project will also support the capacity building and digitization theme of the CPF through improved delivery of essential public services and digitalization of business processes in key institutions. The project will build upon recent World Bank Group (WBG) support of the country efforts in strengthening agri-food export competitiveness, attracting investment, and proliferating good agricultural practices, such as the Moldova Agriculture Competitiveness Project (MACP). The latter built a solid foundation for scaling up needed modernization and EU compliance of the country's food safety management system, enhancing prospects for accessing premium markets, and mainstreaming the use of sustainable agricultural practices.

25. The project is aligned with the Global Crisis Response Framework (GCRF) which outlines the WBG's response to multiple crises to support medium-to long-term development needs. Russia's invasion of Ukraine has led to supply disruptions and further upward pressure on domestic prices - notably energy, food, and fuel. The continued stresses from COVID-19, climate change and regional insecurity impacted livelihoods, as well as food and nutrition security, requiring urgent financial and technical support. By focusing on increasing agri-food sector performance, the project aligns itself with all four pillars of the framework, responding to food insecurity, preservation of jobs, strengthening resilience and strengthening governance in key sector institutions.

26. The project is also fully consistent with the WBG Climate Change Action Plan 2021-2025 and the ECA Climate Change Action Plan, which support transformational integrated landscape management, pollution reduction and climate-smart agriculture across agriculture and food value chains. It will support public institutions, service delivery and

¹⁶ The Strategy was approved by the GOM in 2023

¹⁷ Discussed by the WBG Board on March 14, 2023 (Report #177939-MD).



investment towards the development and adoption of climate-smart knowledge and technologies/practices. Mitigation benefits will be gained, amongst other, through improved production efficiency at farm levels, more efficient use of land cultivation technologies, more precise application of fertilizers, introduction of more efficient breeds with higher feed conversion rates, improved feeding management; sustainable manure management and grazing practices; introduction of energy efficient equipment (pumps) and renewable energy generation (biogas in livestock, use of solar in irrigation equipment). Adaptation benefits are expected to be generated through the improved functioning of the agricultural knowledge management services which supply climate smart knowledge to farmers, scaling up of animal husbandry practices focused on animal health and welfare, and improved access to irrigation services in crop production. Throughout its activities that entail capacity building and capital investments, the project aims to support climate resilience by addressing risks related to drought, heat stress and climate impacts on animal health and welfare, through sustainable adaptation approaches for use of climate smart agriculture and rehabilitation of irrigation systems.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

27. Improve delivery of public agricultural services, foster market-oriented growth and increase resilience of targeted beneficiaries, and in case of an eligible crisis or emergency, respond promptly and effectively to it.

PDO Level Indicators

PDO 1: Improved access of farmers to public agricultural services and support programs (disaggregated by (i) type of support; (ii) type and size of farm; and (iii) gender - (delivery of public agricultural services))

PDO 2: Increased sales by targeted matching grant beneficiaries (disaggregated by (i) type of beneficiary supported by the project (small holder farmers, commercial farmers, agribusinesses) and (ii) gender - (market-oriented growth))

PDO 3: Increased compliance with food safety requirements by targeted beneficiaries (disaggregated by: (i) type of beneficiary (small holder farmers, commercial farmers, agribusinesses, livestock/vegetable value chain actors); and (ii) gender (market-oriented growth))

PDO 4: Increased average productivity of farms accessing irrigated services (disaggregated by (i) type of beneficiary supported by the project (small holder farmers, commercial farmers, agribusinesses) and (ii) gender - (resilience))

B. Project Components

28. Moldova's proximity to and relationship with the EU, one of the world's largest and most successful food markets, offers significant potential for export-oriented growth. To take advantage of this opportunity, the sector needs to maintain alignment with EU requirements while addressing existing sub-sector performance discrepancies to leverage comparative advantages for growth, market orientation, and climate resilience. A proposed framework for achieving these objectives is to prioritize the production and supply of agri-food products that meet quality standards in target markets at competitive prices while remaining resilient and resource-efficient. This framework provides a solid



foundation for reviewing Moldova's sector transformation and modernization plans as well as its EU alignment and justifies the project's activities. This framework, which is supported by extensive analytical work by the World Bank and other development partners, identifies three essential pathways toward market-oriented and resilient agricultural growth. The first emphasizes the overall quality of sector governance and its alignment with EU standards. The second focuses on growth-oriented development of agricultural holding and processors, with additional support needed for EU-compliant modernization. The third centers on resilience and sustainability.

Quality of Governance

- Public institutions - continued support for upgrading food safety systems for EU market access and domestic safe consumption considerations
- Public service delivery – continued support for optimizing business processes in the payment agency and improving farm registration systems
- Improving the knowledge management system - upgrading agriculture advisory, business development and veterinary services

Growth-oriented development

- Dairy and meat farming – essential to rural jobs, integrity of agricultural system/soil health, climate change mitigation, food safety and security, food industry development
- Horticulture – vegetable production and various niche crops are essential to rural jobs, reduced reliance on imports, export growth, food industry development

Resilience and sustainability

- Improving access to and quality of irrigation services
- Expanding climate-smart agriculture and good agriculture practices
- Improvement of productivity traits in national herd; increased animal health and welfare

Component 1 – Enhancing Sector Governance and Agriculture Knowledge Management (US\$6.5 million)

29. To improve sector governance, essential systems for policy formulation and implementation, public spending monitoring, and evaluation will be upgraded. Key institutions will be digitalized, and food quality and safety service delivery will be enhanced. Knowledge management will be improved by supporting MAFI's extension services, modernizing veterinary service delivery, and strengthening linkages between business service providers and farmers seeking EU compliance support. Gender aspects will be addressed through collaboration with the MAFI gender focal point to develop support with a gender- sensitive lens and ensure appropriate female representation in consultations and decision-making. The activities of the component are aligned with the GCRF's pillar on Strengthening Policies, Institutions and Investment for Rebuilding Better..

30. Sub-component 1.1 – Enhancing the functionality of the paying agency. In Moldova, public support to farmers is managed by a dedicated paying agency – the Agency for Interventions and Payments in Agriculture (AIPA) – which was created in 2010. It is a well-established, operational, and autonomous body that plays a critical role in the overall system of agriculture support payments. From start, AIPA was modeled after EU payment agencies, and has made considerable progress in approximating its operations to EU practices. Despite a positive dynamic, AIPA is not ready for accreditation for managing EU funds.



31. To this end, the sub-component will provide support for addressing gaps in AIPA's alignment with EU fiduciary requirements and strengthening prospects for accreditation for pre-accession funding¹⁸. The sub-component will provide technical assistance for identifying solutions to current staffing weaknesses through reforms that increase financial autonomy and ability to attract and retain qualified staff. AIPA and its territorial offices will receive financing for upgrading technical means necessary to provide an effective working environment and facilitation of digitalization, and transportation means for improved field monitoring. Lastly, the sub-component will support AIPA's digitalization transformation by financing an assessment of business processes for digital optimization, followed by the development and implementation of specific digital transformation packages integrated in the country's e-governance agenda.

32. The proposed support vectors are contextualized by recent assessments for EU accreditation readiness. These assessments acknowledge the steady improvement of AIPA's internal control systems, a stable core of experienced professionals with institutional memory, and a proven track record in implementing various payment programs, including donor-funded schemes like the MACP matching investment grant. Additionally, AIPA has made considerable progress in critical EU accreditation aspects, such as conducting regular essential staff training programs on anti-fraud and corruption, managing conflicts of interest, and implementing a risk management system.

33. Although AIPA has shown a positive dynamic, significant improvements in its human and technical capacities, as well as its business processes, are necessary to enhance its effectiveness and achieve accreditation. Assessments have revealed several areas of deficiency, including inadequate staffing levels that impede internal auditing, information system management, budgeting, and anti-fraud controls. Additionally, obsolete technical equipment, particularly in field offices, hinders the efficient decentralization and execution of field monitoring activities. A limited level of digitalization of business processes and insufficient integration with the country's e-governance agenda further exacerbates the situation. Furthermore, discrepancies with EU practices exist in relation to the separation of duties between authorization and execution of payments, data security, monitoring, anti-fraud sampling, conflict of interest management, payment procedures, and timeliness.

34. Sub-component 1.2 – Enhancing food quality and safety systems. The sub-component aims to build upon past and current efforts of the MACP to enhance the human, institutional, and technical capacities of the country's food quality and safety management systems. It seeks to ensure that the efforts continue and are in line with the EU's legislative and regulatory requirements on food safety and animal welfare. The adoption of EU acquis is a mandatory element in the country's path to EU integration and carries significant reform and modernization implications for state institutions responsible for food safety and quality, as well as producers and consumers. Therefore, the sub-component intends to address the regulatory and institutional support needs of several critical elements involved in the ongoing dialogue between national food safety authorities and the EU.

35. Activity 1.2.1 – Regulatory and institutional support. The activity aims to provide technical assistance for harmonizing the national legislative and regulatory framework with EU requirements. Although significant progress has been made, gaps in alignment with multiple EU directives governing food production still exist. On the institutional side, the activity seeks to strengthen the capacity of MAFI and the NFSA by providing training to staff involved in food safety policy formulation and implementation in line with the EU-Moldova roadmap. The project will also focus on supporting the necessary institutional actions towards ISO17020 accreditation in relation to the NFSA's competencies in inspections. Additionally, the project aims to increase awareness and technical understanding of the emerging, EU-aligned food safety, animal health, and welfare legislation and regulations among private sector entities. Finally, the activity will also

¹⁸ Such support will be coordinated with EU twining and TA programs to avoid duplication and ensure consistency of approaches.



provide support for systemic reviews for specific product lines and elaboration and implementation of action plans (including monitoring of milk quality) for achieving acceptance to the EU market.

36. *Activity 1.2.2: Technical enhancements for food safety management.* The activity will support investments aimed at strengthening the technical functionality of the country's food safety management institutions. Specifically:

(a) The activity aims to bolster the capacity of state veterinarian services by providing critical office equipment, connectivity tools, veterinary kits, and transportation means. This support will facilitate the operationalization of a new cadre of state veterinarians, totaling approximately 180, as per the NFSA's plans for 2022. The state veterinarians will play a crucial role in providing essential services related to public veterinary health mandates, bringing much-needed consistency and efficiency to the delivery of veterinary health services for animal farmers. To ensure nationwide coverage, the state veterinarians will operate from a network of 33 precincts, each with clearly defined command areas.

(b) In addition, the activity will provide support for the procurement of additional laboratory equipment for expanding testing capacities for residues of the Republican Center for Veterinary Diagnostics and training for the accreditation in new methods (determination of groups of substances and active substances). Although Moldova has made significant progress in upgrading its food safety and animal and plant health laboratory capacities, further improvements are necessary for the acceptance of Moldovan food products of animal origin to the EU market.

(c) Lastly, the activity will provide support for: (i) finalizing modules related to the country's phytosanitary registry, including data verification and updating; and (ii) establishing a system for electronic veterinary sanitary certification. The NFSA is responsible for managing the phyto-sanitary registry – the most expansive repository of data related to agriculture and food industry – and some other critical information systems and registries, which are essential for a broad range of public management needs. The activity will contribute to the integration and interoperability of these systems to establish an effective control and administration information system, which is necessary for policy support formulation and management of public support funds. Moreover, it is a mandatory requirement for the management of IPARD funds.

37. *Sub-component 1.3 – Enhancing Access to Agricultural Knowledge.* Efficient knowledge management systems for productive, processing, and marketing aspects are essential for increasing the competitiveness of Moldovan farmers and ensuring effective absorption of public and EU IPARD funds. However, the current system is disjointed and inefficient, leading to inadequate knowledge products and services for farmers to stay current on technological advances, market trends, and climate resilience practices. The existing advisory services are limited and ineffective, with narrow and piecemeal extension programs. The GOM is looking to revamp and modernize advisory services, including by prioritizing gender-inclusive approaches that offer customized services to rural female entrepreneurs.

38. *Activity 1.3.1 – Improving Agricultural Knowledge Management.* MAFI is taking steps to establish the Agricultural and Rural Advisory Center (ARAC), an apex institution designed to provide consolidated public advisory services to farmers. To support the establishment and operation of ARAC, this activity will finance technical assistance and equipment needs for several sub-activities. These include legislative and regulatory reviews, comprehensive coaching programs and training of trainers, digital tool development, an agricultural market information system, and decentralization of knowledge management and advisory service delivery to regional entities. With the goal of expanding the knowledge management mandate for ARAC and regional MAFI entities, the activity will seek to improve access to



essential knowledge through various means, such as dedicated web- and mobile-based applications, text messaging and voicemail alerts, online video courses, searchable databases, and kiosks.

39. By pursuing the activities outlined above, ARAC's technical capabilities will be enhanced, resulting in improved transmission of crucial information and knowledge to farmers. This will be achieved through better coordination of existing and potential agricultural advisory service provision, a more effective integration of public and donor-funded knowledge programs, and a more systemic engagement of all existing and potential advisory agents towards a common strategic goal of improving farmer access to agricultural knowledge. The center will prioritize key themes, such as promoting climate smart agricultural practices, supporting beginner farmers (including youth, women, and returning migrant workers), aiding existing farmers transitioning from subsistence to commercial farming and integrating into value chains, promoting productive partnerships and alliances, supporting farmer participation in specialized product/industry associations, facilitating exchanges between farmers, agri-business and innovation/research entities (local and international), and providing assistance in accessing public support programs.

40. To revamp advisory services effectively, a focus on climate resilience, particularly against drought, is crucial. This should involve promoting climate-smart technologies and resilient farming practices to manage farms, including wider introduction of local cultivars of drought-resistant varieties, improved soil management and conservation, agri-forestry, and water-saving technologies. Additionally, capacity development through adult and non-formal education on general agricultural knowledge is necessary, as many Moldovan farmers lack specialized agricultural skills. Finally, facilitating the implementation of existing climate adaptation policies and programs can be achieved by intermediating between different sector actors, including transport agents, markets, inputs suppliers, tech companies that disseminate innovative technologies such as weather stations and remote sensing, and funding programs for adaptation investments.

41. *Activity 1.3.2 – Fostering Excellence in Veterinary Services.* Establishing centers of veterinary excellence is crucial for improving the performance of the agriculture sector, particularly in livestock production. The activity aims to channel top-tier knowledge and best-practice services to animal farmers by providing improved didactic and apprenticeship basis for the country's veterinary students and continuous education opportunities for practicing veterinarians, including the cadre of state veterinarians. The activity will finance specialized technical assistance, equipment, and consumables for the operationalization of three centers of veterinary excellence. The typology of equipment will strike a balance between teaching/training needs and service delivery, including essential portable equipment and transportation means for each excellence center.

42. The livestock sub-sector in Moldova is underperforming and requires renewed attention in the context of complications with traditional supply of dairy and meat from Ukraine, Belarus, and Russia. There is a severe shortage of qualified veterinarians and animal husbandry specialists leading many producers to under-invest in animal health or rely on more expensive regional expertise from Ukraine. However, this option is expensive and available to a limited group of farmers. Furthermore, the transfer of expertise from abroad is hindered by Russia's invasion of Ukraine¹⁹. Improving access to qualified veterinary services will require increasing the pipeline of skilled veterinarians and strengthening specialized education and training programs.

43. The activity includes the establishment of three centers of veterinary excellence, with a national reference center of excellence to be established at the Technical University of Moldova²⁰, the country's only veterinary medicine

¹⁹ Security concerns and significantly more limited air connectivity since the start of Russia's invasion of Ukraine between Moldova and the rest of Europe.

²⁰ The Department of Veterinary Medicine was moved to the Technical University of Moldova in 2022 as part of a broader higher education reform which saw the folding of the former State Agricultural University of Moldova into the Technical University.



department in a higher education institution. This department will serve as the centerpiece of the country's veterinary medicine education and will host a dedicated service delivery and learning entity to address existing problems²¹. Two other regional centers of excellence will be established in collaboration with agricultural technical colleges, which will specialize in the predominant type of animal husbandry in their respective regions. The national reference center will be equipped with more sophisticated equipment for surgery and basic laboratory analysis, while the regional centers will be equipped for more routine types of training and services. The excellence centers will serve as pathways for access to knowledge on improved/high quality selection/artificial insemination services, improved herd management and productivity traits, analyses of nutrition regimen, and other productivity maximizing and animal health and welfare enhancing tools (ex. foot health of dairy cows)²². The training curriculum for the veterinary professionals will include modules on climate change vulnerabilities and impacts, and the provision of services will incorporate knowledge on adaptation practices to adverse climate impacts, as well as reduction of GHG emissions from livestock. The centers will also provide equal opportunities to female students and provide customized services for women engaged in animal husbandry.

Component 2 – Fostering Growth in Underperforming Sub-Sectors (US\$21.0 million)

44. The development of market-oriented value chains is crucial for the growth, competitiveness, diversification, and resilience of Moldova's agriculture sector. While the country has made impressive progress in developing value chains for fresh fruit, wine, cereals, sunflower seeds, and oil, there have been setbacks in sub-sectors where market and structural deficiencies, demographic challenges, and poor technologization have hindered progress. Therefore, the project aims to identify growth opportunities in value chains for dairy, meat, horticultural production of vegetables, and niche products²³. These sub-sectors offer significant potential for entrepreneurship and job creation in rural areas, particularly for women, and can help the country achieve its goals of environmental sustainability and reduced greenhouse gas emissions in agriculture. The activities of the component also directly support the GCRF pillars on Responding to Food Insecurity and Protecting People and Preserving Jobs.

45. The component aims to develop these sub-sectors in a manner consistent with EU funding requirements, which will require retrofitting of productive systems to meet the eligibility criteria for pre-accession funds. The rapid harmonization of national legislation with EU directives will impose stricter requirements related to environmental sustainability, animal and plant health, and animal welfare. Meeting these requirements will necessitate significant farm and processor-level improvements and substantial capital investments. The component seeks to pursue both sector growth and alignment of investments and processes with the general requirements of the EU IPARD program. To achieve this, the project will utilize a matching investment grant instrument, which will be capped at 50 percent of the total investment cost²⁴. This approach is in line with the two relevant measures currently supported by the EU IPARD Program.

- a. Measure 1 – "Investments in physical assets of agricultural holdings" helps farms invest in buildings or technologies to increase efficiency, competitiveness, and more sustainable agricultural production.
- b. Measure 3 – "Investments in physical assets concerning processing and marketing of agricultural and fishery products" seeks to ensure projects in food processing companies meet EU safety and environmental standards.

²¹ The university is located in the capital city – Chisinau in the central part of the country.

²² World Bank, 2021.

²³ For purposes of the AGGRI Project niche means exceptionally high-value crops that may be commercially grown on five hectares or less.

²⁴ For purposes of the AGGRI Project, a matching investment grant is defined as any grant that does not exceed a 50% cap, with the understanding that variable caps can be applied for different types of support, sub-sector, and beneficiary type.



46. *Sub-component 2.1 – Investment Support for Fostering Growth.* The sub-component aims to provide matching investment grants to livestock farmers to increase productivity, improve production standards, and enhance the quality of their products for the market. In sync with the veterinary knowledge management activities described earlier, the sub-component seeks to catalyze the transition to higher degrees of commercialization and industrialization of farms, away from the currently dominant household systems, while promoting environmental sustainability, animal welfare, and improved livelihoods for rural inhabitants. Additionally, the sub-component provides financing for promoting practices and technologies that reduce the GHG emissions of livestock operations, such as manure management, anaerobic digestion, biogas capture for energy production, and improved breeds.

47. The sub-component will provide matching investment grants for several initiatives aimed at promoting the growth and modernization of the livestock sector in Moldova. These initiatives include:

- (i) Piloting the establishment of new commercial dairy farms based on best regional and global practices in herd management, nutrition, climate resilience (drought and heat stress), and green production.
- (ii) Modernizing existing commercially oriented dairy and meat farms to increase productivity, enhance market-ready quality, and reduce environmental impact.
- (iii) Promoting effective up-stream integration of farmers into processor-driven value chains to ensure a more coordinated and efficient supply chain.
- (iv) Supporting the emergence and functionality of local cooperation units for the joint set up and operation of various productive infrastructure elements such as collection, pre-processing, slaughtering, pasture management, and fodder production.
- (v) Supporting alignment with EU market requirements and access thereof for dairy- and meat-based products, including the necessary certification.

48. The sub-component will provide matching investment grants to enable crop farmers to increase productivity, improve adherence to production standards, and enhance market-ready quantities and quality in the vegetables and niche products space. While Moldova has achieved success in developing value chains for fruits, nuts, and wine in the past two decades, other crops, primarily vegetables, berries, mushrooms, aromatic plants, leafy greens, cut flowers, medical and spices plants, have seen less dynamic development and market integration. However, these crops have the potential to become economically significant sources of domestic and foreign market supply, leading to rural job creation, increased farmer incomes, improvements in nutrition quality, and other socio-economic externalities. They are also attractive in mobilizing farmers to work together through various productive partnership arrangements. Developing these production systems will be beneficial for commercially oriented farmers seeking to cooperate, diversify, and intensify production to increase sales. The sub-component will aim to reach semi-commercial and even subsistence farmers, as the focus on vegetables and niche products could catalyze a transformative process towards commercial orientation and clustering.

49. The sub-component will provide matching investment grants for several initiatives aimed at promoting growth in cultivation of vegetables and niche products. These initiatives include:

- (i) Modernizing existing commercially oriented operations for value addition.
- (ii) Promoting effective up-stream integration of farmers into processor-driven value chains.
- (iii) Supporting the emergence and functionality of local cooperation units for joint set up and operation of various productive infrastructure elements, such as collection, storage, pre-processing,
- (iv) Supporting alignment to EU market requirements and access for fresh produce and processed products,



including needed certification.

50. *Sub-component 2.2 – Capacity Building and Business Development Support.* This sub-component will provide funding for technical assistance and capacity building activities to support livestock and crop farmers in developing their businesses. These activities will include help with creating business plans, establishing and expanding partnerships, consulting and training on integrating value chains, and implementing climate adaptation and mitigation measures. Climate adaptation will also be a requirement for successful proposals. Local business development agents, with both local and international expertise, will be the primary mechanism for delivering assistance to producers. These agents will receive coaching on the requirements of the AGGRI Project and relevant EU pre-accession instruments to ensure they can provide the best support possible. Farmers' costs for accessing business development services will be eligible for coverage as matching investment grants. In addition to assisting farmers, this sub-component will provide technical assistance to increase awareness of the project's funding opportunities and the broader EU pre-accession agenda. It will also support product/farmer associations in representing the interests of their members.

51. The specific details of the matching investment grant mechanism will be provided in the Project Operations Manual (POM) for the project. The POM will include definitions, eligibility requirements, and beneficiary typology (including gender considerations), as well as the amount of support available per category, financing conditions, and a description of the application and monitoring procedures. The POM will also include guidelines and benchmarks for addressing gender imbalances. These guidelines will cover specific communication and outreach channels for women, required participation of women in information and planning events (at least 40 percent), and techniques for accommodating the timing and availability needs of women. In addition, the POM will establish a framework for applying incentives to increase access to the matching investment grant schemes for female-owned and/or operated agricultural businesses. The goal is to ensure that at least 30% of these businesses receive support from the project²⁵.

Component 3 – Strengthening Resilience through Irrigation Services (US\$25.0 million)

52. Moldova's agriculture sector is highly susceptible to a range of climate change risks, but particularly drought. Therefore, expanding the availability of irrigation services to interested farmers has become a growing necessity. This need arises not only from the transition to high-value agriculture, which requires water-intensive cultivation of fruits and vegetables, but also from the cultivation of field crops. While Moldova has made progress in establishing a legal and regulatory framework for the functioning of WUAs and transferring assets to them, investments in CISs outside of the MCC Compact Project have been limited. Therefore, public investments must now be directed towards these CISs, which have been or are being transferred to WUAs. Doing so will ensure technical functionality, greater adoption of services, more efficient water, and electricity usage, and facilitate a transition to more productive cropping patterns. (See Annex 3 for further details). The component is aligned with the GCRF pillar on Strengthening Resilience.

53. *Sub-component 3.1 – Rehabilitation of Irrigation Infrastructure.* The GOM is pursuing a swift launch of investments for the rehabilitation of CISs for which feasibility studies and/or technical design work currently exists. There are several command areas under large-scale pumped systems that are already operated and managed by WUAs and for which feasibility and some technical work has been carried by the MCC Compact Project or independently by WUAs. The sub-component will finance a broad range of activities aimed at increasing crop farmer capacity to access irrigation services. Furthermore, crop farmers in the participating WUAs, will be encouraged to take advantage of all investment and business development opportunities afforded by the project under Component 2.

²⁵ The target is set based on existing data on uptake by female farmers/entrepreneurs of past or on-going support programs in the agriculture sector of 20-23 percent.



54. *Activity 3.1.1 – The Rehabilitation of the Tudora CIS.* The activity will support the rehabilitation of the Tudora CIS and its interconnection with the Caplani CIS²⁶. Specifically, it will finance the completion of the technical design of the second phase of the rehabilitation project and capital investments required for the functional rehabilitation of the irrigation infrastructure in the command area. The WUA has already initiated the development of technical project documentation for a two-phase approach to the rehabilitation of the systems: (i) the rehabilitation of the Tudora CIS collection station, construction of an adduction pipeline, and the rehabilitation of the existing water storage reservoir and (ii) the rehabilitation of the transit pumping station and the construction pipeline to the Caplani CIS. The technical design of the first phase is near completion and ready for implementation. The estimated cost of the rehabilitation of the irrigation infrastructure in this command area is US\$20.0 million.

55. The Tudora CIS is currently non-functional, while the Caplani CIS is partially functional through abstraction of water from the nearby Caplani village lake. This is a MCC Compact Project legacy scheme for which a feasibility study was prepared in 2009, but whose rehabilitation was not funded under the project. The initial feasibility study was done in the context of the much larger Suvorov Massif CIS, hence the narrower focus of the rehabilitation of the Tudora CIS requires additional updates of technical aspects. The two CISs are based in the Nistru river basin in the southeastern part of the country, which represents one of the four distinct agri-climatic regions of Moldova, characterized by a steady and increasingly frequent deficit of precipitation²⁷ (Picture below). Crop losses in the area can reach 100 percent in the driest years. The rehabilitation of the two CISs will bring into the irrigated circuit approximately 3,700 hectares of fertile land in which field crops, vegetable production and vineyards dominate the productive landscape. The two schemes are managed by the “Irig-Com” WUA, for which the transfer of operation and management of the irrigation infrastructure was completed in March of 2020. The WUA exhibits a lot of dynamism and encompasses members that understand the value of irrigation services and are ready to be meaningful contributors to the rehabilitation works.

56. *Activity 3.1.2 – The Rehabilitation of the Tetcani CIS.* The activity will finance feasibility work and the technical design for the rehabilitation of the Tetcani CIS and its interconnection with the Corjeuti CIS²⁸. The technical design will be based on principles of energy efficiency and conservation, and water efficiency and conservation, to provide the space for climate change mitigation and adaptation benefits. This is a MCC Compact Project legacy scheme for which a feasibility study was prepared in 2009, but whose rehabilitation was not funded under the project. The initial feasibility study requires considerable update. It foresees the rehabilitation of the existing infrastructure of the Tetcani CIS, including the rehabilitation of two pumping stations for intaking water from the Prut River. This will eliminate dependence on water abstraction from a reservoir on the Vilia River (a Prut River tributary), a shallow and unreliable source of water for irrigation. These upgrades will also create preconditions for the interconnection of the Corjeuti CIS which was not foreseen by the initial feasibility study. The planned rehabilitation of the two CISs will bring into the irrigated circuit about 1,900 hectares of fertile land in which field crops, fruits and vegetables dominate the production landscape. In general, this northern area specializes in the cultivation of a wide range of vegetables and tubers, priorities for increased agriculture sector growth. In addition, war-related domestic food security considerations come into play as Moldova annually imports massive quantities of potatoes from Ukraine, Poland, and Belarus.

57. The two schemes are currently managed by the “Irigarc-Nord” WUA²⁹, for which the transfer of operation and management of the irrigation infrastructure was completed in March of 2020. This is a strong WUA which exhibits a lot

²⁶ Tudora and Caplani are communities in the Stefan Voda district in Southeastern Moldova.

²⁷ Reducing the Vulnerability of Moldova’s Agricultural Systems to Climate Change, World Bank, 2013

²⁸ Tetcani and Corjeuti are communities in the Briceni district.

²⁹ The WUA manages another CIS in the village of Beleavinti, Briceni district.



of proactivity and understanding of the value of irrigation services and will represent an attractive option for further rehabilitation of the public irrigation infrastructure under its management.

58. *Activity 3.1.3 – The Rehabilitation of the Etulia CIS.* The activity will finance feasibility work and the technical design for the partial rehabilitation of the Etulia CIS³⁰. The service area is in the southern-most part of the country, one of the four distinct agri-climatic regions of Moldova, characterized by the hottest and driest climate³¹, and devastating impacts of frequent droughts. The scheme relies on abstracting water from the Cahul lake (fed by the Danube) and will require the rehabilitation of existing pumping and repumping stations, lining of an existing channel with geomembrane (1.6 kilometers), replacing an existing channel with a pipeline (15.3 kilometers), and the construction of 2 new repumping stations and 2 storage reservoirs. This is not an MCC Compact Project legacy scheme, and no prior feasibility studies were carried out during its duration. The technical design for the rehabilitation of the CIS will be based on principles of energy efficiency and conservation, and water efficiency and conservation, to provide the space for climate change mitigation and adaptation benefits. It will also rely on the WB's Resilient Water Infrastructure Design brief for the rehabilitation of irrigation systems which include water distribution networks.

59. The CIS is operated and managed by the “Allin-Su” WUA which received a contractual mandate for the management of an irrigated command area of 2,700 hectares in March 2020. This is a strong WUA that encompasses members that understand the value of irrigation services and are already meaningfully contributing to the rehabilitation of the schemes under their management. Showing initiative, the WUA has invested in the preparation of a technical design for the partial rehabilitation of the CIS. The rehabilitation of the CIS will bring into the irrigated circuit approximately 3,500 hectares of fertile land in which field crops and fruit production (the area boasts 1,500 hectares of perennial plantations) dominate the landscape.

60. *Sub-component 3.2 – Strengthening the enabling environment for irrigation management.* The sub-component will provide funding for the establishment of a propitious environment for the rehabilitation of targeted CISs; for creating conditions for maximizing up-take of irrigation services by farmers; and for enabling an effective institutional response to the existing and emerging challenges in irrigation sector. Specific areas of support include:

- a) Contract management and technical supervision related to the rehabilitation of the CISs.
- b) Institutional development of participating WUAs by providing training for transparent and inclusive governance and efficient management. This includes optimizing operations, improving up-stream linkages with agri-meteorological services, disseminating knowledge on risk management practices, and promoting gender equality and addressing voice and representation gaps in WUAs³².
- c) Institutional and policy reforms in the water resource management and irrigation space and strengthen technical capacities in MAFI, the Water Agency - *Apele Moldovei*, and the future National Agency for Land Improvement.

Component 4 – Contingent Emergency Response Component (CERC)

³⁰ Etulia is a community in the Gagauzia Autonomous Territorial Unit and the Cahul district.

³¹ Reducing the Vulnerability of Moldova’s Agricultural Systems to Climate Change, World Bank, 2013

³² Training will be provided to promote women to managerial and management board positions.



61. Due to the country's documented vulnerability to natural disasters and the precarious regional security situation with potential repercussions on Moldova's stability, the GOM has opted to include a CERC that can be activated in case of an eligible emergency event. Following such an event, the GOM may request of the WB to reallocate uncommitted project funds to finance an emergency response. An eligible emergency and/or crisis are any natural or human-made events that has caused or are likely to cause imminent adverse economic and/or social impacts to the country. The design of the CERC will be contingent on the type and impact of an emergency and will not be *a-priori* limited to any sectors, regions, or specific activities. The activities financed by the CERC will be demand- and event-driven and will be detailed in a GOM Action Plan of Activities. The definition of an eligible emergency, conditions for triggering the CERC and a positive list of financed activities will be included in the project's legal documents, and the mechanics of the decision-making process and implementation of the CERC will be reflected in the CERC Operations Manual, as part of the overall POM.

Component 5 – Project Management (US\$2.5 million)

62. This component will finance costs related to project implementation and coordination across various government agencies. MAFI will play the leading implementation role, while relying on its departments, sub-divisions, and subordinated agencies to provide technical support for implementation. Of these, the Consolidated Agriculture Project Management Unit (CAPMU), will perform a range of fiduciary, coordination and supporting functions to ensure efficient project implementation and compliance with MAFI's commitments on social and environmental safeguards, procurement, financial management and monitoring and evaluation. AIPA will play a key role in the project's set-up for the implementation of the matching investment grant schemes.

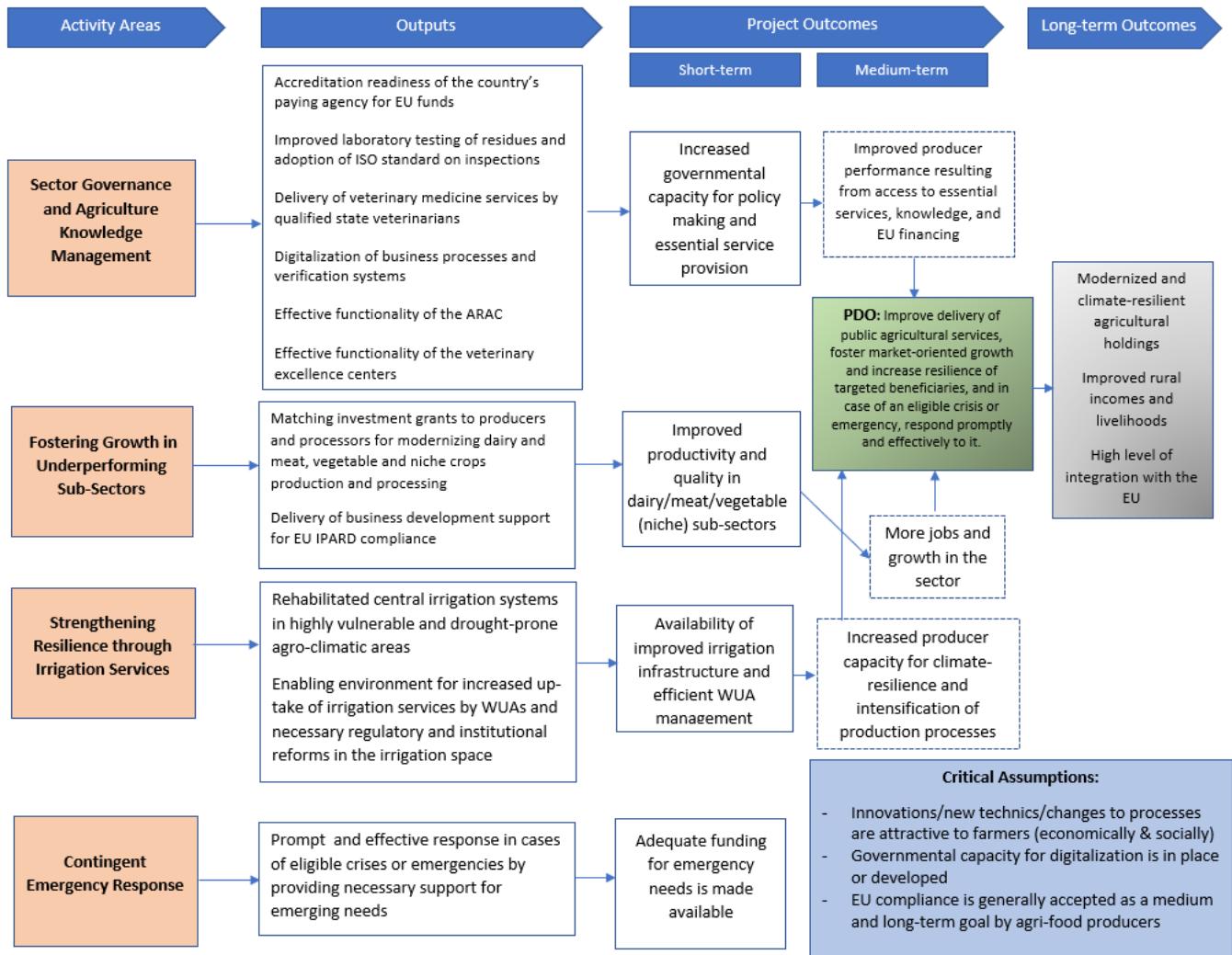
C. Project Beneficiaries

63. The AGGRI Project is set to bring numerous benefits to a diverse range of private enterprises, public institutions, and non-profit organizations. Private entities that stand to gain from the project include both existing and emerging farming and processing companies that are seeking to improve production processes, increase their capacity to access markets, and bolster their farm-level climate resilience. In particular, female-owned, or female-managed farms and firms, which are often underrepresented in the agriculture sector and are less likely to secure bank loans or engage in export activities, will benefit significantly from the project. The AGGRI Project will also enhance the capacity of public institutions that play crucial roles in the EU integration/pre-accession process, as well as institutions that provide essential services to farmers such as the ARAC, NFSA, and AIPA. Finally, a wide range of non-profit entities operating in the advisory and business development space, centers of excellence based in higher education and vocational establishments, and product producer associations will benefit from the project.

D. Results Chain

64. Figure 4 below presents the project's Theory of Change. Low and volatile yields, insufficient quality of produce, and climate change are limiting the agri-food sector's ability to improve rural livelihoods. The project will address these issues through interventions focusing on: (i) enhancing the functionality of AIPA; (ii) enhancing knowledge management systems; (iii) strengthening food safety and quality systems; (iv) modernizing agri-food sector production and processing; and (v) supporting upgrading of irrigation infrastructure.

Figure 4: Theory of Change



E. Rationale for Bank Involvement and Role of Partners

65. The WBG possesses the necessary global and country knowledge, as well as relevant analytical and operational experience to support the GOM with the design and implementation of the project. Regarding agriculture sector governance, the WBG brings an extensive body of knowledge and best practices from Romania, Montenegro, Albania, Turkey, Ukraine, Uruguay, and multiple other countries where similar activities were implemented. The WBG will also provide proven technical expertise and facilitate knowledge-based approaches in the implementation of modern and sustainable practices in livestock and horticulture, building on numerous projects successfully implemented in various regions of the world, including in EU countries which have undergone pre-accession and accession transitions. Similarly, the WBG will bring to the fore highly salient global lessons-learned on strengthening of irrigation services and implementation of climate-smart activities. In 2020, fifty-two percent of all WBG financing in agriculture targeted climate adaptation and mitigation. The WB can also play a key role in sourcing global knowledge and experience to inform the



use of digital agriculture innovations. In the past two years, fifteen WB agriculture projects have included a digital component.

66. The new project aims to build on the success of the ongoing MACP project, which has helped Moldova improve its export competitiveness, attract investments, and promote good agricultural practices for the past ten years. MACP has accomplished significant achievements, such as strengthening the country's food safety management system, improving access to premium markets through investment in post-harvest infrastructure, and promoting sustainable agricultural practices. The project seeks to further enhance Moldova's agricultural competitiveness and compliance with EU standards, leading to higher growth and resilience in the sector.

F. Lessons Learned and Reflected in the Project Design

67. The AGGRI Project builds on lessons from the implementation of the previous Moldova CPF, previous WB lending projects, and recent gender assessments. One of the main lessons drawn from the implementation of the previous Moldova CPF is that the WBG is most effective when it combines policy dialogue, knowledge, lending, private sector investment and advice in support of long-term strategic goals. In this regard, the project will build on this experience and include technical assistance and knowledge sharing, public investments, and direct financial support to farmers.

68. MACP implementation lessons display the importance of a project design that includes: (i) support for regulatory and institutional reforms for better public service delivery to farmers; (ii) a system to support agricultural enterprises in boosting competitiveness and gaining access to foreign markets; and (iii) access to finance and business development services. Particularly, business development services for the establishment and support of producer groups have significantly facilitated the likelihood of their proper functioning and survival. Impact evaluations showed that such specialized technical assistance improved internal management systems and organization as well as improved production and sales management.

69. WBG projects in Moldova have shown that support for regulatory and legislative activities is more successful when part of a larger program. Moldova's commitments to the EU Association Agreement have led to higher levels of commitment and proactivity in implementation. As Moldova prepares for the EU pre-accession process, EU benchmark reports and action plans will serve as programmatic roadmaps. Recent EU pre-accession and accession experiences demonstrate the need to prepare country systems and agricultural/processing enterprises for receiving EU funds. Some countries have struggled with accreditation of payment agencies, resulting in delays, and missed development benefits. The project's Components 1 and 2 focus on supporting Moldova's efforts to accredit a paying agency, improving advisory services, and assisting farmer with financing and technical support to pursue EU-eligible investments based on environmental sustainability, animal and plant health, and animal welfare criteria.

70. Finally, it's important to have a variety of instruments to support vulnerable agricultural enterprises, including female-managed companies that are often overlooked. Women are more likely to access funding opportunities through support programs and development projects, according to the Moldova Comprehensive Gender Assessment (2022)³³. The project will narrow the gap between female- and male-managed companies with a specific focus on gender inclusivity.

³³ Moldova Comprehensive Gender Assessment, United Nations Moldova, 2022.



III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

71. An existing inter-ministerial Steering Committee, established in accordance with the GOM Decision No. 878 dated September 29, 1999 (to be revised to include the relevant up-dates for the AGGRI Project), will perform overall supervisory, coordination and strategic guidance functions for the project. Currently, the Steering Committee has representatives of MAFI, the Ministry of Finance (MOF), the Ministry of Economy, the Ministry of Environment, the Prime-Minister's office, and civil society. The project will be implemented by MAFI, with support from beneficiary institutions, specifically assigned component coordinators, AIPA (Component 2), and CAPMU for all components. Beneficiary institutions will provide contributions on technical aspects for the preparation of Terms of Reference and Technical Specifications. Component coordinators will support MAFI on technical implementation subjects of their respective components. The matching investment grant scheme will rely on AIPA³⁴ for screening of grant application, disbursements, delivery of grants to beneficiaries, financial management and monitoring of grant implementation. Finally, CAPMU³⁵ will provide support for overall coordination of implementation across components and oversee disbursement, financial management and procurement activities. Functions related to the implementation of the Environmental and Social Framework (ESF) and results monitoring will be interspersed across several entities (Figure 5 below). To ensure transparency of the procurement process MAFI will establish representative evaluation committees for specific procurement activities.

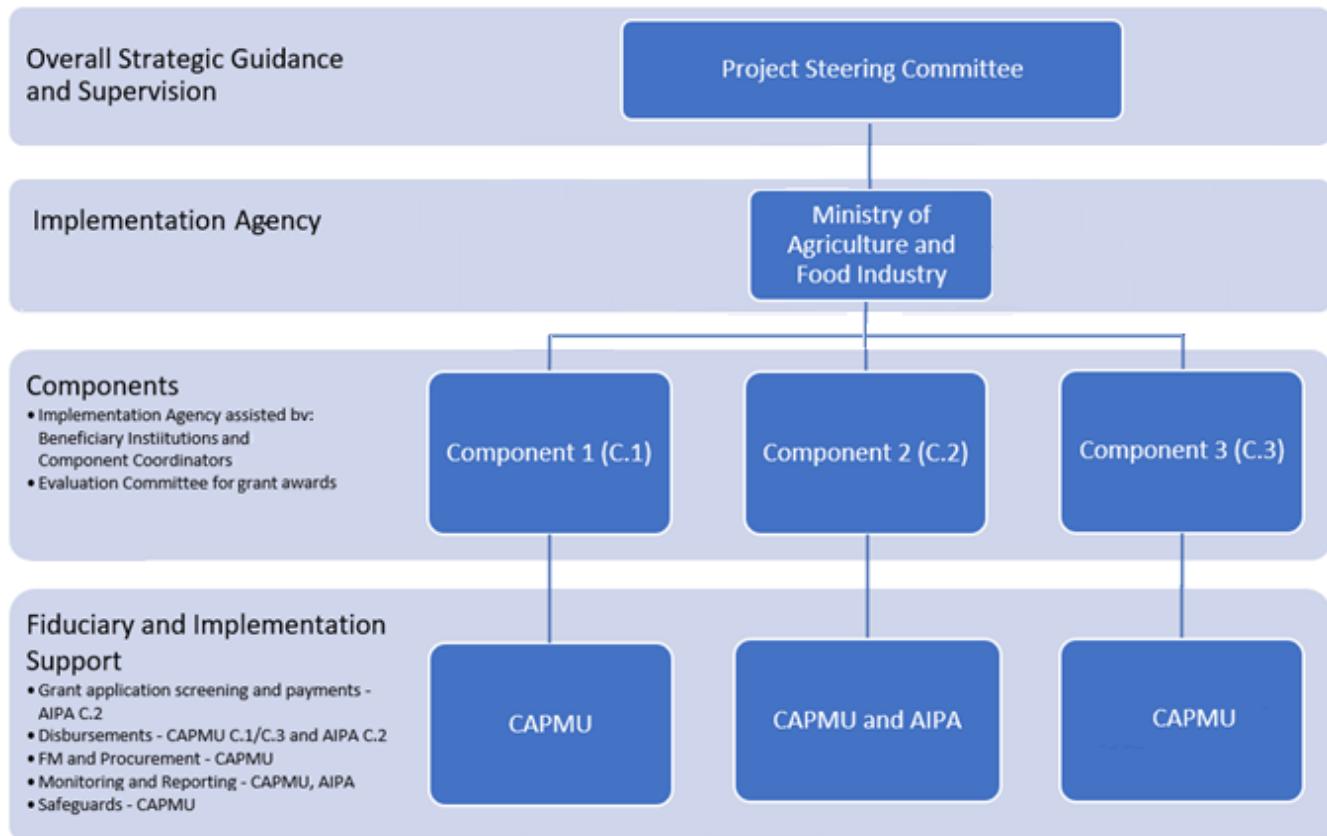
72. To ensure efficiency and transparency in the selection of matching investment grant beneficiaries under Component 2, MAFI will establish a grant evaluation committee in charge of announcing competitive selection rounds, reviewing, and evaluating applications, and making award decisions. To ensure the transparency of the review, evaluation and award processes, the decisions of the committee (both awards and rejections) will be made public on MAFI's and/or AIPA's sites. The composition of the evaluation committee, and any subsequent compositional changes, will be approved by the Steering Committee. The committee will include representatives of MAFI, MOF, State Chancellery and independent technical³⁶ experts. The initial screening of grant applications will be carried out by AIPA.

73. The project will be implemented based on a POM approved by the project's Steering Committee and accepted by the WB. The POM will include: (i) the project's overall operating, fiduciary, and decision-making procedures; (ii) results monitoring arrangements; (iii) a Grant Operations Manual detailing the operating principles of the project's matching investment grant schemes; and (iv) a CERC Operations Manual. Only the Steering Committee will have the authority to amend the two documents above provided such amendments are acceptable to the WB.

³⁴ AIPA is institutionally subordinated to MAFI.

³⁵ CAPMU was established in 1999 through Government Decision 878 and has more than ten years of experience in providing fiduciary support in the implementation of Bank-financed projects in agriculture and rural development.

³⁶ The profile of technical experts will be specific to the thematic area.

**Figure 5: Project administration mechanism**

B. Results Monitoring and Evaluation Arrangements

74. The project's monitoring and evaluation activities will be focused on several types of data specific to activities under each component in accordance with the Results Framework described in Annex 1. The responsibility for monitoring and evaluating results/outcomes will rest with the Implementation Agency. In addition, AIPA, NFSA and CAPMU will provide the necessary technical and system support for collection, processing, and maintenance of monitoring data. CAPMU will support MAFI on producing semi-annual consolidated progress and results monitoring reports for review by the Bank and management of impact evaluation activities mid-way and at the end of the project implementation cycle.

C. Sustainability

75. The GOM has shown a commitment to enhancing sustainable growth in the agriculture sector by modernizing its food safety and quality management system, directing public support programs towards investments and rural development, adopting open market policies, and focusing on enhancing sector resilience to climate and market risks. The project is aligned with this development agenda and has strong government buy-in and commitment for implementation, which are essential for long-term sustainability. The project's mix of activities includes investments, technical assistance, and capacity building for public institutions and private sector players to ensure their effectiveness during implementation and emergence as stronger entities in the future. The project also focuses on engendering a



transformative alignment with EU requirements, which will result in higher degrees of resilience and sustainability for farms and processors.

76. The long-term sustainability of the project's investments will depend on continuing budgetary support for public entities and proper provisioning of operating and maintenance/replacement costs for private entities. The government is aware of this need and has shown a high degree of certainty that it will continue to provide support for the entities financed under the project. The sustainability of farm-based investments and irrigation infrastructure will be ensured by financing new and energy-efficient equipment for entities with sound business plans and solid financial projections, complemented by technical assistance on proper business planning and operations.

77. The ownership demonstrated by MAFI during the preparation stage is a promising sign of successful implementation. It has worked closely with the task team to develop the project's components and has provided rigorous and timely technical inputs. The project's technical and fiduciary arrangements also involve CAPMU, an experienced and well-staffed entity, which adds to the sustainability outlook.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis (if applicable)

78. The project's procurement process will prioritize the technical requirements for goods that will upgrade existing technologies and equipment in both public institutions and the private sector. The aim is to improve performance standards, increase efficiency, and boost productivity while enhancing climate adaptation and mitigation capabilities. Technical requirements for civil works will aim to improve the functionality of project-targeted facilities and will be based on international best practices and standards in design and engineering, such as those set by the International Federation of Engineering Consultants. Additionally, these requirements will adhere to national building codes and standards.

79. The project is expected to have several general economic benefits, including (i) improving rural livelihoods and increasing the incomes of project beneficiaries; (ii) creating new, higher quality jobs, both on-farm and off-farm, by providing access to new market opportunities and technological innovation; (iii) strengthening the resilience of the agriculture sector to climate change by improving access to irrigation, deploying climate-smart agriculture practices, and promoting environmentally friendly livestock production; and (iv) increasing tax revenues resulting from increased business activity in selected sub-sectors and exports. Public sector financing for the project's activities is appropriate as it will be used to (i) support public goods; (ii) serve the country's strategic purpose of economic realignment towards the EU; (iii) address existing market failures in access to knowledge and investment finance; (iv) reduce farm-level emissions and alleviate negative externalities associated with climate change; and (v) stimulate and/or attract private sector investment. The new productive investments in agricultural holdings, processing units, and centralized irrigation infrastructure will not only benefit direct beneficiaries and members of the WUAs who own and operate assets but will also support entire communities by generating significant wage employment opportunities and making these facilities available for use when capacity is not fully used by current owners and operators.

80. The project's economic analysis includes both qualitative and quantitative assessments. For economic benefits that are not quantifiable ex-ante but are assumed to occur and outweigh costs, qualitative assessments are provided based on well-established evidence from similar activities. For demand-based activities, a qualitative proxy analysis is provided using monitoring data and econometric models based on MACP experience in providing matching investment



grants. Quantifiable benefits have been analyzed for access to irrigation activities, with Net Present Value (NPV) and Economic Internal Rate of Return (EIRR) calculations provided below.

81. *Component 1:* The economic case is based on evidence of returns to investments resulting from institutional strengthening, improved public service delivery, and effective advisory services focused on sustainable agricultural and animal husbandry practices. Institutional development activities under this component will focus on strengthening the capacity of key sector institutions, resulting in incremental growth, climate adaptation and mitigation Co-Benefits, improved public health outlook, progress on animal health and welfare, and higher environmental sustainability. These activities will also support transparent and economically efficient use of existing agricultural public support programs and increase capacity for streamlined application of future EU pre-accession instruments and the ensuing absorption of EU funds. By strengthening relevant national food safety functions, the project will ensure sustained progress in accessing EU (and EU-like) food markets. The project will also improve sectoral and inter-sectorial coordination within the government for the formulation of improved agriculture policies and programs and required action plans, including on EU pre-accession (and eventually membership negotiations). Improved agricultural knowledge management systems will increase awareness and availability of knowledge on good agricultural practices and sustainable farming, reducing costs associated with pollution of soil and water, maintaining their qualitative functions, and increasing the implied economic value of potential environmental services provided by the sector. The project is also expected to increase awareness and application of climate smart agriculture approaches, thus enhancing sector resilience, and reducing economic and financial losses from weather-related disasters.

82. *Component 2:* The project aims to co-finance investments that address market failures in livestock and horticulture sub-sectors, with sub-projects that are entirely demand-driven and cover a wide range of investment activities. Due to the uncertainty of the final typology and financial requirements of each sub-project, ex-ante quantitative economic and financial analyses are unfeasible. However, robust economic and financial benefits are expected since investments are awarded based on firm eligibility criteria, and previous agricultural matching investment grant schemes have been efficient and cost-effective. Matching investment grant schemes have catalyzed private investment, formalized and transparentized agricultural operations, increased taxable revenue from agriculture, and created rural employment. MACP impact assessments demonstrate positive NPV and Financial Internal Rates of Return for most sub-projects, indicating strong correlations between the award decision and actual financial results achieved by the grantees.

83. A more specific look into the results of MACP indicate the following:

- (i) The matching investment grants have successfully expanded post-harvest infrastructure owned and operated by producer groups.
- (ii) Private finance mobilized through the grants exceeded 160% of their value, demonstrating effectiveness in catalyzing additional investment.
- (iii) The targeted agricultural businesses supported by the grants saw a 65% increase in aggregate sales, including through direct exports.
- (iv) The grants also resulted in the creation of over 3,000 jobs in rural areas.
- (v) Beneficiaries of the grants have demonstrated a higher propensity to invest and improved access to finance.
- (vi) The project's technical assistance has played a significant role in the success of grant beneficiaries, as evidenced by a high correlation between technical assistance and project outcomes.



84. Component 3: Improved and modernized irrigation is a crucial factor in enhancing agricultural productivity. The AGGRI Project proposes two main outputs: (a) rehabilitation and improvement of physical structures to reduce irrigation water losses and increase irrigation coverage; and (b) creation of a conducive environment to increase production, land productivity, recover irrigation areas, and shift cropping patterns from lower to higher value crops (HVCs), primarily fruits and vegetables. These outputs are expected to yield positive financial and economic impacts.

85. The NPV, EIRR, and Benefit/Cost calculations are based on net incremental benefits, with a forward-looking framework adopted for determining costs and estimating benefits for the Tudora CIS. Incremental benefits were determined by comparing "with" and "without" project scenarios, and the economic appraisal was conducted over a 30-year period, with projected price increases of 6 percent per year in the first few years and 3 percent per year thereafter. The financial analysis examined investments in farms, including small farms and larger agricultural enterprises, with an expected shift towards higher-value crops at the expense of lower-value cereals and field crops. The cultivation of vegetables in open fields and greenhouses is expected to yield higher productivity due to irrigation and support from Component 2, which aims to boost the vegetable sub-sector.

86. The expected benefits of investing in the Tudora CIS center on increased productivity, cropping intensity, and the adoption of higher value crops such as fruits and vegetables. These benefits, specific to the project scenario, include increased yields for crops in previously non-irrigated areas, a significant expansion in the irrigated surface area, the use of high-efficiency irrigation, changes in cropping patterns, increased number of harvests per year, and mitigating productivity losses due to severe droughts like those experienced in 2020 and 2022. The project is expected to generate positive economic spillover effects, including higher income and employment opportunities, especially in the greenhouse sector. An expansion of greenhouses to 200 hectares from 25 hectares suggests a significant boost in agricultural employment in the project region, leading to positive spillover effects from increased income. The project will also increase agricultural production in Moldova, particularly in the vegetable and fruit sectors, which will have a positive impact on import substitution and increased exports.

87. The project is expected to increase the net family income of beneficiaries by an average of 56-73 percent, depending on farm size and the degree of diversification into HVCs. With the shift to HVCs, the labor requirement is estimated to increase from about 81-98 days (around 3 months) to about 86-121 days (around 4 months) per farm per year. However, this is well below the working capacity of an average family. The return to family labor is expected to rise from about US\$20-US\$30 to US\$28-US\$47 per day with the project, which is well above normal wages in rural areas.

88. The productivity of the project areas is expected to improve significantly with the implementation of the Tudora CIS rehabilitation, as water supply through irrigation will be tailored to crop needs based on crop type, development stage, temperatures, and soil water capacity. The project assumes yield improvements between 30 to 80 percent for open field vegetables and 13 to 40 percent for fruits. Specifically, an increase of 21 percent in apple yield, 13.2 percent in peach yield, 38.6 percent in plum yield, and 18.6 percent in vine grape yield is assumed. Additionally, some yield gains will compensate for the reduced area of production in cereals and field crops.

89. Investing in Tudora CIS is not only economically viable, but also has significant potential for impact, according to the cost benefit analysis. The estimated EIRR of 19.77 percent and a Benefit/Cost ratio of 3.5 indicate strong returns on investment. Even under worst-case scenarios tested through sensitivity analyses, such as a 20 percent reduction in benefits and a 20 percent increase in costs, the project remains economically viable with an EIRR of 11.94 percent and a Benefits/Cost ratio of 2.3. The NPV, calculated at a 6 percent discount rate, is estimated to be US157.3 million, demonstrating the project's long-term financial potential. Furthermore, the GHG analysis conducted on the component



shows additional benefits from reducing emissions by 6,013 tCO₂eq over 20 years (301 tCO₂eq per year). The cost-benefit analysis considers both low and high shadow prices³⁷ and shows small and non-significant improvements. The EIRR increases slightly to 19.84% (0.1 percent increase) under high shadow prices, with an NPV of 157.8 million and a Benefit/Cost ratio of 3.5 (see Table 1). Overall, these findings indicate that investing in the Tudora CIS is a viable and sustainable project, with potential for both economic and environmental benefits.

Table 1: Cumulative results of the Economic Analysis (US\$)

| Components | NPV (US\$) million | EIRR | B/C |
|--|-----------------------|--------|-----|
| Tudora CIS Baseline (no GHG) | 157.3 | 19.77% | 3.5 |
| Tudora CIS Baseline (with GHG low shadow price) | 157.6 | 19.81% | 3.5 |
| Tudora CIS Baseline (with GHG high shadow price) | 157.8 | 19.84% | 3.5 |
| Tudora CIS Scenario 1 (10%) | 123.3 | 15.70% | 2.9 |
| Tudora CIS Scenario 2 (20%) | 95.6 | 11.94% | 2.3 |
| Tudora CIS optimistic scenario | 185.7 | 24.51% | 4.3 |

Source: WB team calculation

B. Fiduciary

(i) Financial Management

90. The Financial Management (FM) assessment of CAPMU and AIPA was conducted in accordance with the Financial Management Manual for WB Investment Project Financing Operations. Overall, the FM arrangements in these entities were deemed suitable to implement the project and met the requirements of the WB Policy and Directive on Investment Project Financing. The project's FM arrangements will be based on the well-established and functional FM set-up of the ongoing MACP. To this end, CAPMU, an experienced project implementation unit, will assume overall FM responsibility for the project, including preparing regular financial reports and arranging project audits. Meanwhile, AIPA will manage the dispensing, monitoring, and implementation supervision of the matching investment grants. To ensure efficiency and compliance with project procedures, AIPA will conduct rigorous reviews of documentary evidence and field monitoring of the execution of the matching grants schemes. The execution of matching grants/support will also be closely monitored by the WB task team through regular documentary and fieldwork. Additional details on FM arrangements and the flow of funds mechanism are provided in Annex 1. More specific details will be developed and provided in the POM.

91. The project carries two major FM risks: insufficient or untimely budgetary appropriation and allocation, and inadequate implementation of matching investment grant schemes. To mitigate these risks, CAPMU and AIPA must ensure that realistic project budgets and forecasts are included in the Medium-Term Budgetary Framework and Annual State Budget Law. They will also coordinate with MOF to make any necessary budgetary revisions in a timely manner. A rigorous supervision mechanism for matching investment grant schemes, acceptable to the WB, will be established, and internal compliance will be checked as part of annual financial audits. The project's residual FM risk is assessed as *Moderate*.

³⁷ 2022 Guidance Note



92. The project will rely on some elements of Moldova's public FM system, including project planning in accordance with MOF's budgetary rules and preparation procedures for all budgetary units, inclusion of the project in the Annual State Budget Law, and flow of funds through a single treasury account. The execution of the project budget will be overseen by the State Treasury, which will apply additional controls over spending limits. The 2021 Public Expenditure and Financial Accountability Assessment of the Public FM systems in Moldova indicates that state budget planning, execution, controls, and reporting are overall strong.

93. The project's consolidated financial reports will be prepared by CAPMU, with inputs from AIPA for Component 2, in accordance with the International Public Sector Accounting Standards "Financial Reporting Under the Cash Basis of Accounting" issued by the International Public Sector Accounting Standards Board of the International Federation of Accountants. The Interim Financial Reports (IFRs) will be prepared by CAPMU quarterly following an agreed format and submitted to the WB within forty-five days of the end of each calendar quarter.

94. The annual financial audit for the project will be conducted by an independent private audit firm acceptable to the WB, on Terms of References agreed with the WB and procured by CAPMU. As part of the financial audit, the auditors will review compliance with implementation of the matching investment grant schemes. Annual audited project financial statements will be submitted to the WB within six months of the end of each calendar year and at project closing. After formal acceptance of these reports, the WB and CAPMU will make them publicly available on their websites.

95. The basis for disbursement of project advances into Designated Accounts (DAs) will be the Consolidated IFRs, which will be accompanied by forecasts of cash flow needs prepared by CAPMU and AIPA. Other disbursement methods, such as direct payments and reimbursement, will also be applicable. To facilitate disbursement, CAPMU and AIPA will open separate accounts at the National Bank of Moldova, with access to funds under their respective components/sub-components. More details on the disbursement arrangements applicable to the project are provided in the Disbursement and Financial Information Letter (DFIL).

(ii) Procurement

96. The procurement arrangements for the project will be based upon the established and successful framework of the on-going MACP. CAPMU, an experienced project implementation unit, will lead the procurement function for the project, which will involve coordinating the preparation of technical specifications, terms of references, procurement documents, and the organization of procurement processes. CAPMU currently employs a full-time Procurement Specialist with experience in following the Procurement Guidelines and using the Systematic Tracking of Exchanges in Procurement (STEP).

97. Procurement for the project will be conducted in accordance with the WB Procurement Regulations for Investment Project Financing Borrowers: "Procurement in Investment Project Financing of Goods, Works, Non-Consulting and Consulting Services," dated November 2020 (hereinafter referred to as the "Procurement Regulations") and the most up-to-date Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits.

98. Overall, the AGGRI Project's Procurement Strategy for Development (PPSD) provides sufficient justification for the selection methods outlined in the Procurement Plan. The strategy was reviewed and approved by the WB. Annex 1 contains a summary of the PPSD and additional information on the procurement arrangements.



99. The WB team's assessment identified the following procurement process issues and implementation risks: (i) limited knowledge and experience with the Procurement Regulations; (ii) delays in the development of terms of reference and technical specifications; (iii) potential delivery delays of goods or materials due to the current security situation in the region; (iv) possible increases in the cost of contract performance; and (v) potential delays in contract implementation.

100. To address the identified risks, several measures have been put in place: (i) the WB will provide comprehensive training on Procurement Regulations; (ii) all entities involved in implementation, particularly MAFI/CAPMU/AIPA/ANSA, will attract technical expertise for highly specialized technical areas; (iii) MAFI will closely monitor contract implementation by establishing proper contract administration mechanisms such as regular inspections and meetings, and will amend contracts if delivery is delayed due to the current security situation in the region; (iv) price adjustment formulas will be included in contracts where justified, even if these are shorter than 18 months; and (v) the procurement capacity within CAPMU will be enhanced by hiring additional procurement specialists. As a result, the project's residual procurement risk has been assessed as *Low*.

101. The WB will exercise its project procurement oversight through a risk-based approach comprising prior, post, and independent procurement reviews as appropriate. Post reviews will be conducted to determine contract compliance with legal requirements and the POM. The project will use STEP, an online tool for procurement planning and tracking to prepare, clear and update the project's Procurement Plan. The project counterparts have developed a Procurement Plan for the entire scope of the project.

C. Legal Operational Policies

| Triggered? | |
|---|-----|
| Projects on International Waterways OP 7.50 | Yes |
| Projects in Disputed Areas OP 7.60 | No |

102. The Operational Policy (OP) on Projects on International Waterways (OP 7.50) applies to this Project because the activities of Component 3 will involve the use of water from the Prut River and Cahul Lake which are connected to the Danube River system shared by Albania, Austria, Bulgaria, Bosnia and Herzegovina, Czech Republic, Germany, Croatia, Hungary, Italy, Moldova, North Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia, Switzerland, and Ukraine, and the Nistru River shared between Moldova and Ukraine. A determination was made that neither the quantity nor quality of the water in the international water ways will be impacted by the rehabilitation works of the existing irrigation infrastructure, and any additional irrigation of crops will occur with water-saving offsets. An exception to the riparian notification requirement under paragraphs 7 (a) and (b) of OP 7.50 was approved by the Regional Vice President on April 27, 2023.

D. Environmental and Social

103. The environmental risks associated with the project are assessed as *Substantial*. Although the long-term impacts of the project are likely to be positive, its activities carry several potential risks under Components 2 and 3. The matching grant/support activities under Component 2 may include civil works that could generate moderate, predictable, and readily mitigatable environmental impacts. Due to constructions of the new facilities - (a) new or modernized commercial dairy and meat farms, and (b) milk & meat processing facilities - the following risks are expected: site-specific soil and air



pollution, acoustic and aesthetic impacts, small-scale water pollution from improper handling of waste and machinery, worker health and safety issues, animal welfare risks, and management of waste resulted from civil works and/or generated by the workers. The agricultural activities included in the project may purport the following risks: soil erosion, loss of soil productive capacity, soil compaction, soil pollution, surface and underground water pollution, and health and environmental risks deriving from agri-chemicals use. Agri-processing might bring a small contribution to surface water pollution, generation of several types of waste and odor. Under Component 3, considering the general nature of irrigation projects, proposed activities may be considered as carrying substantial risk. It is probable that the implementation of these activities will, through civil works, generate some adverse site-specific risks akin to those described above, as well as potential impacts on protected areas should abstraction be done in the vicinity of Ramsar zones. Potential negative risks could also be associated with the replacement of old water irrigation systems containing asbestos material, and therefore, the project will analyze all respective sites and decide about the best mitigation options to be applied. The project counterparts have little experience with the use of the Bank's ESF, and therefore, additional efforts will be required to build the capacity for the application of the ESF processes and requirements.

104. The social risks associated with the project are assessed as *Substantial*. Project activities under Component 3 may cause some significant impacts on livelihoods. Construction activities may require temporary requisition/acquisition of productive land to replace piping and renovate pumping systems, and restrictions on access to associated easements. Impacts on crop production are likely to be minor but widespread. These could be minimized and mitigated through local engagement in technical design and compensation processes. Social sustainability of the newly rehabilitated systems will require continued extension work with WUAs and business development support for the investments in value chains. There is a risk that insufficient engagement and capacity building for WUAs to participate in assessment and selection of alternatives for irrigation rehabilitation could weaken achievement of the development objectives. Project activities under Component 2 are unlikely to involve significant risk of adverse impacts on workers or communities. Site-specific community health and safety risks may be present depending on the nature of the grant/support activities, such as risk of interaction with nearby communities during transport of equipment and machinery, or during localized construction activities. Institutional strengthening activities under Component One will catalyze legalization of informal farming and formalization of labor relations in the agriculture businesses. Farmers from culturally or geographically remote communities, or female-led businesses may be less well informed and more reluctant to risk investing during the current emergency and should be provided with adequate information.

105. Workforces participating in individual agricultural businesses are typically small groups of working age local community members (fewer than 100 workers including seasonal labor at harvest time). Irrigation rehabilitation works will involve small groups of specialized national contractors establishing camps in local community areas. Provision of grant/support and implementation of civil works should be accompanied by enhanced labor inspection and prevention of health and safety incidents since a degree of labor informality is likely to remain (especially in the context of the regional crisis and provision of employment to vulnerable refugees). Sexual Exploitation and Abuse and Sexual Harassment risks are estimated to be low and have not been reported during similar previous activities, but preventative measures should be put in place prior to works commencing, including screening of risks, appropriate codes of conduct and communications measures. All agricultural businesses and contractors involved in the project should have protection measures in place to avoid these risks and prohibit the use of forced labor and harmful child labor.

106. MAFI has a track record of working to extend grants/support to agricultural business nationwide and has experience in implementing similar WB-financed projects and irrigation projects financed by other donors. However, MAFI and its institutions will require additional capacity to implement the project in accordance with ESF requirements. To this end, CAPMU will have a social specialist providing overall coordination and support for the application of the ESF



requirements. Additional consultancies at MAFI and CAPMU will be hired as needed to undertake specialized assessments and planning of tasks associated with land acquisition/requisition and community engagement for efficient use of water resources.

107. To address these environmental and social risks the project has prepared an Environmental and Social Management Framework (ESMF) to ensure the future due diligence screening, assessment, and management of component activities and to guide detailed technical design once project locations and feasibility are confirmed. The ESMF will be implemented with a Resettlement Policy Framework (RPF) prepared to address risks of minor temporary economic displacement associated with the rehabilitation of irrigation systems under Component 3. The RPF will inform the preparation of Resettlement Action Plans to ensure that affected stakeholders are compensated for any displacement associated with project activities prior to the implementation of related project works. The project has also prepared a Labor Management Procedures plan, including a Worker Grievance Mechanism (WGM) to inform safe and fair working conditions for project workers. The requirements of these procedures will be further updated and included in bidding documents and contractual requirements for civil works to ensure worker safety and safety separation of workers and community members. MAFI has prepared a Stakeholder Engagement Plan (SEP) identifying and assessing the interests of project-affected and interested stakeholders as far as they can be ascertained at this stage and setting out a program of engagement activities to be undertaken concomitantly with the implementation of other environmental and social assessment and management measures. The SEP also describes an overall project WGM which includes a separate referral path for complaints associated with Sexual Exploitation and Abuse/Sexual Harassment to a national hotline and consulting process established by the GOM in collaboration with civil society. This package of environmental and social measures and key project documentation were disclosed and consulted on before finalizing the project's appraisal.

E. Citizen Engagement, Gender, Climate Change Co-Benefits, and Maximizing Finance for Development

(i) Citizen Engagement

108. The AGGRI Project will build on the citizen engagement experience of WB and other donor funded investment operations in the agriculture sector. Through a proactive and regular engagement with a broad range of stakeholders, the project will seek to be responsive to their views and use emerging feedback, to ensure that proposals for improvements in implementation are reflected in a positive feedback loop. Information sessions, including open-door events, at the national and regional level will be organized by project entities to raise awareness among citizens about the opportunities provided by the project, both for individual farmers and processors, as well as communities. Such events will aim to ensure open communication lines for assessing remaining and/or evolving needs and gaps in relation to the project's activities, thus enabling calibration and further improvements in project implementation. They will also serve as a platform for updating stakeholders on how previous feedback/inputs have been reflected in the implementation of activities impacting their communities. The project will employ these specific citizen engagement approaches:

- For Component 1, information sessions will be organized at the inception of all activities to brief stakeholders of the planned activities, expected objectives and time for delivery. All proposals emerging from the implementation of the component, be it knowledge delivery systems, digitalization of business processes, draft regulatory changes, will be consulted with the agricultural and food business community, as well as other interested stakeholders, to present and incorporate feedback on emerging draft proposals. Thematic roundtables will be organized with physical and remote participation to ensure maximum outreach and representation. Website resources of all relevant MAFI institutions will be employed to further disseminate relevant information



to stakeholders. CAPMU will document and consolidate the feedback provided at these sessions and channel it to all relevant MAFI institutions for decision making. CAPMU will also inform participating stakeholders on how their feedback was incorporated or provide the rationale, on behalf of the relevant MAFI institutions, on why it was not incorporated in project activities. Evaluation forms will be made available to participating stakeholders at the end of each information event to assess satisfaction rates and to improve subsequent consultations.

- For Component 2, targeted information sessions at central and regional levels will be organized to inform and raise awareness about the objectives, eligibility criteria and application process, as well as the availability of business development support available to farmers and processors in accessing financial support. Electronic media and website resources of MAFI, AIPA and CAPMU will also be regularly updated to announce financing calls and provide all the relevant information to those unable to attend physically the information sessions.
- For Component 3, the project will help strengthen WUAs by providing technical assistance to shore up transparent governance and financial management structures in relation to the operation and future maintenance of the rehabilitated schemes, including annual performance reporting to WUA members. The project will provide support to participating WUAs in organizing consultations with local community authorities and interested farmers at each project phase related to the rehabilitation of the CISs - design, construction and hand-over on technical, as well as the pertinent compliance with ESF requirements.

109. MAFI, with support from CAPMU and AIPA, will apply the practice of conducting mid-term consultations to incorporate early lessons learnt and adjust the implementation process accordingly. The project will have the following specific indicators on citizen engagement – (i) *Matching grant beneficiaries satisfied with engagement; and (ii) Improved perception of quality of service by water users.*

(ii) Gender Aspects

110. Moldova is committed to gender equality and the empowerment of women by having ratified the *Convention on the Elimination of All Forms of Discrimination against Women* and other associated International Labor Conventions. The country has adjusted its legal framework in line with international standards and developed several national strategies and action plans to promote gender equality. The gender perspective is also applied in the Agriculture and Rural Development National Strategy for 2014-2020³⁸, which envisages that MAFI will promote active policies for integration of gender aspects and women participation at all levels of the decision-making process in the agriculture/rural sectors. Institutionally, a gender focal point unit, introduced with the support of United Nations Women, is expected to help integrate gender considerations in the legislative, policy and program proposals. However, despite satisfactory progress on the legislative and institutional sides, important gender-related socio-economic discrepancies are still prevalent. Women have lower labor market participation rates, are less likely to own a business and be employers in Moldova and encounter time poverty barriers related to household responsibilities that prevent them from being more engaged and represented in public and civic life. The project will have the following specific indicator on gender – *Women-led businesses accessing matching grant financing.*

(iii) Climate Change

111. The project's GHG analysis resulted in a total estimated net increase of emissions of 92,067 tCO2eq over 20 years (a modest 4,603 tCO2eq per year). As expected, the project's salient focus on reanimating the livestock sector (even with

³⁸ Governmental Decisions No.409 from 04.06.2014 // Official Monitor No. 152/451, 10.06.2014.



multiple mitigation angles discussed below) results in an estimated increase of 98,080 tCO₂eq; while the project's activities related to improved irrigation and ensuing land cultivation patterns result in an estimated reduction of emissions of 6,013 tCO₂eq. The GHG analysis was based on the generic FAO EX-ACT tool and a detailed summary is attached in Annex 4.

112. The project will support public institutions, service delivery and investment towards environmentally sustainable and climate-smart agricultural production systems on a country-wide scale, adjusted for local agri-climatic conditions. Mitigation benefits will be gained, amongst others, through improved production efficiency at animal and herd levels and thus effectively manage GHG emissions intensity, e.g., use of breeds with high feed conversion ratio, feeding management; manure management (including anaerobic digestion); grazing practices; energy efficiency and renewable energy generation. The project will also support upgrading of energy uses efficiency and renewable production in livestock and horticultural value chains (energy efficient farms, storage, and processing facilities) and irrigation systems (more efficient and powered with renewable energy pumps). Also, towards mitigation, higher penetration of irrigation services will increase opportunities for use of precision fertigation, thus reducing excess fertilizer leakage into soil and waterways with the ensuing release of nitrous oxide. Adaptation benefits are expected to be generated amongst others through the development of advisory packages delivered by the ARAC, financial support for modernization of production systems that are sensitive to climate change, and most of all through the increase in access to irrigation services in some of the most arid areas of the country. The Results Framework includes several climate-related indicators, e.g. *Number of beneficiaries with access to irrigation services in drought-prone areas* – which are directly linked to rehabilitation of the CISs. The table below describes project's specific contribution and associated dedicated and estimated financing for climate action.

Table 2: Summary of project climate Co-Benefits per activity

| Activity | Adaptation | Mitigation |
|---|--|---|
| Activity 1.3.1 – Improving Agricultural Knowledge Management | | |
| Capacity building | Support the establishment of the ARAC, resulting in increased awareness and information dissemination on adaptation to climate change impacts in the agriculture sector and food industry. Mainstream national objectives on climate change adaptation and mitigation into advisory services curriculum developed with support of the project. (US\$0.2 million on adaptation and US\$0.3 million on mitigation) | |
| Activity 1.3.2 – Fostering Excellence in Veterinary Services | | |
| Capacity building | Support adaptation to climate change impacts on the livestock sector through training, capacity building, and improved information. (US\$0.5 million) | Excellence in delivery of veterinary knowledge to livestock farmers will support the sector in developing and adopting practices that improve animal production efficiency (health, feed, reproduction management), and thus reduce emission intensity. (US\$0.4 million) |
| Sub-component 2.1 –Investment Support for Fostering Growth | | |
| Capital investments for fostering growth in underperforming | Support farmers in the development and implementation of agricultural geared towards adoption of climate smart practices and technologies, resulting in | All resources in this subcomponent will support farmers in the development and implementation of agricultural production and processing facilities that increase |



| Activity | Adaptation | Mitigation |
|---|--|--|
| sub-sectors (goods and works) | production/processing facilities adapted to two major climate risks such drought and animal heat stress. (estimated US\$5.0 million) | <p>production efficiency and reduce carbon footprint (estimated US\$6.0 million):</p> <ul style="list-style-type: none"> • Manure management via anaerobic digestion and biogas capture for energy production (reports indicate that a majority of Moldovan livestock farmers are keen on investing in biodigesters). • Improved practices, better breeds, and nutrition. • Animal health management, resulting in lower emission intensity from healthy animals. • Field application of good agricultural practices and precision agriculture (fertigation). • Energy efficiency and reliance on renewable energy. |
| Sub-component 3.1 – Rehabilitation of Irrigation Infrastructure | | |
| Infrastructure rehabilitation (goods and works) | Expand the availability of irrigation services to interested farmers in water intense cultivation of fruits, vegetables, cereals, and, more frequently, in the cultivation of fodder crops for animal husbandry. (US\$20.0 million) | <p>Expand the availability of irrigation services to interested farmers while reducing the carbon footprint of operating central and on-farm irrigation systems:</p> <ul style="list-style-type: none"> • Energy efficiency and reliance on renewable energy. • Increase water efficiency, improve land management practices, and mainstream fertigation technologies. (US\$2.0 million) |
| Sub-component 3.2 – Strengthening the enabling environment for irrigation management | | |
| Capacity building and transfer | Transfer irrigation infrastructure to WUAs to ensure technical functionality, greater uptake of services, and provide advice on transitions to more productive and resilient cropping patterns and technologies. (US\$1.0 million) | |

(iv) Maximizing Finance for Development

113. The investments envisaged by the Government of Moldova under the project will not be replacing private sector participation, but rather enabling it to play a more dynamic role in the development of private sector service delivery and resilient private-led growth in several important value chains. The project's activities will also provide a bridge between current levels of development financing and the future flows coming from the EU as part of the pre-accession upgrades in the sector.

114. Private sector participation in agriculture is hindered by institutional inefficiency, unfavorable policies and legislation, and a lack of enabling environment. The project aligns with the MFD approach to development to address



these challenges and incentivize private sector growth and participation. It aims to strengthen public institutions and programs, reduce business costs for farmers and agribusinesses, and promote private-public partnerships, especially in irrigation services. The project seeks to complement, rather than replace, private sector investment in value chains, enabling it to play a more dynamic role in service delivery and resilient private-led growth. Additionally, the project will bridge the financing gap between current levels of development financing and future EU pre-accession funding.

115. The project aims to establish public systems, goods, and services that can support private sector providers in delivering services to farmers. These include advisory and business support, innovation and technology, training and technical assistance, equipment and logistics, financial products, marketing and commercialization (product handlers, agri-logistics hubs, milk collectors), input supply (seeds, feed), and livestock health services (private veterinarians). Private sector actors will be encouraged to invest in selected value chains such as dairy farming, meat, and horticulture, with beneficiary contributions being utilized to improve production quality and supply chain efficiency through investments in on-farm irrigation equipment, cold storage facilities, sorting and packaging, pre-processing, high-performance dairy farm equipment, milk collection and processing, and other value-addition activities. This will lead to increased farm-level production and viable integration into supply chains, which will require more significant investments from the private sector to enhance competitiveness, value addition, and commercialization. The project will also enable private sector participation in irrigation service delivery by minimizing state involvement; improving essential public services in regulations, monitoring, quality assurance and control, food safety, disease surveillance, and climate-smart approaches; and inviting private sector input in drafting new laws, regulations, public awareness, and risk communication.

116. The role played by the International Finance Corporation (IFC) in the country's food safety and quality management and in supporting private sector initiatives in the agriculture and food industry is complementary to the MFD approach applied in previous WB agriculture projects. The IFC Advisory Services Project has been pursuing a significant agenda aimed at increasing private sector engagement in food safety and the development of value chains in the dairy and horticulture sub-sectors, dovetailing with the main elements of the AGGRI project.

V. GRIEVANCE REDRESS SERVICES

117. Communities and individuals who believe that they are adversely affected by a project supported by the WB may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism. The Accountability Mechanism houses the Inspection Panel, which determines whether harm occurred, or could occur, because of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the Accountability Mechanism at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service, please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit <https://accountability.worldbank.org>.



VI. KEY RISKS

119. The overall residual risk rating for the AGGRI Project is assessed as *Moderate*. The lingering spillovers from the COVID-19 pandemic and Russia's invasion of Ukraine are affecting the risk profile but are not expected to pose a vital risk to the achievement of the PDO. The scale and duration of the impacts of Russia's invasion of Ukraine will be closely monitored to ensure prompt adjustments in the project's implementation plan.

120. The residual macroeconomic risk is rated *High*. After the declaration of state of emergency in mid-March 2020 and its continuation through April 2021, caused by COVID-19 pandemic, several measures were taken to contain the crisis impact, although the economic outlook is subject to considerable downside risks. The main risk is the ongoing Russia's invasion of Ukraine, which might have large macro fiscal impact through multiple channels including the inflow of refugees, increase of energy prices, and trade and financial flows. These risks may affect the achievement of the PDO, including the underlying demand for matching investment grants/support. These risks are partially mitigated by the GOM receiving substantial financial support from bilateral donors, the EU, the International Monetary Fund, and multilateral development banks.

121. The residual political and governance risk is rated *Substantial*. The political developments in the recent decade show that the country experiences frequent political changes which induce significant instability on the policy level and in government institutions. Political instability may bring changes in policy priorities, changes in the leadership of key institutions, changes in instruments preferred for policy implementation, as well as changes to decision-making and the speed at which decisions are taken. Such changes can affect the project's priorities and may affect the achievement of the PDO, as well as shift away the focus from certain instruments towards other less effective but more popular interventions. The team has established coordination with various levels of government counterparts in the key agencies and has continued working on a technical level even during politically turbulent times.

122. The residual institutional capacity for implementation risk is also rated as *Substantial*. While MACP supported the efforts of the GOM to strengthen the institutional capacity of its key institutions in the agriculture and food space (MAFI, AIPA, NFSA) institutional weaknesses remain. Risks to institutional capacity relate to a bigger role to be played by AIPA and the NFSA in the project and the future compliance with EU pre-accession and accession requirements. Additional risks are due to institutional memory, which is undermined by frequent changes in top management and significant turnover of staff, but also to insufficient training and weak financial motivation. The risk is mitigated by the current political commitment to continue with essential institutional reforms, including increasing financial motivation, to strengthen these institutions in line with EU rigors. The presence of CAPMU in the implementation set up further mitigates institutional risks.

**VII. RESULTS FRAMEWORK AND MONITORING****Results Framework****COUNTRY:** Moldova

Agriculture Governance, Growth and Resilience Investment Project

Project Development Objectives(s)

Improve delivery of public agricultural services, foster market-oriented growth and increase resilience of targeted beneficiaries, and in case of an eligible crisis or emergency, respond promptly and effectively to it.

Project Development Objective Indicators

| Indicator Name | PBC | Baseline | End Target |
|--|-----|----------|------------------------------|
| Improve delivery of public agricultural services | | | |
| Improved access of farmers to public agricultural services and support programs (Text) | | TBD | Satisfaction rates above 70% |
| Foster market-oriented growth | | | |
| Increased compliance with requirements on food safety by targeted beneficiaries (Number) | | 0.00 | 50.00 |
| Increased sales by targeted matching grant beneficiaries (Percentage) | | 0.00 | 25.00 |
| Increase resilience of targeted beneficiaries | | | |
| Increased average productivity of farms accessing irrigated services (Percentage) | | 100.00 | 140.00 |

**Intermediate Results Indicators by Components**

| Indicator Name | PBC | Baseline | End Target |
|--|-----|--|---|
| Enhancing Sector Governance and Agriculture Knowledge Management | | | |
| Enhanced functionality of AIPA (Text) | | AIPA not ready for accreditation as paying agency for EU funds | AIPA ready for accreditation to be paying agency for EU funds |
| Enhanced institutional performance of ANSA (Text) | | No | Yes |
| Enhanced delivery of knowledge services (Text) | | No | Yes |
| Fostering Value Chain Development for Growth | | | |
| Increased production volume resulting from matching investment grants (Percentage) | | 0.00 | 20.00 |
| Producers benefiting from business development services (Number) | | 0.00 | 100.00 |
| Producers receiving matching grants (Number) | | 0.00 | 120.00 |
| Matching grant beneficiaries satisfied with engagement (Percentage) | | 0.00 | 75.00 |
| Women-led businesses accessing matching grant financing (Percentage) | | 0.00 | 30.00 |
| Strengthening Resilience through Irrigation Services | | | |
| Hectares under improved irrigation (Hectare(Ha)) | | 300.00 | 3,500.00 |
| Improved satisfaction with quality of service by water users (Percentage) | | 0.00 | 75.00 |
| Centralized irrigation systems rehabilitated (Number) | | 0.00 | 1.00 |
| Centralized irrigation systems re-designed (Number) | | 0.00 | 3.00 |
| WUA receiving rehabilitated infrastructure demonstrating financial sustainability (Number) | | 0.00 | 1.00 |



| Indicator Name | PBC | Baseline | End Target |
|--|------|----------|------------|
| WUAs with active and representative governance (Number) | 0.00 | | 10.00 |
| Number of beneficiaries with access to irrigation services in drought-prone areas (Number) | 0.00 | | 150.00 |

Monitoring & Evaluation Plan: PDO Indicators

| Indicator Name | Definition/Description | Frequency | Datasource | Methodology for Data Collection | Responsibility for Data Collection |
|---|---|--|-----------------------|---|------------------------------------|
| Improved access of farmers to public agricultural services and support programs | Indicator measures satisfaction rates with delivery of selected agricultural services. | Twice during project implementation cycle, i.e. mid-term and end of project. | Satisfaction surveys. | Targeted evaluations of satisfaction rates based on surveying of service beneficiaries. | MAFI, CAPMU |
| Increased compliance with requirements on food safety by targeted beneficiaries | Increase in beneficiaries complying with food safety requirements (number) (disaggregated by: (i) type of beneficiary (small holder farmers, commercial farmers, agribusinesses, livestock/vegetable value chain actors); and (ii) gender | Yearly | NFSA | Targeted readiness audits contextualized in the requirement of the matching investment grant scheme for compliance with EU food safety requirements | MAFI, CAPMU |



| | | | | | |
|--|---|--------|---------------------|-----------------------------|-------------------|
| | (market orientation; resilience) | | | | |
| Increased sales by targeted matching grant beneficiaries | Increased volumetric sales by targeted value chain beneficiaries disaggregated by (i) type of beneficiary supported by the project (small holder farmers, commercial farmers, agribusinesses) and (ii) gender. | Yearly | AIPA, Beneficiaries | Direct interviews/reporting | MAFI, CAPMU, AIPA |
| Increased average productivity of farms accessing irrigated services | Increase in average productivity of farms accessing irrigated services disaggregated by (i) type of beneficiary supported by the project (small holder farmers, commercial farmers, agribusinesses) and (ii) gender | Yearly | Beneficiary WUAs | Direct interviews/reporting | MAFI, CAPMU |

Monitoring & Evaluation Plan: Intermediate Results Indicators

| Indicator Name | Definition/Description | Frequency | Datasource | Methodology for Data Collection | Responsibility for Data Collection |
|--------------------------------|--|-----------|------------|---|------------------------------------|
| Enhanced functionality of AIPA | AIPA accreditation-readiness to manage EU funds enhanced through support for: (i) improved key functions, such as internal auditing, information | Yearly | MAFI, AIPA | Regular monitoring reports and EU audits of readiness | MAFI, AIPA |



| | | | | | |
|--|---|-----------------|---------------------|--|-------------------|
| | system management, budgeting and anti-fraud controls; (ii) improved performance of field offices; (iii) revamped and digitized business processes; and (iv) adoption of EU best practices in relation to separation of duties between authorization and execution of payments, data security, monitoring, anti-fraud sampling, conflict of interest management, payment procedures and timelines. | | | | |
| Enhanced institutional performance of ANSA | Harmonization of food safety legislation and regulations based on the schedule agreed by the Moldova-EU food safety committee. ANSA performance for inspection of food of animal origin enhanced through ISO17020 accreditation. ANSA performance enhanced through the completion of the digital phytosanitary registry. ANSA performance enhanced through fostering of the state veterinary | every two years | ANSA, EU Delegation | Regular EU assessment and monitoring reports | MAFI, ANSA, CAPMU |



| | | | | | |
|---|--|--|-----------------------------|--|-------------|
| | services. | | | | |
| Enhanced delivery of knowledge services | Established and functioning rural ARAC; veterinary excellence services | mid-term and end-project | MAFI, CAPMU | Project progress reports | MAFI, CAPMU |
| Increased production volume resulting from matching investment grants | The increase will be measured from a baseline of sales by producers before and after the receiving the matching grant. | Annual (upon completion of investment) | Targeted producers | Administrative and business data provided by the beneficiaries | |
| Producers benefiting from business development services | This indicator will track the increase in the number of producers that benefited from all business development services (disaggregated by gender). | Annual | MAFI/CAMP U | self-reporting | MAFI/CAPMU |
| Producers receiving matching grants | The indicator will track the increase in the number of producers who benefited from matching grants disaggregated by gender. | Annual | CAPMU's administrative data | Self-reporting | MAFI, CAMPU |
| Matching grant beneficiaries satisfied with engagement | Percentage of increase of matching grant beneficiaries satisfied with engagement (information campaign, quality of advisory services) based on survey/immediate feedback forms for information sessions. | Mid-term/final year/immediate feedback after information sessions. | MAFI/CAPMU | Survey | MAFI/CAMPUS |



| | | | | | |
|---|--|--|------------------|-------------------------------|--------------------|
| Women-led businesses accessing matching grant financing | The indicator will track the female participation rates accessing the matching grant schemes. | Semi-annual | MAFI, AIPA | Self-reported, vetted by AIPA | MAFI, AIPA, CAPMU. |
| Hectares under improved irrigation | The number of hectares served by existing or new irrigation infrastructure that are either rehabilitated or constructed by the project | Twice at completion of scheme rehabilitation and end-project | WUAs | Administrative data | MAFI, CAMPU |
| Improved satisfaction with quality of service by water users | Percentage of irrigation systems users satisfied with the timeliness, cost and administration of irrigation services | Twice (start of project, end of project) | WUAs | Survey | MAFI, CAPMU |
| Centralized irrigation systems rehabilitated | Number of centralized irrigation systems with rehabilitation works completed | Annual | MAFI/CAMP U//WUA | Administrative data | MAFI,CAMPU,WUA |
| Centralized irrigation systems re-designed | Number of centralized irrigation systems designed for rehabilitation | Annual | MAFI/CAMP U | Administrative data | MAFI, CAMPU |
| WUA receiving rehabilitated infrastructure demonstrating financial sustainability | Number of assisted WUAs (with schemes completed and fully operational and assuming state still subsidize the pumping costs) where tariffs collected covers 100% of operating costs plus an | Annual | MAFI/CAMP U/WUA | Administrative data | MAFI,CAMPU, /WUA |



| | | | | | |
|---|---|--------|---|--------------------------------|--------------|
| | amount for capital/replacement costs | | | | |
| WUAs with active and representative governance | Number of WUAs complying with transparent governance practices including an annual plan and year end report approved by the respective general assembly | Annual | WUAs' administrative and operational data | interviews/administrative data | MAFI, CAMPUS |
| Number of beneficiaries with access to irrigation services in drought-prone areas | Beneficiaries in drought-prone areas with access to irrigation services provided by the project. | Yearly | WUA, Cadaster Agency | Project progress reports | MAFI, CAPMU |

**ANNEX 1: Implementation Arrangements and Support Plan****COUNTRY: Moldova**
Agriculture Governance, Growth and Resilience Investment Project**(i) Financial management**

1. The FM assessment was conducted to determine whether CAPMU and AIPA have adequate financial management arrangements in place to implement the new project. Both entities have relevant experience and capacity in the implementation of WB financed projects. Their FM performance over the last years was satisfactory. Any issues or audit matters were promptly resolved and addressed. The assessment concluded that the existent FM arrangements at the entities (budgeting, accounting, reporting, internal control, staffing, funds flow and auditing) are acceptable and will be applicable for the new project. Both entities will maintain a project accounting system, capable of accurately tracking all project resources and expenditures, and generating regular financial reports. CAPMU will keep the main fiduciary responsibility for the project. The project's FM arrangements are described below for each element of FM system.
2. **Budgeting and planning.** CAPMU and AIPA have acceptable budgeting and planning capacity. The entities follow the rules and procedures established by the MOF for budget approval, execution, reporting, and monitoring. The same rules will apply for the project. The budget of the projects funded from external sources is included in the country's annual state budget document, and this provides the basis for opening budget allocations for the projects. The project budget will be prepared by the CAPMU based on the Procurement Plan, approved by MAFI, and then endorsed by the MOF. The approved annual budget will be entered into the accounting system and used for periodic comparisons with actual results as part of the interim financial reporting.
3. **Accounting and reporting.** The project accounting will be conducted as per Cash Basis International Public Sector Accounting Standards. CAPMU and AIPA will keep project-related records in automated accounting software which must be adjusted to the project needs. Currently, it satisfies the statutory accounting and reporting requirements established by the MOF for public institutions and authorities. Additionally, the CAPMU and AIPA will keep accrual accounting as required by national legislation.
4. **Internal controls.** Both CAPMU and AIPA have in place an adequate internal control system capable of providing reliable and strong controls over FM and disbursement processes and procedures. These include controls for safeguard of assets, segregation of duties, authorization of transactions, review and approval of invoices, contract management, and others. The internal control system and additional reporting and auditing requirements will be specified in the POM.
5. **Staffing requirements.** CAPMU has proper staffing arrangements in place. The Chief Accountant has considerable experience and good knowledge of WB requirements. He is supported by a qualified FM assistant. AIPA has no dedicated project FM staff. The project related accounting is done by AIPA staff according to their job description. Any additional FM staff will be hired in coordination with the WB after assessing the needs and estimated workload under the project.
6. **Financial reporting.** Unaudited IFRs will be used for project monitoring and supervision and for disbursement of project proceeds. CAPMU will prepare consolidated IFR with inputs from AIPA. The format of the IFRs for the project has been confirmed during assessment, and the IFRs include (a) project sources and uses of funds, (b) uses of funds by project components, and activities, (c) DA statements, (d) cash flow forecast. These financial reports will be submitted to the WB within 45 days of the end of each quarter. The IFRs will also capture details about matching / support grants.



7. **Annual audits.** As per their mandate, the Court of Accounts (Supreme Audit Institution) carries out annual audits of several WB projects, however, current capacities to audit this project are limited. Hence the project audit will be performed by private audit firms. CAPMU will be responsible for arranging independent annual audit of project financial statements, conducted by independent private auditors acceptable to the WB, on the Terms of Reference acceptable to the WB, and according to the International Standards on Auditing issued by the International Auditing and Assurance Standards Board of the International Federation of Accountants. The audit scope will include (a) audit of the project financial statements, (b) the review of matching / support grants per risk-based approach, and (c) review of the internal controls of the CAPMU and AIPA with special attention to the compliance with the requirements of the Financing Agreement, provisions of the POM and WB FM and disbursement handbooks and guidelines. The annual audits of the project financial statements will be provided to the WB within six months after the end of each fiscal year and at project closing. The audit reports for the project will be disclosed within one month of their receipt from the auditors and acceptance by the WB, by posting the reports on its official website. Following the WB's formal receipt of these reports from the CAPMU, the WB will make the audit reports publicly available according to the WB Policy on Access to Information. The audit's cost will be financed from the project's proceeds.

8. The WB will exercise oversight of the FM performance under the project by conducting regular FM implementation support missions, by reviewing and providing feedback on the project IFRs and audits as well as by consulting the CAPMU and AIPA on FM and disbursement matters. Comprehensive reviews of project FM arrangements covering all aspects of planning and budgeting, internal control procedures, flow of funds, FM systems and FM capacity will be performed at least annually. The reviews will also cover the walkthrough over a sample of transactions.

(ii) Disbursement

9. CAPMU and AIPA will open separate DAs in the loan currency specifically for this project in the National Bank of Moldova, which is acceptable to the WB. The project's DAs and associated Operating Accounts will be managed by CAPMU and AIPA individually. The Operating Accounts (opened in the Treasury of the MOF) will be used for payments in local currency obtained through conversion of the DA currency. Project IFRs will be used for disbursement of project proceeds. DA ceiling will be provided in the DFIL. In addition to the DA, the project funds will flow from the WB through the direct payment method, reimbursement method, and/or special commitments. Detailed instructions on withdrawal of loan proceeds with respect to these methods will be provided in the DFIL. The MOF will give authorization to designated officials to withdraw funds from the project financing account. The DAs will be audited annually with the project financial statements.

10. No withdrawals will be made under Component 2, until the Grant Operations Manual has been prepared, adopted and incorporated to the Project Operations Manual in a manner acceptable to the Bank.

(iii) Procurement

Project Procurement Strategy for Development

11. Based on the project requirements, operational context, economic aspects, technical solutions, and market analysis, a PSD was developed for the entire project's scope. The PSD identifies the following major types of activities: (a) consulting services; (b) goods; (c) works; and (d) non-consulting services. Major contracts for supply of goods include equipment for ANSA laboratories, vehicles for state veterinaries, veterinary equipment for excellence centers and irrigation equipment for Tudora CIS and Caplani transit pumping station. The value of these contracts varies from



US\$250,000 to US\$6.0 million. The international market approach will be adopted for these contracts using the Request for Bids (RFB) method. There are several small value contracts (chemicals and reagents for labs, specialized intervention kits, office equipment) for which the Request for Quotations method (national market approach) will be adopted. Procurement of works includes one large contract – Rehabilitation of Tudora CIS and Caplani transit pumping station. Based on the market analysis, there are no local companies which will have the capacities and experience in rehabilitating large-scale irrigation systems. Therefore, this contract will follow the Request for Bids procedures with an international market approach. Given this contract's complexity, the PPSD suggests conducting the prequalification of firms to ensure that only those firms with appropriate and adequate capacity, and capability and resources are invited to submit bids. Consulting services are of small value. The major contract is the one for works supervision of the irrigation system's rehabilitation. This contract will follow the Quality and Cost-based Selection procedures. Although market research finds a substantial number of potential consultants/suppliers within Moldova for the types of services needed, the participation of reputable and qualified international consultants will be beneficial to project implementation. Therefore, the WB recommends that the project approaches international markets for larger-value contracts and for those critical for the project. It has however been agreed that—irrespective of the market approach—the WB's Standard Procurement Documents be used for all contracts, including those for which a national approach is foreseen. If this is not feasible, other procurement documents agreed by the WB will be used. For procurement in the international market, the WB's Standard Procurement Documents should be used.

List of major contracts

| Contract Description | Estimated Cost (US\$) | Selection Method | Planned Date |
|---|-----------------------|-----------------------------------|--------------|
| Rehabilitation of Tudora CIS and Caplani transit pumping station | 14,000,000 | RFB (works) with Prequalification | TBD |
| Irrigation equipment for Tudora and Caplani CISs | 6,300,000 | RFB (goods) | TBD |
| Equipment for ANSA laboratories | 2,100,000 | RFB (goods) | TBD |
| AIPA digital transformation project | 1,000,000 | RFB (ICT) | TBD |
| Contract management, technical and safeguards supervision for the Tudora and Caplani CISs | 1,000,000 | QCBS | TBD |

12. ***Procurement under Sub-component 2.1 –Investment Support for Fostering Growth.*** Private sector commercial practices will be followed for procurement of goods, works, non-consulting and consulting services under grants in accordance with paragraph 6.46 and 7.26 of Procurement Regulations.

13. ***Procurement under Component 4 – Contingent Emergency Response Component (CERC).*** It was agreed that, once CERC is triggered, CAPMU will revise the PPSD to include a section applicable to the CERC. The CERC-PPSD will focus mainly on complex contracts and new or innovative procurement, rather than on smaller, routine contracts. The strategy will describe, among other things, how procurement opportunities and risks will be managed in emergency circumstances and how suppliers and contractors will be motivated to bid and incentivized to perform. Procurement arrangements under the CERC will be streamlined. The WB's oversight and due diligence for procurement will be done through augmented implementation support with close monitoring, increased procurement-related post review, and/or third-party procurement reviews. Given that the CERC is contingent and event-driven, no Procurement Plan for the CERC can be prepared ex-ante.



14. **National Procurement Procedures.** Public procurement regulations in Moldova were assessed and it is concluded that these cannot be used at this stage. The new Public Procurement Law No. 131 which went into effect on May 1, 2016, is better adjusted to the EU Directives. While the Law No. 131 provides a good basis for the public procurement system and properly draws the legal framework for a sound public procurement system, the law has not been fully implemented/applied and there are still critical areas which require major reforms, including the e-procurement system. The GOM is developing the National Program for the Development of the Public Procurement System for 2020-2027 and intends to embark on major reforms in this sector. Given the ongoing and planned reforms, as well as various technical issues with the current e-procurement system, the PPSD suggests that the project adopts the Standard Procurement Documents developed by the Bank or any other procurement documents agreed with the Bank for procurement following national market approach.

15. **Complaint handling mechanism.** The project is required to ensure recording of procurement-related complaints in the STEP system. Both the WB and MAFI/CAPMU will use STEP to track complaints. CAPMU will be responsible for performing the following actions in STEP: (a) promptly record all complaints relating to procurement process; (b) for procurement process complaints received on contracts subject to the WB's prior review, submit MAFI/CAPMU's proposed response to each complaint before issuing it to the complainant(s); (c) record MAFI/CAPMU's response to the procurement process complaints upon issuance to the complainant(s); and (d) promptly register requests for debriefings and update STEP with the record of the debriefings to interested parties. Procurement-related complaints arising from contracts where the WB's Standard Procurement Documents must be used will be handled according to Annex III of the Procurement Regulations. Procurement-related complaints under national market approach contracts will be handled in accordance with the procedures defined in the POM.

16. **Procurement documentation.** All documentation regarding each procurement will be retained by CAPMU according to the Legal Agreements requirements. CAPMU will furnish such documentation to the WB upon request for examination by the WB or by its consultants/auditors. Documents related to procurements subject to post-review will be furnished to the WB upon request.

17. **Procurement prior review thresholds.** The procurement prior review thresholds will be set by the WB based on the project's procurement risk level. All contracts at or above the set thresholds are subject to international advertising and the use of the WB's Standard Procurement Documents. Use of certain procurement approaches—specifically best and final offer, procurement processes involving contract negotiations, competitive dialogue, and sustainable procurement—are not foreseen under the project but these approaches will be subject to the WB's procurement prior review, irrespective of the contract value, if the decision is taken during project implementation to apply them. The applicable thresholds are defined in the table below and will be specified in the textual part of the Procurement Plan.

| Type of Procurement | Method Threshold (US\$, millions) | Prior Review Threshold |
|--|--|---|
| Works (including Turnkey, Supply & Installation of Plant and equipment, and PPP) | Open International ≥ 5 Open National < 5 Request for Quotations < 0.2 | All contracts above US\$20 million equivalent |
| Goods, Information technology and Non-Consulting Services | Open International ≥ 1 Open National < 1 Request for Quotations < 0.1 | All contracts above US\$6 million equivalent |



| | | |
|--------------------------|---|--|
| Consulting firms | Selection Based on Consultants' Qualifications < 0.3 Least Cost Selection and Fixed Budget Selection - in justified cases Quality- and Cost-based Selection and Quality-based Selection - in all other packages National Consultant Ceilings < 0.3 | All contracts above US\$4 million equivalent |
| Consulting - individuals | No threshold | All contracts above US\$500,000 equivalent |
| Direct selection | Thresholds defined above for the respective expenditure | As per paragraphs 6.46 and 7.26 of the Procurement Regulations |
| Commercial practices | Thresholds defined above for the respective expenditure | As per paragraphs 6.46 and 7.26 of Procurement Regulations |

Note: Based on the procurement performance of the project these thresholds may be subsequently modified.

**ANNEX 2: Gender Gaps in Entrepreneurship, Access to Finance and Employment****COUNTRY: Moldova**

Agriculture Governance, Growth and Resilience Investment Project

1. **Moldova continues to make progress in closing the gender gap, maintaining an upward trend in global and regional gender rankings.** Moldova climbed to the 16th position globally in 2022. It ranks 25th in terms of economic participation and opportunity gap and 29th on the political empowerment gap³⁹. The country scores 84.4 out of 100 possible (higher than the regional average) on the WB's Women, Business and Law index which covers 190 economies. Moldova gets a perfect score on such important aspects as freedom of movement, constraints on starting and running a business and gender differences in property and inheritance. Moldova has reached near universal enrolment of both boys and girls in primary education and in secondary education and has a higher Human Development Index (HDI) for females than males. The Gender Development Index which represents the ratio of female to male HDI values is equal to 1,014 which puts Moldova into the group of countries with high equality in HDI achievements by absolute deviation from gender parity.
2. **Moldova has made international commitments to promote gender equality and the empowerment of women.** It ratified the Convention on the Elimination of All Forms of Discrimination against Women and other associated international labor conventions. The country has adjusted its legal framework in line with international standards and developed several national strategies and action plans to promote gender equality. The gender perspective has been applied in the National Agriculture and Rural Development Strategy for 2014-2020⁴⁰, which envisaged mainstreaming of active policies for the integration of gender aspects and women participation at all levels of the decision-making process in agriculture and rural development. These aspects are being further enhanced in the new National Agriculture and Rural Development Strategy 2030. Institutionally, focal points and gender units exist in sector ministries and other public administration bodies with the objective of mainstreaming gender considerations into public policies and programs. Admittedly, their performance across time and sectors has been uneven.
3. **Despite high rankings and important progress made, significant gender discrepancies are still prevailing.** The joint UN-WB Moldova Country Gender Assessment of 2021 highlight inequalities in: (i) endowments (health and education); (ii) employment; (iii) entrepreneurship and access to finance; and (iv) voice and agency.
4. **At the regional level Moldova is an outlier country in terms of low female occupation rates.** Moldova has the lowest women's employment rate in the EU, Eastern Partnership and Balkan region, alongside Armenia and Kosovo. The share of young women neither in employment nor in education/training is among the highest in the region at 24%. Women from rural areas have even less access to labor opportunities. The employment rate for rural women is 31.8 percent as compared to 39.6 for urban areas. However, the spatial disparity for men's employment is markedly more noticeable with a 38.7 percent employment rate for rural males compared to 50.1 percent in urban areas. Excluding retirement, men are most often out of the labor force, working or looking for work abroad. Women's engagement in domestic and care work is a key limiting factor in their ability to take on formal employment⁴¹. Additionally, low levels of entrepreneurship and business skills are some of the reasons behind the important levels of female unemployment in rural areas.

³⁹ Global Gender Gap Report 2022, World Economic Forum⁴⁰ Governmental Decisions No.409 from 04.06.2014 // Official Monitor No. 152/451, 10.06.2014.⁴¹ National Gender Profile of Agriculture and Rural Livelihoods, FAO, 2022

**5. While women's entrepreneurship has been on the rise, only 34% of entrepreneurs are women in Moldova.**

Several factors contribute to this gap, including limited access to resources and financial capital to start a business, barriers to accessing investment resources (such as credits and loans), discrimination practices and gender stereotypes. Compared to men, women are more reluctant to initiate private enterprises. Given that on average, women possess fewer assets, financial resources and informal support, women entrepreneurs must rely on formal financial schemes, and are more willing to access funding opportunities through different support programs and development projects. Finally, time poverty severely limits women entrepreneurs. Due to care responsibilities, women are unable to put in more time to make sure their enterprises are well run. On average, a working week for women entrepreneurs is eight hours shorter than for men entrepreneurs. Women are less available to work in the evenings. Time poverty restricts the choices and flexibility of women entrepreneurs and makes them more reluctant to start or expand their enterprises⁴².

6. Investments in women-owned businesses in Moldova pay off. According to the 2018 WBG report "Supporting Women's Entrepreneurship in Moldova"⁴³, women-owned businesses produce higher average annual sales, employ on average more people, show higher labor productivity than male-owned companies as well as a much stronger propensity to provide employment and advancement for other women than male-owned firms. Despite these strong indicators, growth from 2014 to 2016 among female-owned firms was less than that of male-owned firms in four of seven industries. This trend can be reduced by a targeted policy effort. One special concern identified in the survey is the apparent trend across industries and regions for women to lose ownership and control over their businesses to males, likely because of indebtedness and lack of access to equity capital.**7. Legislative changes to increase women representation and voice produced improvements, but important gaps exist.** The double quota system (40% representation and political party listing provisions), introduced in Moldova in 2016, increased women representation in Moldovan legislature and subsequently Government. As a result, 40 women were elected as deputies in the 101-seat parliament and in 2021, and there are seven women in the current 17-member Cabinet. However, progress in representation is more limited in local governments with just a two-percent increase in female representation in 2019 compared to the previous elections of 2015, with 21.83% of females elected as local mayors while the percentage of female councilors increased significantly with women representing 27.08 percent of all district/municipal council members and 36.5% of local/community level councilors. Female agency over household decisions is quite high with both women and men having even decision-making power over subjects related to family issues, such as time spent working and household purchases. However, women tend to have lower civic participation than men with 27.8 percent of women likely to address political and civic subjects with relatives and friends compared to 38.5 percent of men. This may be accounted for by uneven care responsibilities related to household and childcare, with females more occupied with household tasks than men. There is also a positive trend in the share of people aware of their rights to request public-interest information and become involved in local decision-making, with the increase higher among women than men, but females from marginalized groups and with disabilities are significantly less represented.**8. Women entrepreneurship has been receiving increasing attention in Moldova, but lack of gender-disaggregated data makes actual policy development challenging.** The 2016 Small Business Act for Europe assessment indicated that women's entrepreneurship has received increasing attention in the policy discourse of Moldova, and women's entrepreneurship has become an official priority in the country. Moldova became one of the top performers in the region due to the maturity of its women's entrepreneurship support policy frameworks and persistent investment into a

⁴² UN-WB Moldova Comprehensive Gender Assessment, 2021

⁴³ Supporting women's entrepreneurship in Moldova: review, assessment, and recommendations (English). Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/411391516856355553/Supporting-women-s-entrepreneurship-in-Moldova-review-assessment-and-recommendations>



dedicated set of implementation measures since the 2016 assessment. At the same time, building an over-arching, comprehensive policy vision that extends across economic sectors and encompasses all parts of the government remains a serious challenge. The lack of sex-disaggregated data makes it hard to design gender-responsive policies, which should be based on a rigorous analysis of the structural and socio-cultural factors behind the lack of women's entrepreneurship. However, the setting of targets for women's entrepreneurship is a good practice in Moldova. The Organization for Small and Medium Enterprises Sector Development (ODIMM) set a target of 30% for women within its training drive, including a 30% target set for women within the wider effort to support young entrepreneurs and returning migrants, including loan guarantees and credits. These 26 targets are already yielding results. For example, under the young entrepreneurs' program, 45% of those receiving entrepreneurial consultancy are women, with 43% following entrepreneurship training and 30% accessing finance. Furthermore, 34% of 132 occupants of the Moldovan Business Incubators Network are women. Nevertheless, more needs to be done to support women's entrepreneurship in rural areas where employment opportunities are limited and were opting for migration comes at great family and social cost to reach similar targets⁴⁴.

⁴⁴ Country Gender Profile of Moldova, EU Delegation, 2021

**ANNEX 3: Strengthening Resilience through Irrigation Services****COUNTRY: Moldova**
Agriculture Governance, Growth and Resilience Investment Project**Country water resources and utilization in sub-sectors**

1. Moldova heavily relies on surface water from its two transboundary rivers, namely the Nistru (Dniester) in the East and the Prut (a tributary of Danube) in the West. Together, these rivers provide an annual renewable water resource of 15,224 million cubic meters (MCM), while groundwater sources contribute an additional 53 MCM. The country's internal groundwater resources are estimated at 1.3 billion cubic meters per year, comprising 300 million cubic meters per year of deep groundwater and 1 billion cubic meters per year of shallow transient groundwater, which interacts with and feeds the surface water. At present, deep groundwater withdrawal stands at 78 million cubic meters per year, which is believed to be within sustainable yields of the aquifers, representing a quarter of the total internal renewable deep groundwater resources. The country's total water consumption (surface and ground) amounts to 110 MCM/year. Moldova's water resources endowments are estimated to be 4,952 m³ per capita per year, including an internal water resources endowment of 694 cubic meters per capita per year, which is large enough to support the current levels of water withdrawals at 231 cubic meters per capita per year. In summary, Moldova boasts ample water resources endowments, as evidenced in Table 1 below that shows the details of the water balance. Water withdrawals in Moldova are mainly sourced from (1) surface water, including rivers or streams or shallow groundwater, or (2) deep groundwater resources. Water demands in the baseline situation reflect various withdrawals for municipal and domestic drinking water use, water use for industrial and manufacturing services, withdrawals for agriculture (irrigation), and withdrawal for thermal cooling. For more details on water demand, see Table 2 below.

Table 1: Water Balance under Current Climatic Conditions

| | Unit | 2018 |
|---|--------------|-------------|
| Inflow across borders upstream (surface water) | MCM/y | 13,370 |
| Internally produced water (surface water) | MCM/y | 1,878 |
| Outflow across borders downstream (surface water) | MCM/y | 15,224 |
| Total surface water consumption | MCM/y | 86 |
| Total groundwater consumption | MCM/y | 25 |
| Total water consumption from groundwater and surface water | MCM/y | 110 |
| Return flow from deep groundwater withdrawal available for use | MCM/y | 53 |
| Return flow from surface water withdrawal available for use or reuse | MCM/y | 5.5 |
| Unmet water demand | MCM/y | 3.5 |
| Environmental flow requirements internally | MCM/y | 336 |
| Environmental flow requirements downstream outflow Prut and Nistru | MCM/y | 3,846 |

Source: WEAP Moldova data.

Note: FAO AQUASTAT reports lower cross-boundary inflows (namely 10.6 billion cubic meters per year) as compared to WEAP (13.37 billion cubic meters per year). AQUASTAT uses higher population numbers (namely 4.1 million) than those used in WEAP (3.1 million). Hence the renewable water resources per capita reported in AQUASTAT are much lower at 3,029 cubic meters per capita than through the WEAP water balance assessment (4,592 cubic meters per capita per year).

**Table 2. Water Withdrawals and Consumption under Current Climatic Conditions**

| Key data on withdrawals and consumption | Unit | 2018 |
|---|-------------|-------------|
| Irrigation water withdrawal: surface | MCM/y | 9 |
| Irrigation water withdrawal: groundwater | MCM/y | — |
| Industrial water withdrawal: surface | MCM/y | 21 |
| Industrial water withdrawal: groundwater | MCM/y | 9 |
| Municipal water withdrawal: surface | MCM/y | 60 |
| Municipal water withdrawal: groundwater | MCM/y | 69 |
| Thermal water withdrawal: surface (excl. Kuchurgan) | MCM/y | 57 |
| Thermal water withdrawal: groundwater | MCM/y | 0 |
| Total water withdrawal (excl. Kuchurgan) | MCM/y | 225 |
| Total water withdrawal (incl. Kuchurgan) | MCM/y | 725 |
| Total ground water withdrawal | MCM/y | 78 |
| Total surface water withdrawal (excl. Kuchurgan) | MCM/y | 147 |
| Irrigation water consumption | MCM/y | 6 |
| Industrial water consumption | MCM/y | 4 |
| Municipal water consumption | MCM/y | 43 |
| Thermal water consumption | MCM/y | 56 |

Source: WEAP Moldova data.

Note: At the Kuchurgan Combined Heat and Power Plant an estimated 550 MCM per year is diverted from the Nistru, of which 500 MCM is not consumed and discharged again, that is, non-consumptive withdrawal.

2. The results of climate change modeling indicate that Moldova's future climate will be warmer and drier, which is expected to have a modest impact on water availability and reliability for municipal and industrial use. However, this risk can be mitigated by implementing efficiency measures, recycling, and demand management strategies. While irrigation water use in Moldova currently accounts for a negligible proportion of the total available water resources, a drier climate is likely to exacerbate irrigation water shortages, leading to the expansion of hotspot catchments and increased vulnerability of rainfed farming. To manage water insecurity risks to livelihoods and the national economy, a range of measures can be employed, such as adaptive irrigation and climate-resilient agronomic practices, allocative measures that favor high-value uses in an efficient manner, and seasonal storage.

3. The rivers in Moldova have been heavily regulated over several decades, resulting in the construction of thousands of storage reservoirs. While some larger reservoirs serve both hydropower and thermal cooling purposes, there are also over 5,000 small dams used for irrigation, fish farming, and local drinking water supply. However, the quality of water in these reservoirs has been declining. Moldova's overall storage capacity is estimated at 738 m³ per capita out of its 4,952 m³ per capita per year.

4. Moldova has a moderately continental climate characterized by long and warm summers with an average temperature of 20°C and mild and dry winters with an average temperature of -4°C in January. There are four agri-climatic



zones in Moldova that differ in terrain, climate, soils, and water availability. The country's annual precipitation ranges from 370 to 560 millimeters per year (FAO 2019), with the northern regions receiving higher precipitation than the south and southeast, where marginal productive rainfed agriculture is prevalent due to lower rainfall and higher temperatures. In the south, natural wetlands exist along the Prut, and high salinity levels occur naturally, necessitating drainage to ensure productivity in the agriculture sector. Therefore, irrigation and drainage are essential components of Moldova's water management.

Irrigation and Drainage

5. Given Moldova's topography, its irrigated lands are situated on higher ground and rely on lift irrigation powered by electricity. Most of the country's irrigation infrastructure is organized around centralized irrigation systems (CISs). In 2008-2009, the Government of Moldova requested assistance from the Millennium Challenge Corporation (MCC) to rehabilitate up to 16 CISs, with the aim of transitioning to high-value agriculture and increasing the production of high-value-added fruits and vegetables. The MCC hired a consulting firm that produced a comprehensive feasibility report for the 16 high lift pumping irrigation systems in Moldova in 2009. These 16 CIS systems are supplied by surface waters located within the Black Sea Basin, in the watersheds of Moldova's two main rivers: the Nistru in the eastern portion of the country (9 CIS) and the Prut in the west (7 CIS). The MCC Compact Project, using its allocated budget, rehabilitated 10 out of the 16 schemes. The remaining schemes will be financed from other sources, including this project.

6. In addition, the MCC also invested in the Irrigation Management Transfer program, aimed at establishing and strengthening Water User Associations (WUAs) responsible for the administration, operation, and maintenance of the rehabilitated CIS. The program operates on the premise that farmers will gradually shift towards diversified and high-value crop production, leading to increased farm incomes, poverty alleviation, and the sustainability of these systems. Moreover, the MCC Compact Project has led to crucial legislative and regulatory reforms, which have enabled the creation of WUAs for 10 rehabilitated schemes, and multiple others in the years since.

7. The primary and secondary irrigation system in Moldova is owned by the state, while farmland is privately owned. According to Moldovan legislation, the Government of Moldova (GOM) is responsible for capital investment in the rehabilitation of the irrigation asset up to the farm field. Individual farm owners and operators are responsible for on-farm capital investments, although they can receive subsidies for up to 50% of the costs from state subsidies. Subsidies for electricity are also available to alleviate the excessive costs of pumping, also at a rate of 50% of the cost. The WUA is responsible for the full operation and maintenance of a transferred CIS, as stipulated through management transfer agreements with the government. According to the current legal framework, the WUAs' members are owners and users of agricultural land in the CIS service areas. Land users can be divided into two categories: (1) individuals who own agricultural lands in the CIS service areas, usually with small plots ranging from 0.5 ha to 20 ha, and (2) legal entities - agricultural producers, who own or lease agricultural land. Legal entities can be further divided into small (up to 20 ha), medium (from 20 to 500 ha), and large farms (over 500 ha).

8. Institutional, Policy and Legal framework. MAFI is responsible for developing and promoting policies related to land improvement, including irrigation. In early 2023, the National Strategy for Agricultural and Rural Development 2030 was approved, which will guide the development of the Irrigation Sector Development Program. Currently, the Land Improvements Program is the only program in force to ensure sustainable management of land resources for the period 2021-2025, as outlined in Government Decision no. 864/2020. The GOM plans to establish in 2023 a new agency that will be in charge of administering public irrigation systems, including those transferred to WUAs.



9. The Law on Water Users Associations, no. 171/2010, was adopted as a precondition to the MCC Compact Project. This law establishes a comprehensive legal framework regarding the constitution and functioning of WUAs as legal entities specific to participatory management in irrigation. Also, it regulates the gratuitous transmission of the state-owned irrigation and/or drainage infrastructure to WUAs. At the same time, the law determines the role and attributions of the Monitoring and Supervision Unit of the associations' activity that currently functions as a structural division of the Apele Moldovei Agency, subordinated to the Ministry of the Environment (plans are under way for the unit to be transferred to MAFI). The associations and their governing bodies (The General Assembly, the Administration Board, the Audit Commission, and, where appropriate, the Dispute Resolution Commission) include farmers - members of the associations. Major decisions about the WUA activities (irrigation plans, budgets, water tariffs, membership fees, investment projects and contributions, etc.) are transparently discussed and adopted by most associations' members. According to the legislation, public authorities and other decision-makers are not allowed to interfere in the associations' activity.

10. The Law on Water Users Associations, no. 171/2010, was implemented as a prerequisite for the MCC Compact Project. It establishes a comprehensive legal framework for the formation and operation of WUAs, which are specific legal entities for participatory management in irrigation. The law also governs the transfer of state-owned irrigation and/or drainage infrastructure to WUAs, while defining the role and responsibilities of the Monitoring and Supervision Unit, which is currently a division of the Apele Moldovei Agency under the Ministry of the Environment (with plans to transfer its functions to MAFI). The associations consist of farmers who are members and are managed by their governing bodies, which include the General Assembly, the Administration Board, the Audit Commission, and, where appropriate, the Dispute Resolution Commission. Important decisions, such as irrigation plans, budgets, water tariffs, membership fees, investment projects and contributions, are discussed and adopted in a transparent manner by most members of the associations. Public authorities and other decision-makers are prohibited from interfering in the associations' activities, according to the legislation.

11. In addition to the Law no. 171/2010, the irrigation sector and participatory irrigation management is regulated by the following normative acts:

- a) Water Law no. 272 of 23.12.2011, which was a precondition for the disbursement of the MCC funds. This law is aligned to the European Water Directives, which regulate the conditions and procedure for issuing the environmental authorizations for special water use.
- b) Government Decision no. 198/2013 for the approval of the Regulation on gratuitous transmission of the state-owned irrigation and/or drainage infrastructure for use to WUAs.

The Central Irrigation System Layout and Design

11. The design of a CIS involves locating a primary pump station near the river intake to pump water to a secondary pump station or storage reservoirs for additional lift. The system includes open canals, and in some cases tertiary canals, as well as a network of pipes that deliver water at hydrants throughout individual farms. These schemes involve lifting irrigation between 50-120 meters and use high efficiency irrigation systems based on valves or sprinklers. Electrical pumping systems are used, and the CISs are equipped with new centrifugal pumps, frequency drivers, and other electrical equipment.

12. The GOM has submitted a funding request for several CISs, including the Tudora and Caplani CISs, the Etulia CIS, and the Tetcani CIS. The Tudora-Caplani CIS has a partial detailed design for a command area of 3,700 hectares, which will require technical vetting and possible improvements under the project. The Etulia and Tetcani CISs are still at the

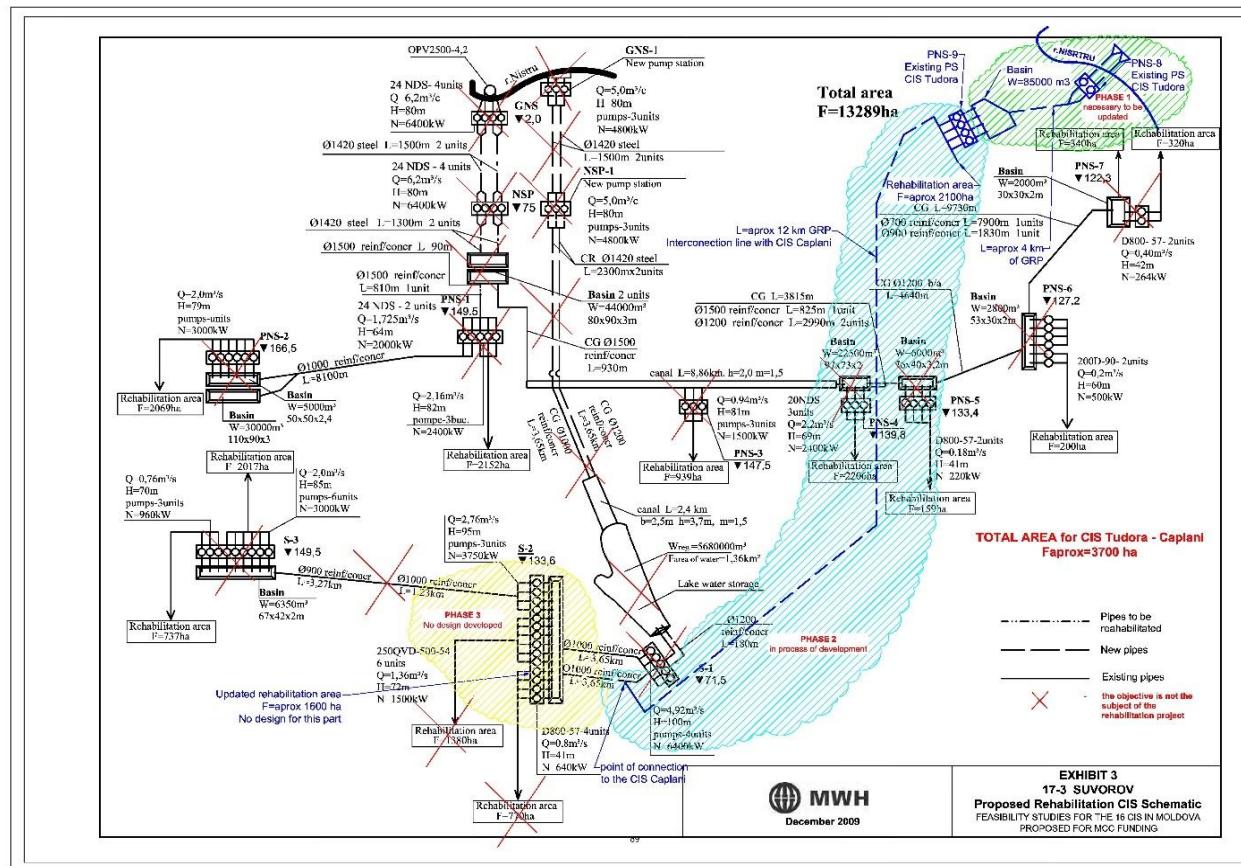


conceptual design stage. The expected areas for development under the Etulia and Tudora and Caplani CISs are 3,500 hectares and 1,258 hectares, respectively. Further details on each CIS are provided below.

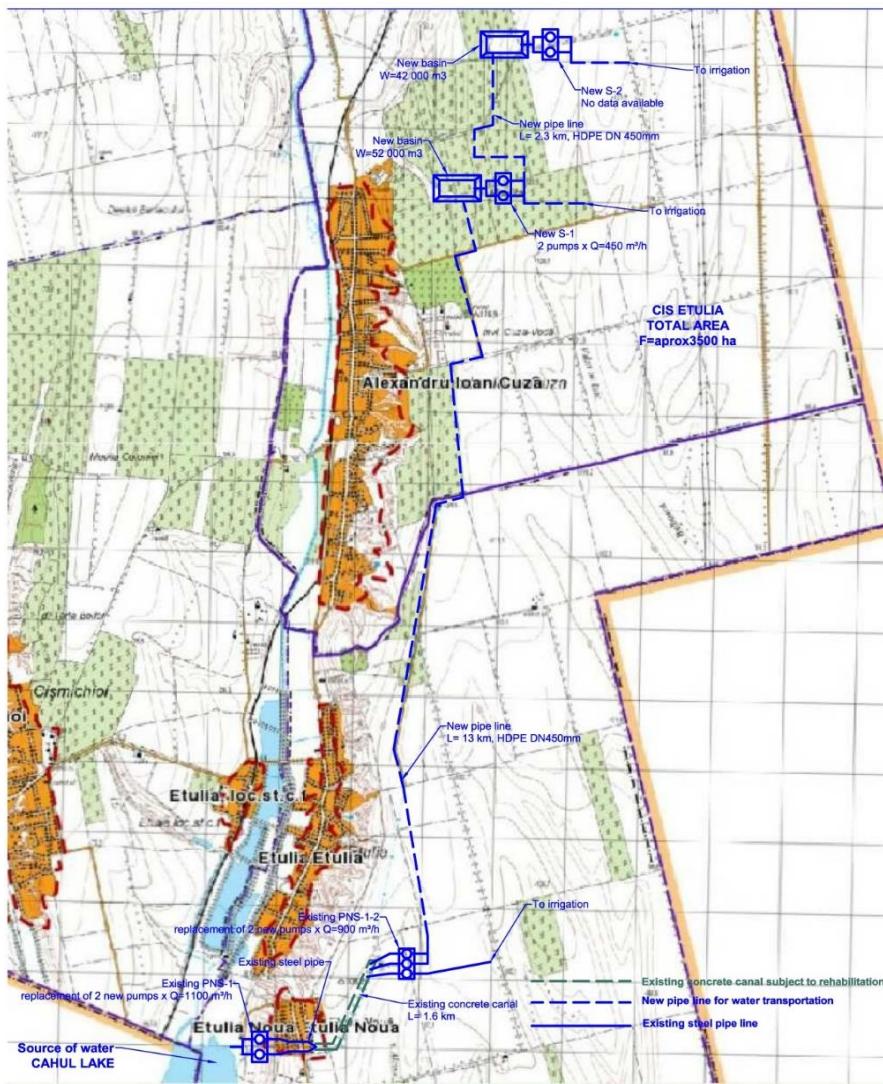
13. ***Tudora and Caplani CISs.*** These two CISs are part of the larger primary system of Masivul Suvorov, with 13,289 ha of command area. In there, the current combined Tudora-Caplani system under consideration has a command area of 3,700 hectares to be carved out from the original Suvorov area only in the command area but using an existing Tudora CIS Pumping Station PNS8 to be renovated. The pumps in the Tudora CIS must be replaced with new pumps and a pipeline originating from the Nistru River, as shown below. The PNS-8 pumping station needs to be rehabilitated within the Tudora CIS. The Tudora main pumping station will have two pumping units with **an estimated capacity of 4 m³/sec for an approximate lift of 80 m and N= 3,100 KW connected to the 4 km of pipeline** into the existing modulating basin of 85,000 m³ capacity situated near to the second existing pumping station PNS-9 (non-functional) within Tudora CIS as well. From PNS-9, a part of water will be delivered on field of 2,100 ha for irrigation process in the service area of the Tudora CIS system. The 2,100-hectare irrigation area will be provided with pressure outlet valves in the tertiary units to be finalized during the final design stage. The other part, through the new interconnection pipeline (L=12 km) will be pumped and delivered to the Caplani CIS area, directly to existing S-2 pumping station, which originally received water from the Caplani Lake by using the existing pumping station S-1 (not to be used in the new system). **The existing S2 pumping station will have an estimated 2 pumping units with a capacity of 1.3 m³/sec (N= 1200 KW) for a lift of about 95 m.** To this end, based on the statements of the managing WUA, for the Tudora CIS, the irrigated area will be approximately 2,100 hectares, and for the Caplani CIS the irrigated area will be approximately 1,600 ha. However, all these figures are approximations based on preliminary data furnished by the managing WUA and the final design will need to be updated during project implementation.

14. The WUA has undertaken the initiative and started the detailed design process earlier, but the design documentation is divided into several phases as described below, however, this phased approach is done to accommodate lack of funds for the entire system. The optimal approach under the project is to provide sufficient funding for the rehabilitation of the entire system:

- I. **Phase I** includes the **a)** rehabilitation of PNS-8, **b)** replacement of 4 km of adduction main pipe till the basin near PNS-9 (without the rehabilitation of the PNS-9); and **c)** rehabilitation of the basin with the capacity of 85,000 m³. The design was prepared in 2019-2020, but it was done based on a smaller service area and does not meet the new required volumes of water, thus it should be updated considerably (should be increased the pumping capacity of PNS-8, the diameter of the adduction pipe, electrical part, structural part, and others).
- II. **Phase II** includes the **a)** rehabilitation of PNS-9 (including all facilities, electrical and mechanical equipment, structural and architectural part, and others), **b)** construction of a new main adduction and a 12-kilometer interconnection pipeline (including secondary lines for connection of the existing accumulation basins and other irrigation facilities); and **c)** connection to the existing infrastructure of the Caplani CIS. Based on this approach, the pumping station S-1 from Caplani CIS will not be used any more in the new irrigation scheme, because the water will directly be delivered to the existing compensation basin of S-2 by using the PNS-9 from Tudora CIS.
- III. **Phase III** that includes the rehabilitation of the Caplani CIS infrastructure will be developed during project implementation.



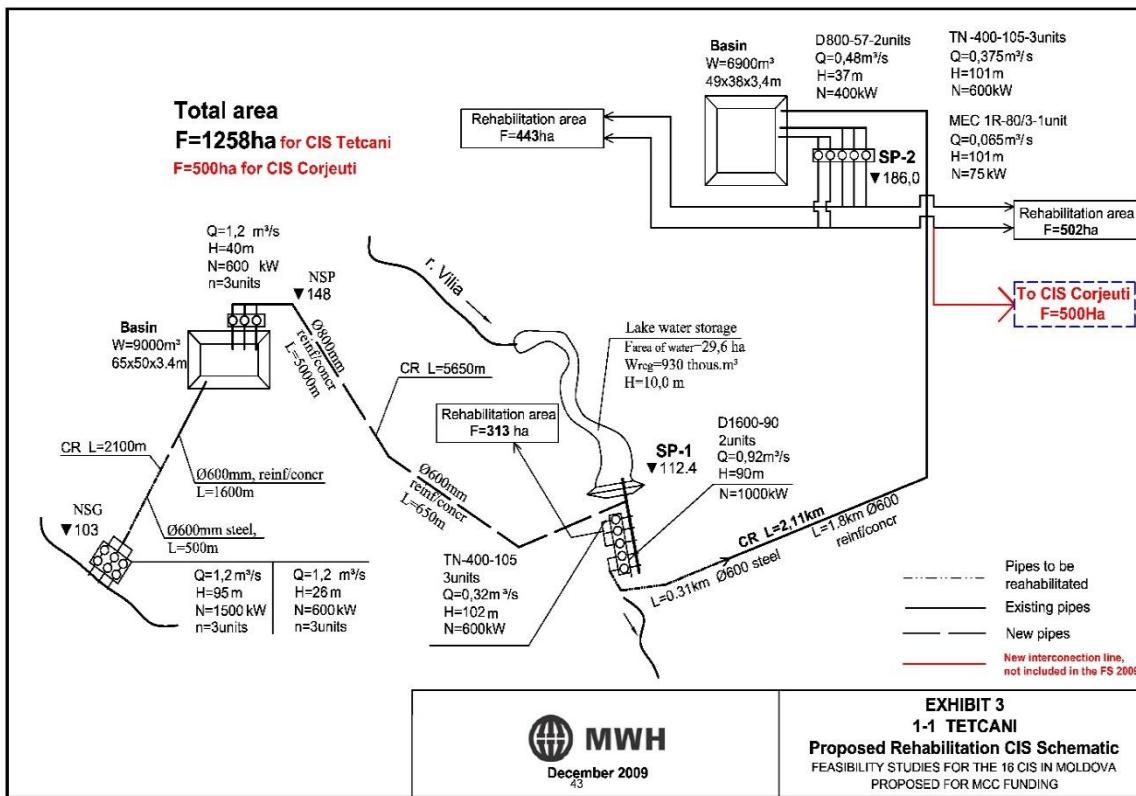
15. *Etulia CIS*. The attached map represents the schematic layout of Etulia CIS with pertinent information related to the irrigation scheme. The source of water is the Cahul Lake near the town of Cahul, a municipality in southern Moldova. The Cahul Lake has a total water volume of approx. 180 million m³. It is a natural fluvial lake in the meadow formed on the lower course of the Danube River. In the north part, the lake is connected to the Cahul River, which is the main source of water for the lake in the spring and autumn seasons. In the southern part, the lake is connected to the Danube River through a canal. For the Etulia CIS, there are some early designs commissioned by the WUA, that foresee the extraction of the water directly from the Cahul Lake using the existing main pumping station PNS-1 where 2 pumps will be replaced with a total flow of 0.6 m³/sec. The main pump station PNS-1 will lift water from the lake to the existing secondary pumping station PSN 1-2 through two open, concrete-lined 1.6-kilometer-long canals. The two pumps in PNS-1-2 will be replaced with new pumps with a total capacity of 0.5 m³/sec capacity. From PNS 1-2, water will be further repumped into a first new accumulation basin (water modulation reservoir to be constructed with a capacity of approximately 52,000 m³), using a new pipeline (to be constructed) with a length of 13.0 kilometers. From the first basin the water will be lift-pumped into the second new accumulation basin (to be constructed) with the capacity of 40,000 m³ using the third pumping station S-1 (to be designed and constructed) with the capacity of 900 m³/hour and a new 2.3-kilometer-long pipeline (to be constructed). The total irrigated area of the project is estimated at 3,500 hectares. As noted, the existing WUA is actively involved in the detailing of the CIS design which needs, however, to be preempted by a technical and environmental feasibility study, and eventually a technical vetted final design. The project will provide financing for the feasibility and technical design work, while the investments will be covered from other financing sources.



16. Tetcani CIS. This CIS derives water from a dam on the Vilia River, a tributary of Prut River. The dam is 13.6 m in height, 6.0 meters in width and 125 meters in length. It was built in 1963 as an earthen compacted dam. The maximum volume of water stored in the lake is 930,000 m³ and the minimum 222,000 m³. The adjacent slopes are protected with grass. The existing pumping stations located at the dam are functioning, but the pumps and motors are obsolete and need to be repaired by replacing worn out or missing parts. Electric switchgear and panels need to be repaired or replaced. The intake is in good condition but the structure for fish protection needs to be replaced. The station's piping network needs to be repaired. The valves and ancillary equipment also need to be replaced or repaired by replacing worn out or missing parts. The main discharge pipes are in good condition. The suction and discharge basins are functional but need clearing of silt deposits, repairing of inner slope protection, and replacing the membrane to prevent water loss by infiltration. In general, the underground delivery pipe network is in adequate condition. However, there are broken pipes, hydrants and valves that are not functioning or are damaged beyond repair with a lack of adequate and reliable water supply. Due to nonfunctioning components and lack of watering equipment the assurance of water supply cannot be guaranteed for now. The volume of available water in the lake is not sufficient for local irrigation needs, as the volume required for the command area of 1,258 ha is ranging from 3.0 - 5.0 MCM. The GOM is also interested in including in the same focus area the rehabilitation of an interconnection station with the CIS Corjeuti, increasing command area by



another 500 hectares. The technical approach will focus on developing solutions for abstracting water directly from the Prut River, using the river pump station that requires rehabilitation, thus discarding the need for the rehabilitation of the Vilia dam and reservoir. Details are provided schematically in the following diagram. The project will provide financing for the feasibility and technical design work, while the investments will be covered from other financing sources.



CIS Operation and Maintenance

17. The project assigns the responsibility for operation and maintenance of the CISs to the managing WUAs. The Lift Irrigation System Operation and Maintenance (O&M) expenditures are divided into fixed costs and variable costs. Fixed costs include all electromechanical infrastructure installed under the system and staff costs for operation, which need to be amortized, maintained, and repaired annually. Variable costs comprise the operation costs of the energy supplied to the pumping stations annually, based on the crop-water requirements of the crops, as demanded, or forecasted by the WUAs prior to each season. These expenditures have been estimated and appropriately applied in the economic and financial feasibility analysis of the CIS under consideration.

18. The cost of energy required for the operation of the CIS is currently subsidized by the GOM at a rate of 50%. This subsidy will continue for a reasonable period to allow the WUAs and irrigation farmers to become familiar with the operation of the system. However, given that the CIS involves the use of electro-mechanical equipment, it is essential that farmer organizations receive hands-on training in the field to enhance their knowledge and skills in irrigated agriculture. This training will be included under Component 3.2 of the project.



Implementation Period

19. The project includes a comprehensive feasibility study, design, and commitment formalization process for the three CISs. The Tudora and Caplani CISs require rectification of the physical pumping system and irrigated area designs, drawings and estimates which will be completed during the first year of project implementation. After this, capital investments will be made through the tendering and selection of supply and installation contracts, followed by the construction or reconstruction of the CISs, which is expected to take approximately 2-2.5 years. To ensure proper system operation, farmers and WUAs will receive training during and after the construction phase over several years, including during one irrigation system. As a result, Component 3 is estimated to have an implementation period of at least 4 years.

Economic and Financial Analyses

20. **Improved and modernized irrigation is a key precondition for improving productivity in agriculture sector.** Agriculture represents 9.4 percent of Moldova's GDP and employs 21.5⁴⁵ percent of the total labor force. Increasing agricultural productivity and competitiveness of the sector is essential in boosting economic growth prospects and poverty alleviation efforts.

21. **Moldova remains one of the most climate-vulnerable countries in Europe and one of the least adapted to cope with projected temperature increases and heightened variability of precipitation.** The 2020 and 2022 droughts are just the latest episodes in an increasingly worsening new climate normal in a sector that is fully dependent on rainfall. In 2020, productivity losses in agriculture reached 60%, with estimates for 2022 coming on a smaller, but still significant scale. Climate models predict mean temperature rises and more variable rainfall with anything from a slight increase to a significant decline in total precipitation. Even under scenarios with an increase in mean rainfall, however, water availability will decrease due to increased temperatures and rates of evapotranspiration. The total cost of inaction on climate adaptation is estimated at US\$600.0 million (6.5 percent of GDP) and is expected to more than double to US\$1.3 billion by 2050. Also, Russia's invasion of Ukraine has impacted the country's food security outlook and agriculture sector's ability to supply food for domestic consumptions and carry on with exports to several lucrative markets.

22. **The project aims to achieve two main sets of outputs.** These include: (a) rehabilitated and improved physical structures, which reduces irrigation water losses and increases irrigation coverage; and (b) facilitated environment for increased production, productivity of land, recovered area for irrigation, and changed cropping patterns from low value grains (wheat and maize) and forages to HVCs, mostly fruits and vegetables. They both are expected to generate positive financial and economic impacts.

Methodology, data sources, and key assumptions

23. **The calculation of the net present value (NPV), economic rate of return (ERR), and benefits over costs (B/C) is based on net incremental benefits.** This economic analysis adopted the forward-looking framework for quantifying costs and benefits of investments for the Tudora CIS scheme. Incremental benefits were determined based on "with" and "without" project scenarios. In addition, the GHG emission reduction benefits were computed using high carbon price (US\$85.5/tCO2eq) and low carbon price (US\$42.8/tCO2eq) assumptions⁴⁶.

24. **The economic appraisal was carried out for a 30-year period.** The project implementation time horizon and life

⁴⁵ Data is for 2020 from the National Development Strategy 2022-2030.

⁴⁶ In accordance with the Guidance note of shadow price of carbon in economic analysis, World Bank, 2023

<https://documents1.worldbank.org/curated/en/621721519940107694/pdf/2017-Shadow-Price-of-Carbon-Guidance-Note.pdf>



expectancy of the investment works justify the time considered for analysis. The prices were projected to increase by 6% per year in the first few years⁴⁷ and then continue a price increase of 3% per year over the other 25 years of project period.

25. Financial analysis is done for investments in farms, looking at the small farm sector and larger agricultural enterprises. Although much of the agricultural data is available in aggregate level, due to lack of detailed farm data, analysis used assumptions on the farming trends following the irrigation improvements, as experienced in other countries with irrigation projects supported by the bank in recent years.⁴⁸

26. Expansion on higher value crops at cost of lower value cereals and field crops is expected. The main fruits currently cultivated are apples, peaches, and plums, which are foreseen to expand further. But the project also expects other fruits such as Pears and berries to come to picture following improved irrigation systems. Wine grapes dominate currently and are expected to further expand but also table grapes are foreseen too. The major changes are expected from vegetables in both open fields and especially in greenhouses as they rely totally on irrigation and can yield much higher productivity. A presentation of the anticipated changes in increased irrigated land and shifting from low value crops (cereals and field crops) to high value crops (fruits and vegetables) and expected yield improvements are presented in table 1.1 below.

Table 1.1. Expected changes in areas cultivated and yield, without and with project

| Crops | area hectares | | | Yields t/quintal | | |
|-------------------|---------------|--------------|------------|------------------|------|-------------|
| | Without | With | Change | Without | With | change in % |
| <i>Fruits</i> | | | | | | |
| Apple | 271 | 350 | 79 | 109 | 132 | 21.0 |
| Peaches | 155 | 185 | 30 | 37 | 42 | 13.2 |
| Plums | 312 | 350 | 38 | 72 | 100 | 38.6 |
| Pears | 0 | 35 | 35 | 0 | 42 | |
| Berries | 0 | 35 | 35 | 0 | 98 | |
| <i>Grapes</i> | | | | | | |
| Wine grapes | 557 | 700 | 143 | 60 | 71 | 18.6 |
| Table Grapes | 0 | 15 | 15 | 0 | 91 | |
| <i>Vegetables</i> | | | | | | |
| Open field | 725 | 850 | 125 | 59 | 82 | 40.0 |
| Greenhouses | 25 | 200 | 175 | 80 | 100 | 25.0 |
| Cereals | 811 | 530 | -281 | 50 | 55 | 10.0 |
| Field Crops | 823 | 550 | -273 | 50 | 57 | 13.1 |
| Total | 3,679 | 3,800 | 121 | | | |

Source: WB Project team calculation, Moldova Statistical Institute.

27. The project costs that are directly relevant or specific to the Tudora CIS are included in the analysis (table 1.1). About half of total project-related costs are hard investments analyzed using economic models, as presented in sub-

⁴⁷ The current Russia's invasion of Ukraine has put tremendous pressure on food prices, exceeding the projected rates, and such upward price pressure is expected to continue for years to come.

⁴⁸ Water Resource and Irrigation Project in Albania was one of those examples used.



component 3.1 (Rehabilitation of irrigation Infrastructure), with the focus on Activity 3.1.1 (Rehabilitation of the Tudora CIS). Besides the WB investment costs in the irrigation infrastructure, the model also incorporates farmers investment costs in the construction of greenhouses.

Table 1.2: Tudora CIS Investment Costs (US\$, thousand)

| Components □ – | Sum of Total Cost (000) | % |
|--|-------------------------|--------------|
| 1 WB project investments | 21,000 | 72.7% |
| 2 Farmers investments (greenhouses and equipment mainly) | 6,500 | 22.5% |
| 3 Program Management (part of this component) and O&M | 1,375 | 4.8% |
| Grand Total | 28,875 | 100% |

28. The distribution of investment costs over the four-year implementation period of the project are assumed to follow the disbursement schedule shown in table 1.2, which is informed by the project implementation experiences in the region and in Moldova. Given the nature of the investments, this calculation uses an annual operation and maintenance costs of about 5 percent of the investment.

Table 1.3. Relevant Costs and Disbursement Schedule (WB financing only)

| | Year 1 | Year 2 | Year 3 | Year 4 | Total |
|----------------------|--------|--------|--------|--------|--------|
| Percent distribution | 23.81% | 28.57% | 33.33% | 14.29% | 100% |
| US\$ amounts (000) | 5,000 | 6,000 | 7,000 | 3,000 | 21,000 |

Source: World Bank team calculation

Expected Benefits

29. The key expected benefits from investments in the Tudora CIS are driven by increased productivity and cropping intensity, and the shift to HVCs such as vegetables and fruits. The benefits with the project scenario include: (a) increased yields for crops in formerly poorly irrigated areas (or without any irrigation); (b) increase in irrigated surface area (it is currently estimated at only 200 hectares, and it is targeting 3,800 hectares with a potential to cover 5,000 hectares) and reduced cost of irrigation; (c) changes in cropping patterns, favoring crops with higher yields (vegetables and fruits); d) increased number of harvests in the same field per year (2 or even 3 crops per year); and e) avoiding extreme productivity losses due to severe droughts similar to those in 2020 and 2022. Farmers would like to grow more maize and less wheat, which can be grown with and without irrigation, as well as more vegetables, fruit trees, and vineyards. The actual data support those changes.⁴⁹

30. Positive economic spillover effects are expected to be generated from higher income generated and boosted

⁴⁹ The actual data are mainly those published by the Moldova Institute of Statistics, in specific agriculture reports and agriculture data series. These statements are also supported by interviews and discussions with farmers .



employment, especially in the greenhouses sector. Greenhouses need intensive labor, therefore employing many times more labor than vegetables in open field and fruits, and 20 times more labor than areas cultivated with cereals and field crops (which are mechanized operations). Therefore, expansion of greenhouses to 200 hectares from 25 hectares suggests a big boost in agriculture employment in the project region, leading to large positive spillover effects due to income increase. Being conservative, this analysis assumes only limited additional benefits from the spillover positive economic effects.

31. **Import substitution and export promotion are among the expected benefits, leading to an improved balance of payments.** The project will lead to increased agricultural production in Moldova, especially for vegetables and fruits, and given increased prices for agricultural products worldwide, it will have a significant impact in import substitution, and potentially lead to increased exports.

Financial analysis

32. **Farm models combined crops and livestock activities typical of the areas in the assessed schemes.** Prices for the analysis were based on published information by Moldova Institute of Statistics and consideration of the World Bank published past commodities' international prices and forecasts. Farm income increases due to improved water availability as irrigation infrastructure gets rehabilitated, improving land productivity, and from farmers' investment in HVCs when irrigation water becomes more reliable (Table 1.4).

33. **Beneficiaries are estimated to, on average, increase their net family income by 56 to 73 percent depending on the farm size and the degree of diversification into HVCs.** Given the diversification to HVCs the labor requirement is expected to increase from about 81-98 days to about 86-121 days per farm per year, due to the enhanced agricultural activity, which is well below the working capacity of an average family. The return to family labor is expected to increase with the project from about US\$20 - US\$30 to US\$28 - US\$47 per day, which is well above normal wages in rural areas. The farm size is too small to provide full-time employment for all family members, or adequate income to support an average household.

Table 1.4. Project Financial Impact at the level of typical farms in the project area (US\$, thousand)

| | Farm 1.8 ha all irrigated | | Farm 1.2 ha all irrigated | |
|-------------------------|---------------------------|---------|---------------------------|---------|
| | Without | With | Without | With |
| Gross revenue | 2,904.8 | 4,513.4 | 2,178.7 | 3,689.7 |
| Net revenue | 2,592.3 | 4,064.4 | 1,972.3 | 3,402.2 |
| Income increase (%) | | 56.8 | | 72.5 |
| Labor required per year | 81 | 86 | 98 | 121 |
| Returns/days of labor | 3212 | 4735 | 2012 | 2832 |

Source: Project Management Team, WB team calculations using farm models

Economic Cost Benefit analysis

34. **Cost Benefit Analysis is done only for Component 3 of the project which finances hard investment in the Tudora CIS.** Only the component with hard and *a-priori* known investments which are possible to quantify (monetize) is considered here. These investments are related to the rehabilitation and expansion of irrigation coverage to about 3,800 hectares, with a potential to cover 5,000 hectares, compared to only 200 hectares current coverage.



35. **Project expects strong diversification to HVCs.** That includes an increase in surface with vegetables by 40 percent, driven by a boost in greenhouses sector to 200 hectares expected (from 25 hectares current) and an increase by 17.2 percent of vegetables at open field (from 725 hectares to 850 hectares). Similarly, we expect the surface cultivated with apple as the main fruit in the region to increase by 29.4 percent from 270 hectares currently to 350 hectares. Surface cultivating peaches is expected to grow by 19.6 percent from 155 hectares to 185 hectares. Also surface cultivating plums is expected to grow by 12.1 percent from 215 hectares to 350 hectares. Surface cultivated with wine grapes (vineyards) as a significant agriculture product in the Tudora CIS is also expected to grow by 25.7 percent, from current 557 hectares to 700 hectares. In meantime it is expected that a functional irrigation network will be an incentive to switch to new high value crops not much present in the Tudora region but already present in the south region of Moldova. Therefore, we expect new surfaces to be cultivated with berries about 30 hectares and table grapes 15 hectares. There will be other high value crops which will add value to investment, and that are not included in the model.

36. **However, as more agricultural production expands into high-value crops, there will be less area cultivated with cereals and field crops.** Therefore, it is expected that the area cultivated by cereals will shrink by 34.6 percent from 811 to 530 hectares, and the area cultivated by field crops will also shrink by 33.2 percent from 826 to 550 hectares.

37. **Water supply through irrigation depends on the crop yields, development stage, temperatures, and soil water capacity.** The irrigation method and scheduling also affect irrigation efficiency and irrigation influence on crop yield. If the water available is sufficient to irrigate the entire surface, there is a substantial increase in productivity for the main crops cultivated. One more irrigation cycle adds on average, a 9 percent increase in production of fresh vegetables, a 10 percent in vineyards, and a 12 percent increase in fruit orchards. Two more irrigation cycles, result in, on average, a 13 percent increase in production of fresh vegetables, a 13 percent in vineyards; and a 20 percent increase in fruit orchards. Thus, there is a clear increase in productivity considering only these two scenarios.

38. **Tudora CIS implementation is expected to have a positive influence on crop yields in the project areas.** Productivity is expected to significantly improve as the rate of adoption of new irrigation practices and diversification towards HVCs accelerates. The project assumes yield improvements between 30 to 80 percent for the open field vegetables⁵⁰ and 13 to 40 percent for fruits. The model analysis assumes a 21 percent yield growth for apples, a 13.2 percent increase in yield for peaches, and a 38.6 percent yield increase for plums is expected. An 18.6 percent yield increase for vine grapes is also expected due to the Tudora irrigation project. Besides fruits and vegetables, it is expected that the project will also increase yields of field crops, especially maize and other crops that rely on irrigation. Despite the shrinking surface of land cultivated with cereals and field crops due to switching to high value crops, some yield gains will compensate for this reduced production in cereals and field crops.

39. **The project also expects diversification to HVC to be strong, especially with expansion of greenhouses as the new irrigation system enables that, but also increased crop intensity and number of harvests even in the open field vegetable cultivation.** Expansion of greenhouses to an expected 200 hectares is expected to play a crucial role in overall productivity gains, but also have positive economic spillover effects as they employ more labor and generate higher revenues. Therefore, the project expects also benefits from spillover effects due to increased farmers income and economic turnover. These economic benefits due to positive spillover effects are foreseen in a very conservative way as part of overall benefits in the model.

40. **Another positive effect of investment in irrigation in the Tudora CIS is reducing irrigation costs for lands already irrigated using water wells and their pumping stations.** Although only 200 hectares currently use the irrigation system,

⁵⁰ Similar irrigation projects in other countries have produced similar and even higher yield improvements. Such an example is from Albania that based on the agricultural statistics of Albanian institute of statistics (INSTAT) produced yield increases between 30 and 118 percent in vegetable production.



it is well known that the surface being irrigated is larger. These farms use their water wells with water pumps which are cost inefficient and negatively impact on their productivity. By replacing them with the proper irrigation system, the cost of irrigation is reduced, hence productivity gains will become evident. Replacement of these inefficient water pumps also has a positive effect in reducing GHG emissions.

Overall economic results

41. **The cost benefit analysis indicates that investing in the Tudora CIS is economically viable, with an estimated EIRR of 19.77%, (table 1.5) well above the benchmark 6% economic cost of capital.** The Benefit Cost ratio is 3.5. The sizable benefits from productivity gains through higher yields of vegetable production, including significant benefits from greenhouses, account for the robust NPV and EIRR obtained. Higher yields from apple production and wine grapes are also important drivers to these positive results. Switching from less productive cereals and field crops to higher value crops and investment in greenhouses, which is enabled with the proper irrigation system in place and working, is a key factor to account for. Considering the benefits of GHG emission reductions further enhances the project's economic viability, but not significantly.

42. **The GHG emission analysis estimates an overall reduction in emissions equal to 6,013 tCO2eq for the 20-year period, on an annual reduction equivalent to 301 tCO2eq.** Low shadow prices and high shadow prices were used for the cost benefit analysis, as provided in the 2022 shadow price guidance note. Larger areas devoted to perennials (fruit crops, grapes) contribute to carbon sequestration. The provision of irrigation (which increases carbon sequestration by enhancing residue production) to annual and perennial crops contributes to emission reductions. Instead, the land-use change from annuals (cereals) to perennials is a source of emissions, as is the rehabilitation and expansion of the irrigation system. Applying the low and high shadow prices for carbon emissions in the cost benefit analysis suggests that overall economic results do not change much as shown in the table below.

Table 1.5. Cumulative results of Economic analysis (US\$)

| Components | NPV (US\$) million | EIRR | B/C |
|--|-----------------------|--------|-----|
| Tudora CIS Baseline (no GHG) | 157.3 | 19.77% | 3.5 |
| Tudora CIS Baseline (with GHG low shadow price) | 157.6 | 19.81% | 3.5 |
| Tudora CIS Baseline (with GHG high shadow price) | 157.8 | 19.84% | 3.5 |
| Tudora CIS Scenario 1 (10%) | 123.3 | 15.70% | 2.9 |
| Tudora CIS Scenario 2 (20%) | 95.6 | 11.94% | 2.3 |
| Tudora CIS optimistic scenario | 185.7 | 24.51% | 4.3 |

Source: WB Team calculation

Sensitivity of economic analysis

43. **Sensitivity tests show that project is economically viable even when tested for the worst-case scenarios.** Two worsening scenarios were tested: 1) a 10 percent lower benefits and 10 percent higher costs; and 2) a 20 percent lower benefits and a 20 percent higher costs; and 3) a 10 percent higher benefits and 10 percent lower costs (optimistic scenario). At the sensitivity scenario with 10 percent lower benefits and 10 percent higher costs, the EIRR was still strong at 15.6 percent, a B/C of 2.9 and an NPV at US\$123.3 million. Even at the worst-case scenario when assuming a 20 percent



lower benefits and 20 percent higher costs (very unlikely), the project does well and is economically viable at EIRR 11.9 percent. Its B/C is still strong at 2.3 times, and its NPV is estimated at US\$95.6 million, at 6 percent discount rate. These results, not even incorporating gains from reducing GHG emissions, suggest a very viable project investment. In the optimistic scenario the EIRR increases further to 24.5 percent, the B/C is 4.3 and NPV - US\$185.7 million. Results of sensitivity tests are presented in Table 1.6.

Table 1.6. Cumulative results of stress tests Economic analysis (US\$)

| Components | NPV (US\$) million | EIRR | B/C |
|--|-----------------------|--------|-----|
| Tudora CIS Baseline (without considering shadow carbon prices) | 157.3 | 19.77% | 3.5 |
| Tudora CIS Scenario 1 (10%) | 123.3 | 15.60% | 2.9 |
| Tudora CIS Scenario 2 (20%) | 95.6 | 11.90% | 2.3 |
| Tudora CIS optimistic scenario | 185.7 | 24.50% | 4.3 |

Source: WB Team calculation



ANNEX 4: GHG Analysis

COUNTRY: Moldova

Agriculture Governance, Growth and Resilience Investment Project

Summary of Data and Assumptions for EX-ACT analysis of Livestock Activities

| Components / Benefits analyzed | COMPONENT 2 – FOSTERING GROWTH IN UNDERPERFORMING SUB-SECTORS (matching investment grant mechanism) – <i>livestock-related activities</i> <ul style="list-style-type: none"> Establishment of 10 new pilot dairy farms Increasing productivity (improved breeds, animal health and welfare) Improved manure management at existing dairy/meat farms Construction of various productive infrastructure elements (at the newly established farms) | | | | |
|---------------------------------------|---|--|--|---|---|
| EX-ACT module | Activity | WOP (Without Project) | WP (With Project) | Assumption | Source |
| 4.2 Livestock | Establishment of 10 <u>new dairy farms</u> with <u>100 cows/farm</u> and 17.5% culling rate, used for meat | <i>Not existing</i> | 660 dairy cows 140 meat cows High productivity cows provided Manure mgmt.: digester (in Tier 2) | 80% adoption rate for conservative approach | WB Team Estimates, Project Appraisal Document |
| 9.2 Energy use (*) | Establishment of 10 new dairy farms: <u>Electricity use for operations</u> | <i>Not existing</i> | 6,300 MWh/year/ all farms (700,000 kwh/year/farm) | 10% of energy is sourced from biodigester | WB Team Estimates |
| 9.4 Buildings (**) | Establishment of 10 new dairy farms: <u>Building construction</u> | <i>Not existing</i> | 1,500 m ² /all farms | Assuming concrete, 'agricultural building' | WB Team Estimates |
| 4.2 Livestock | <u>Improved manure mgmt.</u> (***) at existing (#100) dairy farms, with 1,300 cows in total and 17.5% culling rate, used for meat | 1,073 dairy cows 227 meat cows Low productivity cows | 1,073 dairy cows 227 meat cows Improved manure management - digester (in Tier 2) | 80% adoption rate for conservative approach in WP (matching grants) | WB Team Estimates |

* Energy use for operations of *existing* dairy/meat farms has *not been included* due to lack of data. Changes in energy consumption across Without and With Project scenarios (partially due to the establishment of biodigesters on farms) are likely to occur but were not considered.

** New building construction at *existing* dairy/meat farms has *not been included* due to lack of precise information on what it is going to be constructed, and as the related impact on GHG emissions is understood as being minimal.

*** No additional improvements have been assessed for *existing* dairy/meat farms due to lack of precise data on interventions at that level.



EX-ACT results

| Project name | AGRICULTURE GOVERNANCE, GROWTH AND RESILIENCE INVESTMENT PROJECT | | | Project duration (in years) | Total area (ha) | Global warming potential |
|--------------|--|------------------------------|----|-----------------------------|-----------------|--------------------------|
| Continent | Europe | Implementation Phase | 6 | Mineral soil | 0 | CO ₂ 1 |
| Country | Republic of Moldova | Capitalization Phase | 14 | Organic soil | 0 | CH ₄ 28 |
| Climate | Warm Temperate | Total Duration of Accounting | 20 | Waterbodies | 0 | N ₂ O 265 |
| Moisture | Dry | | | | | |

| GROSS FLUXES | | | SHARE PER GHG OF THE BALANCE | | | | | AVERAGE ANNUAL EMISSIONS | | | |
|--|--------------------|---------|------------------------------|-------------------------|----------------------|------------------|-----------------|--------------------------|---------|-------|---------|
| PROJECT COMPONENTS | WITHOUT | WITH | BALANCE | CO ₂ BIOMASS | CO ₂ SOIL | N ₂ O | CH ₄ | ALL NON-AFOLU EMISSIONS* | WITHOUT | WITH | BALANCE |
| Land use changes | Deforestation 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Afforestation 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Other land-use 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Annual 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cropland | Perennial 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Flooded rice 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grasslands & Livestock | Grasslands 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Livestock 73,926 | 107,301 | 33,376 | | -1,143 | 34,519 | | | 3,696 | 5,365 | 1,669 |
| | Forest mngt. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Inland wetlands 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Coastal wetlands 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fisheries and aquaculture | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Inputs & Invest. | 0 | 64,704 | 64,704 | | 0 | 0 | 0 | 64,704 | | 0 | 3,235 |
| Total emissions, tCO ₂ -e | 73,926 | 172,006 | 98,080 | 0 | 0 | -1,143 | 34,519 | 64,704 | | 3,696 | 8,600 |
| Total emissions, tCO ₂ -e/ha | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Total emissions, tCO ₂ -e/ha/yr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |

Tier 2
Annual
emissions

* = Source / - = Sink
Results presented include GHG fluxes on mineral and organic soils
See further down for detailed results on organic soils
* Includes fisheries, aquaculture and inputs & investments that are not included in the AFOLU definition.

- The overall carbon balance for the livestock activities of the project is **positive** and equal to **+98,080 tCO₂e over 20 years (or +4,904 tCO₂e per year)**, hence the activities analyzed constitute a source of emissions as compared to the without-project scenario. GHG fluxes in the without-project and in the with-project scenario are also positive, due to the nature of the same activities – livestock, energy use and construction of infrastructure.
- Activities strictly related to livestock heads (increased number of heads and improved manure management) together contribute to **+33,376 tCO₂e** over 20 years.
 - The establishment of 10 new dairy farms will be the most important source of emissions (methane) due to the presence in the with-project scenario of additional 800 cow heads (+35,546 tCO₂eq over 20 years). Inversely, improved manure management at the existing livestock farms will contribute to emissions reduction (-2,170 tCO₂eq over 20 years).
- Activities related to energy use and building construction together contribute to **+64,704 tCO₂e** over 20 years.
 - The electricity use for on-farm and processing operations at the newly established farms is the main source of emissions (+63,720 tCO₂-eq over 20 years), even though the partial use of energy for biodigesters (assumed to be 10% of total energy requirements for conservative purposes) slightly reduces the potential total electricity consumption and hence emissions. The construction of buildings contributes to +984 tCO₂e over 20 years.

| Uncertainty level | tCO ₂ -e/yr | Percent |
|-------------------|------------------------|---------|
| WITHOUT | 3,696 | 33% |
| WITH | 8,600 | 33% |
| BALANCE | 4,904 | 33% |



Summary of Data and Assumptions for EX-ACT analysis of Irrigation Activities

| Components / Benefits analyzed | COMPONENT 3 – STRENGTHENING RESILIENCE THROUGH IRRIGATION SERVICES – <i>irrigation-related and horticulture cultivation</i> | | | | | |
|---|---|--|--|--|--|---|
| EX-ACT module | Activity | Details | WOP | WP | Assumption | Source |
| 9.3 Irrigation | Increased surface irrigated | Area | 200 ha | 3,040 ha | Total rehab. 3,800 ha, but assuming 80% adoption rate for conservative approach | Economic and Financial Analysis |
| | Rehabilitation of irrigation infrastructure | Type of irrigation system | - Solid set sprinkle irrigation | - Traveler sprinkler - Solid set sprinkler - Trickle | 2/4 of area 1/4 of area 1/4 of area | WB Team estimates |
| | | Pump energy source | Electricity | Electricity and solar | 1/3 of irrigation uses solar energy (trickle and part of traveler sprinkler irrigation, for conservative approach) | WB Team estimates |
| | | Gross irrigation requirements | 292 mm/year | 292 mm/year | See Calculation sheet for more details | AQUASTAT Climate Info Tool (FAO) |
| 2.3 Other land-use changes | Land-use change from annual to perennial systems | Shift from cereal production to fruit crops (higher value), following the new irrigation systems | 375 ha of cereals | 375 ha of fruit crops (apples, peaches, plums, vine) | | Component 3 (Table 1.1) -Economic and Financial Analysis |
| 3.1.2 Annual systems remaining annual systems | Improved practices (irrigation) for annual crops (cereals, vegetables) | The area that remains stable under <u>cereals</u> | 1,080 ha Full tillage Low C input Residues exported | 1,080 ha Full tillage Medium C input Residues exported | Improved practices on 80% of land for a conservative approach | Component 3 (Table 1.1) – Economic and Financial Analysis |
| | | The area that remains stable under <u>vegetables</u> (both in open field and in greenhouses) | 750 ha Reduced tillage Low C input Residues exported | 750 ha Reduced tillage Medium C input Residues retained | Improved practices on 80% of land for a conservative approach | Component 3 (Table 1.1 pg. 4) – Economic and Financial Analysis |
| | Shift from cereal production to vegetables | Increased area devoted to vegetables (both in open field and in greenhouses) | 300 ha cereals | 300 ha vegetables - 125 in open field - 175 ha in greenhouse | (Not a land use conflict, as remaining annuals) | Component 3 (Table 1.1 pg. 4) – Economic and Financial Analysis |
| 3.2.2 Perennial | Improved | The area that | 1,295 ha | 1,295 ha | Improved | Component 3 (Table |



| | | | | | | |
|-------------------------------------|---|--|---------------------------|------------------------------|--|---|
| systems remaining perennial systems | practices (irrigation) for perennial crops (apples, peaches, plums, grapes) | remains stable under <u>perennials</u> | No tillage Low C input | No tillage Medium C input | practices on 80% of land for a conservative approach | 1.1 pg. 4) – Economic and Financial Analysis WB Team Estimates |
|-------------------------------------|---|--|---------------------------|------------------------------|--|---|

Notes: Application of fertilizers/pesticides *has not been included* due to lack of data.

EX-ACT results

| Project name | | AGRICULTURE GOVERNANCE, GROWTH AND RESILIENCE INVESTMENT PROJECT | | | Project duration (in years) | | Total area (ha) | | Global warming potential | | |
|---|---------------------------|--|---------------|-------------------------|---------------------------------|------------------------------|-----------------|--------------------------|--------------------------|------------------|---------|
| Continent | Europe | | | | | Implementation Phase | 6 | Mineral soil | 3,800 | CO ₂ | 1 |
| Country | Republic of Moldova | | | | | Capitalization Phase | 14 | Organic soil | 0 | CH ₄ | 28 |
| Climate | Warm Temperate | | | | | Total Duration of Accounting | 20 | Waterbodies | 0 | N ₂ O | 265 |
| GROSS FLUXES | | SHARE PER GHG OF THE BALANCE | | | AVERAGE ANNUAL EMISSIONS | | | | | | |
| In tCO ₂ -e over the whole period analysis | | In tCO ₂ -e over the whole period analysis | | | In tCO ₂ -e/yr | | | | | | |
| PROJECT COMPONENTS | WITHOUT | WITH | BALANCE | CO ₂ BIOMASS | CO ₂ SOIL | N ₂ O | CH ₄ | ALL NON-AFOLU EMISSIONS* | WITHOUT | WITH | BALANCE |
| Land use changes | Deforestation 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Afforestation 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Other land-use 0 | 8,554 | 8,554 | 5,958 | 2,588 | 9 | 0 | 0 | 0 | 428 | 428 |
| Cropland | Annual 23,580 | 10,465 | -13,115 | 0 | -13,274 | 159 | 0 | 0 | 1,179 | 523 | -656 |
| | Perennial -31,866 | -46,752 | -14,887 | -6,266 | -8,554 | -66 | 0 | 0 | -1,593 | -2,338 | -744 |
| Grasslands & Livestock | Flooded rice 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Grasslands 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Livestock 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Forest mngt. 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Inland wetlands 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Coastal wetlands 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Fisheries & aquaculture 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Inputs & Invest. 1,440 | 14,874 | 13,434 | 0 | 0 | 0 | 0 | 13,434 | 72 | 744 | 672 |
| Total emissions, tCO ₂ -e | -6,846 | -12,859 | -6,013 | -308 | -19,241 | 102 | 0 | 13,434 | -342 | -643 | -301 |
| Total emissions, tCO ₂ -e/ha | -1.8 | -3.4 | -1.6 | -0.1 | -5.1 | 0.0 | 0.0 | 3.5 | | | |
| Total emissions, tCO ₂ -e/ha/yr | -0.1 | -0.2 | -0.1 | 0.0 | -0.3 | 0.0 | 0.0 | 0.2 | | | |

+ = Source / - = Sink
 Results presented here include GHG fluxes on mineral and organic soils
 See further down for detailed results on organic soils
 * Includes fisheries, aquaculture and inputs & investments that are not included in the AFOLU definition.

| Uncertainty level | tCO ₂ -e/yr | Percent |
|-------------------|------------------------|---------|
| WITHOUT | -342 | 41% |
| WITH | -643 | 37% |
| BALANCE | -301 | 43% |

- The overall carbon balance of the irrigation activities and transition to perennial horticulture is **negative**, equal to **-6,013 tCO₂eq over 20 years** (or **-301 tCO₂eq per year**). Hence, the activities analyzed contribute to emission reduction as compared to the without project scenario.
- The activities analyzed are the rehabilitation of the irrigation system (CUS Tudora and CIS Caplani), the expansion of the irrigation system with consequent increase in irrigated surface area, and the changes in cropping patterns – favoring crops with higher yields (vegetables and fruits) to cereal crops.
- A larger area devoted to perennials (fruit crops, grapes) contributes to carbon sequestration. The provision of irrigation (which increases carbon sequestration by enhancing residue production) to annual and perennial crops also contributes to emission reduction (overall benefit is -13,115 tCO₂e and -14,887 tCO₂e over 20 years for annuals and perennials respectively).
- The land-use change from annuals (cereals) to perennials is a source of emissions instead (+8,554 tCO₂e over 20 years).
- The rehabilitation and expansion of irrigation system is the main source of emissions (+13,434 tCO₂e over 20 years).