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Report No: PAD00253

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF EUR 230.1 MILLION
DOLLARS (US$250.0 MILLION EQUIVALENT)

TO THE

REPUBLIC OF TÜRKİYE

FOR A

AGRICULTURE SECTOR RECOVERY IN TÜRKİYE'S EARTHQUAKE-AFFECTED PROVINCES PROJECT (P181428)

NOVEMBER 18, 2024

Agriculture and Food
Europe And Central Asia

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2024)

Currency Unit =	TURKISH LIRA
TRY 1=	US$ 0.03
US$ 1 =	TRY 34.25
US$ 1 =	EURO 0.92

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Antonella Bassani
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ABBREVIATIONS AND ACRONYMS

ABDGM	General Directorate of EU and Foreign Relations (*Avrupa Birliği Ve Dış İlişkiler Genel Müdürlüğü*)
AM	Accountability Mechanism
AMTC	Agricultural Machinery Test Center (of the Ministry of Agriculture and Forestry)
AWPB	Annual Workplans and Budgets
BAU	Business-as-usual
B/C	Benefit/Cost ratio
bps	Basis points
BUGEM	General Directorate of Plant Production (*Bitkisel Üretim Genel Müdürlüğü)*
CC	Climate change
CE	Citizen Engagement
CDS	Credit Default Swap
CHS	Community Health and Safety
COVID-19	Corona Virus Disease 2019
CPF	Country Partnership Framework
CQS	Consultant's qualifications
CRI	Corporate Results Indicator
CSA	Climate-smart agriculture
DA	Designated Account
DDA	District Directorates of Agriculture
DFIL	Disbursement and Financial Information Letter
DSI	General Directorate of State Hydraulic Works *(Devlet Su İşleri Genel Müdürlüğü).*
EIRR	Economic Internal Rate of Return
EFA	Economic and Financial Analysis
ENPV	Expected Net Present Value
ESCP	Environmental and Social Commitment Plan
ESMF	Environmental and Social Management Framework
ESMS	Environmental and Social Management System
EU	European Union
E&S	Environmental and Social
EX-ACT	Ex-Ante Carbon-balance
FIRR	Expected Financial Internal Rate of Return
FM	Financial Management
FP	Focal Point
FO	Field Officer
FY	Financial Year
GAP	Good Agriculture Practice
GDP	Gross Domestic Product
GHG	Greenhouse gases
GRS	Grievance Redress Service
HAYGEM	General Directorate of Livestock (*Hayvancılık Genel Müdürlüğü*)
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFR	Interim un-audited Financial Reports

IPF	Investment Project Financing
IRR	Internal Rates of Return
Ha	Hectare
LCS	Least Cost Selection
LMP	Labor Management Procedures
MIS	Monitoring Information System
ML	Management Letter
MoAF	Ministry of Agriculture and Forestry (*Tarım ve Orman Bakanlığı*)
MoTF	Ministry of Treasury and Finance (*Hazine ve Maliye Bakanlığı*)
M&E	Monitoring and Evaluation
NDC	Nationally Determined Contributions
NDP	National Development Plan
NPV	Net Present Value
OECD	Organization for Economic Co-operation and Development
OHS	Occupational Health and Safety
PAD	Project Appraisal Document
PCU	Project Coordination Unit
PDAF	Provincial Directorate of Agriculture and Forestry
PDO	Project Development Objective
PFMC	Public Financial Management and Control
PMO	Project Monitoring Office
PMP	Pasture Management Plan
POM	Project Operations Manual
PP	Procurement Plan
PPP	Purchasing Power Parity
PPSD	Project Procurement Strategy for Development
PSC	Project Steering Committee
QCBS	Quality and Cost Based Selection
RF	Resettlement Framework
RFB	Request For Bids
RFQ	Request For Quotes
SBO	Presidency of Strategy and Budget Office (*T.C. Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı- SBB*)
SC	Subcomponent
SDD	Strategy Development Directorate
SEP	Stakeholder Engagement Plan
SOEs	Statements of Expenditures
STEP	Systematic Tracking of Exchanges in Procurement
SuTPs	Syrians Under Temporary Protection
S&P	Standard and Poor's (rating agency)
TAGEM	General Directorate of Agricultural Research and Policies (*Tarımsal Araştırmalar Ve Politikalar Genel Müdürlüğü*)
TCM	Technical Coordinating Committee
TİGEM	General Directorate of Agriculture Enterprises (*Tarım İşletmeleri Genel Müdürlüğü*)
TORs	Terms of Reference

TRGM	General Directorate of Agricultural Reform (*Tarım Reformu Genel Müdürlüğü*)
TUCSAP	Türkiye Climate Smart and Competitive Agriculture Growth Project
TULIP	Türkiye Resilient Landscape Integration Project
V_f	Volume of water reaching field
V_t	Volume of water diverted from the source
WB	World Bank
WBG	World Bank Group

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Turkiye	Agriculture Sector Recovery in Türkiye's Earthquake-affected Provinces		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P181428	Investment Project Financing (IPF)	Moderate	

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternative Procurement Arrangements (APA)	[ ] Hands-on Expanded Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
11-Dec-2024	31-Dec-2030
Bank/IFC Collaboration	
No	

Proposed Development Objective(s)

The Project Development Objective is to support the resilient recovery of the agriculture sector in Türkiye's earthquake-affected provinces and targeted adjacent areas.

Components

Component Name	Cost (US$)

Enabling Service Provision for a Climate Resilient Agriculture Sector Recovery	113,341,000.00
Supporting the Climate-Smart Recovery of the Livestock Sector	127,159,000.00
Project Management, Monitoring and Evaluation (M&E)	9,500,000.00

Organizations

Borrower:	REPUBLIC OF TÜRKİYE		
Contact	Title	Telephone No.	Email
Kerem DÖNMEZ	Director General, Foreign Economic Relations	903122047498	kerem.donmez@hmb.gov.tr
Implementing Agency:	MINISTRY OF AGRICULTURE AND FORESTRY		
Contact	Title	Telephone No.	Email
Ferhat ÇOLAK	Director General, EU and Foreign Relations	903122873360	ferhat.colak@tarimorman.gov.tr

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)? No

Is this project Private Capital Enabling (PCE)? No

SUMMARY

Total Operation Cost	**276.88**
Total Financing	**276.88**
of which IBRD/IDA	**250.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	250.00

Non-World Bank Group Financing

Commercial Financing	26.88
Unguaranteed Commercial Financing	26.88

Expected Disbursements (US$, Millions)

WB Fiscal Year	2025	2026	2027	2028	2029	2030	2031
Annual	3.02	32.00	50.00	70.00	70.00	22.00	2.98
Cumulative	3.02	35.02	85.02	155.02	225.02	247.02	250.00

PRACTICE AREA(S)

Practice Area (Lead)

Agriculture and Food

Contributing Practice Areas

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Low
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Low
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Moderate

8. Stakeholders	Moderate
9. Overall	Substantial

POLICY 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

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

E & S Standards	Relevance
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Relevant
ESS 10: Stakeholder Engagement and Information Disclosure	Relevant
ESS 2: Labor and Working Conditions	Relevant
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant
ESS 4: Community Health and Safety	Relevant
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
ESS 8: Cultural Heritage	Relevant
ESS 9: 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

Legal Covenants

Sections and Description
LA, Schedule 2, Section I.A.2. By no later than one hundred twenty (120) days after the Effective Date, the Borrower, through MoAF, shall have operationalized and shall continue to maintain within ABDGM, throughout Project implementation, the PCU with terms of reference, qualified staffing, authority and budgetary resources necessary and appropriate to, in the Bank's opinion, effectively carry out the responsibilities set forth in paragraph 1 of this Section I.A, including specifically the financial management, monitoring and evaluation, and environmental and social requirements of the Project.
LA, Schedule 2, Section I.A.4. By no later than sixty (60) days after the Effective Date, the Borrower, through MoAF, shall appoint coordination focal points in TRGM, BUGEM and HAYGEM and designate staff with functions, resources, and authority necessary and appropriate for the purpose of effectively carrying out the respective parts of the Project to the satisfaction of the Bank.
LA, Schedule 2, Section I.A.5. By no later than sixty days (60) days after the Effective Date, the Borrower, through MoAF, shall establish, and thereafter maintain throughout Project implementation, and coordinate the regular meeting of, a Project Steering Committee, with composition and terms of reference detailed in the Project Operations Manual, to be responsible for, inter alia, ensuring effective institutional coordination amongst the General Directorates for the Project, reviewing the Annual Work Plan and Budget, monitoring the implementation progress of the Project, and providing instructions as needed to ensure the delivery of Project outputs and the achievement of Project outcomes.
LA, Schedule 2, Section I.A.6. By no later than sixty days (60) days after the Effective Date, the Borrower, through MoAF, shall establish, and thereafter maintain throughout Project implementation, and coordinate the periodic meeting of: (a) A Technical Coordinating Committee, with composition and terms of reference detailed in the Project Operations Manual, to be responsible for, inter alia, reviewing Project progress based on monitoring and evaluation results and address technical and administrative issues related to implementation; and (b) A monitoring and evaluation technical working group, represented by each of the General Directorates for the Project to further refine the Project's overall monitoring and evaluation strategy and to coordinate Project monitoring, including measurement approaches and strategies for data capture, reporting and evaluation.
LA, Schedule 2, Section I.A.8. By no later than sixty days (60) days after the Effective Date, the Borrower, through MoAF, shall tailor accounting and reporting software capable to ensure that it supports the Bank's financial reporting and accounting requirements under the Project, in accordance with terms of reference acceptable to the Bank.
LA, Schedule 2, Section I.B.1(f). The Borrower, through MoAF, shall ensure that the Project is carried out in accordance with Environmental and Social Standards, in a manner acceptable to the Bank, and ensure that the Project is implemented in accordance with the Environmental and Social Commitment Plan, in a manner acceptable to the Bank.

Conditions

Type	Citation	Description	Financing Source
Effectiveness	Loan Agreement (LA), Section IV, 4.01	The Borrower, through MoAF, shall have prepared and adopted the Project Operations Manual ("POM"), in form and	IBRD/IDA

		substance satisfactory to the Bank.	
Disbursement	LA, Schedule 2, Section III.B.1(b)	No withdrawal shall be made for expenditures under Categories (2) and (3), unless and until the Borrower, through MoAF: (i) has adopted a Machinery Matching Grants Manual, in form and substance satisfactory to the Bank, and incorporated said Machinery Matching Grants Manual as part of the POM; and (ii) has provided to the Bank sufficient evidence of the legal basis under the Borrower's national legislation for the implementation of activities under Part 1.B(ii) and (iii) of the Project, in form and substance satisfactory to the Bank.	IBRD/IDA
Disbursement	LA, Schedule 2, Section III.B.1(c)	No withdrawal shall be made for expenditures under Category (4), unless and until the Borrower, through MoAF: (i) has adopted a Livestock Matching Grants Manual, in form and substance satisfactory to the Bank, and incorporated said Livestock Matching Grants Manual as part of the POM; and (ii) has provided to the Bank sufficient evidence of the legal basis under the Borrower's national legislation for the implementation of activities under Part 2.A(i)	IBRD/IDA

		of the Project, in form and substance satisfactory to the Bank.	

I. STRATEGIC CONTEXT

A. Country Context

1. **Türkiye's development achievements over the past two decades have been remarkable**. Real gross domestic product (GDP) growth averaged 5.4 percent between 2002 and 2022, resulting in income per capita (in real terms) that was more than double over the same period. Moreover, growth was accompanied by rapid poverty reduction, with the poverty rate ($6.85 2017 PPP poverty line) halving from above 20 percent in 2007 to less than 10 percent in 2021. As in other countries, the COVID-19 pandemic had a negative impact on growth in 2020, but the country was one of the few that did not register a GDP contraction that year, instead it's GDP grew by 1.9 percent. This performance was due largely to the government's economic policy response to said pandemic, which focused on loosening monetary policy and rapid credit expansion. Moreover, supported by domestic and external demand, Türkiye achieved double-digit GDP growth in 2021 (11.4 percent) and maintained significant momentum in 2022 (5.5 percent) and 2023 (5.1 percent).

2. **However, the policy framework that ensured a strong economic performance during and after the pandemic also heightened macroeconomic risks**. As a result of the loose monetary policy, the country has been suffering from high inflation (with annual inflation reaching 48.6 percent in October 2024 after having peaked at 85.5 percent in October 2022), currency depreciation (83 percent against the US$ between January 2020 and October 2024), corporate and banking sector vulnerabilities, and declines in reserve buffers.

3. **Following the May 2023 elections, the Government has taken steps to normalize the economy gradually to manage risks associated with the adjustment process**. This included monetary policy tightening of interest rates, increasing from 8.5 percent in May 2023 to 50 percent in March 2024, the unwinding of distortive financial regulations, and implementing fiscal revenue measures to reduce the fiscal deficit. Markets have reacted positively, with 5-year Credit Default Swaps (CDSs) declining from over 500 basis points (bps) in May 2023 to around 250bps in September 2024. All three of the major rating agencies have upgraded their outlook to positive recently, and both Fitch and S&P upgraded the credit rating (most recently S&P to BB- on November 2, 2024). The authorities are also contemplating on how to complement these actions with structural reforms that may help with growth prospects going forward. These efforts will need to be sustained and supported in the coming months.

4. **Along with macroeconomic vulnerabilities, Türkiye is highly exposed to natural disasters, with devastating socio-economic consequences**. About 70 percent of Türkiye's population live in first-and second-degree seismic zones, since 1990, 39 earthquakes of magnitude 5 and above have occurred [1] causing approximately 20,000 fatalities and over US$43 billion in damages. On February 6, 2023, two major earthquakes (7.8 and 7.5 magnitude) struck southeast Türkiye and Syria, resulting in 50,000 casualties and affecting more than 3.3 million people. Provinces where per capita income lags the national average and poverty rates are higher, were particularly hard hit.[2] The estimated financial impact of the earthquakes was estimate at US$ 103.6 billion (9 percent of Türkiye's GDP forecast for 2023).[3] The government's immediate response involved mobilizing emergency services, coordinating search and rescue operations, and providing temporary shelters and essential supplies to affected communities. Additionally, the government announced a comprehensive reconstruction plan, committing substantial resources to rebuild the affected areas.

[1] EM-DAT, CRED / UC Louvain, Brussels, Belgium— www.emdat.be.
[2] The five NUTS2 regions covering the 14 provinces, including 11 earthquake-affected provinces, had an already high poverty rate (14.5 percent) in 2021, accounting for 37 percent of Türkiye's poor with just 19.1 percent of the total population of the country (The World Bank, Poverty & Equity Brief, April 2024).
[3] 2023 Kahramanmaraş and Hatay Earthquakes Report, Strategy and Budget Office, Government of Türkiye, March 2023 (available at: https://www.sbb.gov.tr/wp-content/uploads/2023/03/2023-Kahramanmaras-and-Hatay-Earthquakes-Report.pdf)

5. **Beyond Türkiye's vulnerability to earthquakes, the country is also vulnerable to climate-related disasters, adding socio-economic challenges and potentially hampering the country's ability to recover from recent multiple crises.** Climate-related disasters have been striking in with greater frequency and intensity over the last two decades. Climate models predict worsening trends leading to more frequent extreme rainfall events, extreme heat, prolonged drought, and wildfires. Exposure to droughts and heatwaves are among the country's main climatic vulnerabilities. Nine of the eleven earthquake-affected provinces encompass areas highly susceptible to aridity and desertification. Historically, these areas have experienced drought-driven agricultural losses. The ongoing trend of rising temperatures and changing precipitation patterns will continue to pose a significant threat to agricultural production and the livelihoods of rural populations in these regions in the medium and long term (see Annex 3 for details).

B. Sectoral and Institutional Context

6. **Agriculture is a backbone of the Turkish economy, including in the earthquake-affected region, which is part of what is known as the "Fertile Crescent."** Before the 2023 February earthquakes, the agriculture sector accounted for 6.4 percent of the national GDP, with the impacted provinces collectively contributing 15.3 percent of this total. Agriculture in these provinces accounted for 16.9 percent of the country's cultivated land and 10 percent of the pastureland, with significant shares of national production in a broad range of crop and livestock subsectors.[4] At the provincial level, the sector contributed approximately 20.8 percent of GDP in Şanlıurfa, 14 percent in Kilis and Diyarbakır, and 13.1 percent in Adıyaman. The earthquake-affected area accounted for roughly one-fifth of Türkiye's total agricultural exports (approx. US$34.2 billion in 2022) and hosted around 14 percent of national farm holdings. The significance of agriculture to local economies is further underscored by its extensive backward and forward linkages with processing, distribution, and export activities.[5]

7. **Estimates of earthquake-related damage within the agriculture sector are significant.** Assessments by the Government indicate that 25 percent of all cultivated land in the earthquake-affected provinces was adversely impacted. Livestock breeders incurred losses exceeding US$30 million due to animal deaths. The cost of repairing damaged agriculture-related infrastructure was estimated at approximately US$1.3 billion. However, this figure does not include the costs associated with damage to farm barns, fences, equipment and machinery, storage facilities, on-farm irrigation systems, and greenhouse infrastructure, all of which are significant. For example, about 17,100 farm barns were damaged by the earthquakes.[6] Production activities in livestock enterprises that were destroyed or heavily damaged are now being carried out in open areas or tents. Additionally, approximately 4,000 units of essential agricultural machinery (tractors/combines) were fully damaged, with substantial losses in specific provinces, i.e., in Gaziantep, it is estimated that 50 to 75 percent of agricultural machinery suffered damage.

8. **Assessments of the damage to off-farm irrigation infrastructure estimate losses at nearly US$350 million, excluding damage to dams and flood control facilities.** Moreover, Türkiye's irrigation sector needs improvements due to inefficient infrastructure, particularly in the earthquake-affected regions. Open-channels and flood systems generate significant losses and translate into unsustainable water resource management.[7] Furthermore, many farmers tap into limited groundwater reserves, exacerbating resource-related pressures. Efforts to repair and rebuild irrigation infrastructure in the earthquake-affected area would need to focus on achieving water efficiencies and sustainable water management.

[4] With shares of 16.2 percent of national crop area; 26 percent of fruits area; 13 percent of the country bovine stock; 17.9 percent of ovine stock; 42.6 percent of the silk worm national production; 12 percent of aquaculture production; and 38 percent of the total trout production in inland waters.
[5] For example, Gaziantep accounts for 35 percent of Türkiye's dried fruit production. Hatay contributes 21.7 percent of Türkiye's fresh fruit and vegetable exports. The earthquake-affected area is also a central hub for the national cotton value chain, contributing 35 percent of the country's textile exports. Additionally, 60 percent of Türkiye's lentils (legumes) are processed in Gaziantep.
[6] Kahramanmaraş and Hatay Earthquakes and Reconstruction Progress Report. Presidency of Strategy and Budget Office, Ankara, 2024.
[7] Average irrigation efficiency in Türkiye is estimated at 50.4 percent. The Ministry of Agriculture and Forestry (MoAF) targets to increase this efficiency to 60 percent by 2030 and 65 percent by 2050. Source: Water Efficiency Strategy and Action Plan in the Framework of Adaptation to Changing Climate (2023-2033).

9. **The economic disruptions associated with the earthquakes are estimated to be even higher than the direct damage.** Economic activity disruptions caused by the earthquake were estimated to lead to losses of approximately US$5.1 billion in agriculture production alone, excluding agrifood processing stages.[8] Many livestock producers were forced to sell animals for one third of their value due to the lack of fodder and/or economic pressures. Furthermore, the earthquakes have increased the sector's vulnerability to sanitary and phytosanitary risks, creating additional challenges for farmers and livestock producers in the affected regions.[9]

10. **Recovery and reconstruction efforts present an opportunity to rebuild the agriculture sector more robustly, reversing trends in its natural capital degradation while enhancing the sector's climate resilience**. This can be done by applying disaster risk principles (e.g., seismic resistance) to reconstruction of on-farm and agriculture-damaged infrastructure and by mainstreaming building-back-better approaches across agricultural activities. The earthquake-affected area includes crucial steppes, covering agricultural and pasturelands, vital for sustainable livelihoods, biodiversity, and ecosystem services. Recent decades have seen habitat loss and ecosystem degradation due to poor land use planning, unmanaged agricultural mechanization, overgrazing, increased synthetic inputs, and escalating climate pressures. Severe drought conditions have worsened grazing quality, livestock yields, and animal health in these regions. Changing climate patterns threaten the viability of agriculture and livestock further. Post-earthquake reconstruction offers opportunities to build-back-better with climate adaptation measures such as sustainable irrigation, pasture and land restoration, and efficient land mechanization.

11. **Implementing "build-back-better" approaches in post-reconstruction efforts for the agriculture sector is also significant for seizing climate mitigation opportunities.** The sector accounted for 12.8 percent of total 2019 greenhouse gas (GHG) emissions.[10] Earthquake-reconstruction efforts can integrate solutions to reduce GHG emissions, such as improved forage and pasture management, better animal health and manure management practices, and promoting energy efficiency and solar energy use. The sector also holds significant potential for carbon sequestration through carbon farming and nature-based solutions. With appropriate support mechanisms, these measures can be scaled-up, leading to a low-carbon, productive agriculture recovery in the affected provinces.

12. **Through its policy orientation, the Ministry of Agriculture and Forestry (MoAF) has acknowledged the need to enhance agriculture and livestock productivity, build resilience, and safeguard natural capital.** Relevant policies for reconstruction efforts in earthquake-affected areas include:

(a) **The Agriculture Sector Plan 2024-2028** envisioning a sustainable agricultural production, reliable food access, rural development, and the protection of agriculture, forest, water resources, and natural ecosystems.
(b) **The Ecosystem-Based Adaptation Strategy for Anatolian Steppes (2022-2036)** enhancing climate adaptation in Steppe areas, ensuring climate-resilient rural communities, including nomadic pastoral populations (transhumance).
(c) **2024-2028 Livestock Road Map**, launched in February 2024, aiming to improve animal health and welfare, resource-use efficiency, and overall sector sustainability and resilience.
(d) **The National Agricultural Strategy and Action Plan to Combat Drought (2023-2027)** emphasizing Provincial Drought Action Plans, modernization of irrigation systems, improvements in irrigation infrastructure and water conservation.

[8] Türkiye Agriculture Sector Needs Assessment for the Earthquake-impacted Provinces. Food and Agriculture Organization of the United Nations, 2023. Assessment conducted in partnership the Ministry of Agriculture and Forestry (MoAF).
[9] For instance, in March 2023, a strain of Foot and Mouth Disease (FMD, serotype SAT2) not previously detected in the country was found entering from the southern border.
[10] Türkiye. 2023 National Inventory Report (NIR). https://unfccc.int/documents/627786

(e) **The Pasture Law No. 4342/1998**[11] **and its subsequent amendments** aims to provide protection and reclamation for degraded pastures.

13. **Reactivating the agriculture sector in earthquake-affected provinces is expected to boost labor opportunities for vulnerable populations, including women and refugees**. Only 15 percent of farmers in Türkiye are women, yet women play a crucial role, comprising 36.8 percent of the sector's labor force. Refugees also contribute significantly to the sector's labor force. A labor assessment in earthquake-affected provinces[12] identified that labor constrains, which were already a challenge before the earthquakes, have worsened due to increased emigration. In the agriculture sector, the assessment highlighted as crucial for short-term recovery, the prioritization of unskilled and low-skilled job opportunities, including seasonal employment, while over time, introducing more formal and skilled jobs, such as machine operation roles, to support a more mid-long term sectoral recovery.

14. **In conclusion, strengthening the agriculture sector in earthquake-affected regions is essential for a successful economic recovery and transitioning towards improved climate resilience and mitigation.** Supporting the sector's revitalization is crucial for restoring income opportunities for farmers and laborers, thus contributing to rebuilding prosperity in earthquake-affected areas.

C. Relevance to Higher Level Objectives

15. **The proposed project is part of the World Bank Group (WBG) support package for earthquake-affected populations, focusing on infrastructure reconstruction, public service provision, and economic recovery.** It complements ongoing recovery efforts through the Türkiye Earthquake Recovery and Reconstruction Project (P180849) for rural housing and the Post-Earthquake Micro, Small and Medium Enterprises (MSME) Recovery Project (P181068) supporting business continuity and sustainable growth of viable MSMEs, including in the agrifood sector, in the earthquake-affected provinces. Furthermore, the project complements efforts under the ongoing Türkiye Water Circularity and Efficiency Improvement Project (P174915) and the to enhance irrigation water use efficiency, by focusing investments on earthquake-affected provinces.

16. **The proposed project is aligned with the WBG Country Partnership Framework (CPF) for Türkiye for FY24–FY28 (Report No. CPF0000004-TR, discussed by the Board on April 9, 2024).** It will contribute to *CPF High Level Outcome 1 (High and sustainable productivity growth), Objective 1: Boost competitiveness and enabling services, including by climate-smart agricultural practices*, via support for sustainable use of land and water resources; and to *CPF Objective 2: Support post-earthquake economic recovery and spatial development* via rebuilding damaged agricultural productive assets and facilitating access to improved agricultural services.

17. **It aligns with priorities identified in the WBG Climate Action Plan 2021–2025 "Supporting Green, Resilient, and Inclusive Development**," particularly, in relation to accelerating sustainable transitions in priority systems that contribute the most to GHG emissions and facing significant adaptation challenges. It also aligns with identified agriculture-related pathways to Net-Zero emissions highlighted in the **WBG Türkiye's Country Climate and Development Report (2022)**, specifically in relation to pasture/grassland landscape rehabilitation and management and actions to reduce emissions in the livestock sector.

18. **The proposed project aligns with Türkiye's 12th National Development Plan (NDP) 2024-2028**, contributing to its objectives of creating an efficient, competitive, and sustainable agriculture sector. It aims to enhance technology use, efficiency, and organization, ensuring planned production within supply-demand balance while effectively and sustainably utilizing natural resources.

[11] In 2004, 2009 and 2013.
[12] Assessing the Local Labor Market Dynamics and Skills Needs Following the Earthquakes in Türkiye. International Labor Organization (ILO). August 2023.

19. **It aligns with the government's post-earthquake recovery strategy outlined in the Government's earthquake assessment report.** This strategy emphasizes cross-cutting key principles to ensure that the recovery is resilient, inclusive, green, and sustainable. In the case of the agriculture sector, MoAF initially focused efforts on emergency expenditures for a range of activities,[13] and rapidly transitioned from emergency response to recovery efforts, largely through adjusting ongoing support programs and investments to enhance participation of earthquake-affected farmers.[14] MoAF's support has been complemented with deployment of subsidized credit to farmers and enterprises.[15] The proposed project complements MoAF's post-earthquake efforts by facilitating mid- to long-term rebound and recovery, emphasizing agricultural resilience, inclusivity, and environmental and social sustainability.

20. **The proposed project is consistent with Türkiye's updated National Determined Contributions (NDC)**. Türkiye ratified the Paris Agreement in 2021,[16]and in the 2023 updated NDC, it committed to a 41 percent reduction in GHG emissions through 2030 compared to the 2012 baseline scenario (national level 2030 unconditional target). The updated NDC emphasizes addressing climate change impacts on the agriculture sector and mitigating its effects through various measures. The proposed project supports climate-smart agriculture (CSA) measures highlighted in the NDC, such as soil conservation practices to reduce drought, water, and wind erosion; rehabilitation and modernization works to enhance water use efficiency in irrigation; measures to reduce desertification and land degradation; improved manure management; rehabilitation of pasture/grasslands including through the selection of native climate resilient forage varieties; etc.

21. **It also aligns with Türkiye's 2024-2030 Climate Change Mitigation and Adaptation Strategies and Action Plans**,[17] particularly in relation to mitigation of methane emissions from livestock, actions related to improving manure management and support to sustainable grazing through improving grasslands; increasing efficiency of land and soil management through reduced tillage approaches; and enhanced water use through efficient agricultural irrigation. **It also supports MoAF's Water Efficiency Strategy and Action Plan in the Framework of Adaptation to Changing Climate (2023-2033)** in relation to water use efficiency in irrigation. In conclusion, the proposed project does not hinder the achievement of the country's NDC or its climate change mitigation and adaptation strategies; instead, it complements and supports these efforts.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

22. The Project Development Objective (PDO) is to support the resilient recovery of the agriculture sector in Türkiye's earthquake-affected provinces and targeted adjacent areas.

PDO Level Indicators

(a) Beneficiaries with recovered operating capacity (Number)
(b) People with enhanced resilience to climate risks (Number) (Scorecard indicator)

[13] Such as helping families continue production by facilitating inputs, replacing of dead animals, cleaning damaged irrigation channels/dams and other public infrastructure, providing emergency animal health support to households, etc.
[14] Kahramanmaraş and Hatay Earthquakes and Reconstruction Progress Report. Presidency of Strategy and Budget Office, Ankara, 2024.
[15] Post-earthquake, Ziraat launched a disaster relief loan package to benefit SMEs and farmers affected covering 11 Provinces. In December 2024, a US$200 million agreement was signed between the Islamic Development Bank Group and the Turkish Development and Investment Bank (TKYB) to support disaster areas and improve the agricultural food sector.
[16] Türkiye ratified the Paris Agreement in 2021 and published in the Official Gazette dated 07.10.2021, No. 31621 the updated NDC.
[17] In March 2024, the Government published the 2024-2030 Climate Change Mitigation Strategy and Action Plan and the 2024-2030 Climate Change Adaptation and Action Plan as separate documents, emphasizing that in agriculture, mitigation and adaptation measures will reinforce each other.

(c) Area under improved climate adaptation management (Hectares)

B. Project Components

23. **The project will aim at rebuilding productive activities in the earthquake-affected provinces by providing farmers with access to essential agricultural services and by helping farmers rebuild productive assets**. The project aims to facilitate a mid- to long-term rebound and recovery, emphasizing agricultural resilience, inclusivity, and environmental and social sustainability. It will target the eleven provinces most severely affected by the February 2023 earthquakes, designated as disaster zones: Adana, Adıyaman, Diyarbakır, Elazığ, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, and Şanlıurfa. Additionally, efforts will extend to adjacent provinces with communal pasturelands, including Sivas, Kayseri, Erzincan, and Mardin. This expansion aims to improve roughage accessibility for shepherds from the earthquake-affected provinces, especially during hot summer periods, facilitating pastureland restoration investments.

24. **The project focuses on areas where the MoAF has expertise, while fostering necessary innovations.** It will scale up support mechanisms the Ministry has operated over the years, enhance their effectiveness in post-earthquake reconstruction to better serve affected farming and rural communities, while promoting climate smartness. For instance, project's support to the implementation of pasture improvements, an area where the Ministry has been investing over the years, will benefit from a more integrated intervention to improve shepherd welfare and climate-smart outcomes. The General Directorate of Agricultural Reform (TRGM) has focused efforts on-farm irrigation modernization for water use efficiency. The project will adopt a holistic approach, supporting complementary investments in repairing and modernizing off-farm infrastructure managed by farmers' cooperatives. Moreover, given the extensive agriculture-related damage from the earthquake, there is a need to expand collective approaches for service provision, such as machinery parks, an area where Türkiye has been consolidating successful experiences gradually.

25. The project includes three components: (i) Enabling services provision for a climate resilient agriculture sector recovery; (ii) Supporting the climate-smart recovery of the livestock sector; and (iii) Project management, monitoring and evaluation.

26. **Component 1: Enabling Service Provision for a Climate Resilient Agriculture Sector Recovery (US$113.34 Million IBRD, US$2.55 Million Beneficiaries).** This component, to be implemented by TRGM, focuses on rebuilding and enhancing services to farmers to help them reclaim and enhance production capacity, while also bolstering climate resilience. It will focus largely on facilitating sustainable provision of two types of services: irrigation and mechanization. Component activities are to be implemented through two subcomponents, as follows.

27. ***Subcomponent 1.1: Investing in Irrigation for Enhanced Water-Efficiency and Climate Resilience (US$80 Million IBRD)***. This subcomponent aims to: (i) Facilitate the rehabilitation, construction, and modernization of small irrigation infrastructure managed by cooperatives in earthquake-affected areas; and (ii) Enhance the capacity of irrigation cooperatives' management bodies and farmers for efficient irrigation management and long-term sustainability. The primary focus of the irrigation investments is on financing the conversion of open channels into closed, pressurized systems and the repair of associated infrastructure such as pipes, valves, and pumping stations. The installation of water-efficient pumps will also be financed, as well as the installation of prepaid meters to water intake facilities to monitor water use. The subcomponent will also finance associated feasibility and environmental and social assessments and development of tools to monitor water efficiency. These investments will ensure the continuity of irrigation services provided to farmers, while enhancing service reliability and water-use efficiency.

28. Criteria for the selection of irrigation cooperatives eligible to benefit from these subcomponent investments include: i) Active cooperatives operating irrigation schemes with infrastructure affected by the earthquake or in need

of modernization; ii) Located outside General Directorate of State Hydraulic Works (DSİ)'s irrigation areas; and (iii) Irrigation areas not sourcing water from internationally shared hydrological basins. Additionally, investments in solar-powered pumps for selected cooperatives are being considered, pending feasibility assessment validation, carried out during project implementation.

29. Investments will rehabilitate and enhance irrigation efficiency across 9,000 hectares of land, strengthening the climate resilience of 2,500 farmers. Training activities on water use efficiency will target local MoAF staff, beneficiary cooperatives, and farmers. The collaboration with beneficiary cooperatives will begin with awareness creation activities and the implementation of a capacity-building program targeting irrigation cooperative management bodies and technical staff, with specific attention to ensure participation of female staff. These activities will run concurrently with irrigation feasibility/design work, the procurement process of which will consider female technical staff as a positively weighted criterion in contractor selection.

30. A collaborative protocol will be established between the selected cooperatives and TRGM,[18] outlining roles and responsibilities during feasibility/design preparation, capacity-building phases, and construction work. A second protocol (Transfer Arrangement) will be signed before commencing construction work for irrigation rehabilitation and/or modernization, specifying responsibilities for management and maintenance of investments by the beneficiary cooperatives and outlining TRGM's monitoring and evaluation roles. Emphasis will be placed on TRGM's role in monitoring water and energy-use efficiency. Drafts of these protocol documents will be included in the Project Operating Manual (POM). The repaired/improved irrigation infrastructure will remain under public ownership, with only management rights transferred to cooperatives. Cooperatives will be responsible for maintenance costs and repairs.

31. **This subcomponent will generate significant Climate Co-Benefits**. Repairs and conversion to closed channels aims to enhance overall irrigation efficiency, providing both mitigation and adaptation benefits. On the mitigation front, investments are expected to improve water use efficiency, increase energy efficiency of pumps, and transition to solar energy, reducing reliance on fossil fuels. Additionally, these investments can contribute to increased soil carbon storage in irrigated land. Training for irrigation canal operators will promote optimal pump operation, further reducing energy consumption. Regarding adaptation, resilient irrigation infrastructure will safeguard crop productivity and quality in drought-prone areas. Promoting efficient water use via climate resilient infrastructure (closed channels), installation of water meters, and awareness campaigns, can reduce excessive water consumption, making water available during droughts, which is in the semi-arid conditions of the project's targeted areas. Moreover, improved water management can reduce unsustainable groundwater abstraction, enhancing farmers' adaptive capacity and resilience to droughts and rising temperatures.

32. ***Subcomponent 1.2: Promoting Common Machinery Utilization Models for improved Access to Mechanization (US$33.34 Million IBRD, US$2.55 Million Beneficiaries).*** The subcomponent activities focus on facilitating farmer's access to essential machinery and equipment necessary for land preparation, harvesting, and crop input application, through common utilization models, as farm fragmentation made individual ownership economically unfeasible for many farmers in the earthquake-affected areas. It also aims to address persistent challenges of land and

[18] Presidential Decree No. 1. Article 417 (10/7/2018), outlines the duties and powers of TRGM, covering among several others: "increasing efficiency in agricultural irrigation, ensuring the use of appropriate irrigation techniques"; and "to raise the knowledge level of producers; cooperatives, unions and other producer organizations allow its establishment, as well as to provide support and audit these entities and to ensure their transactions to be concluded in accordance with the law." (https://www.resmigazete.gov.tr/eskiler/2018/07/20180710-1.pdf). TRGM's Irrigation Systems and Agricultural Infrastructure Services Department is responsible of a set of tasks to improve irrigation efficiency, including: "to carry out and commission and support studies and projects for the dissemination of modern in-field irrigation systems that will save water," and to "take steps to ensure agriculture sustainability in cooperation with water user organizations and conducting studies to increase irrigation efficiency" (https://www.tarimorman.gov.tr/TRGM/Menu/8/Baskanliklar). Cooperatives have legal personality under Cooperatives Law No. 1163 and are legally registered in MoAF and mapped with TRGM. TRGM carries out relevant investment and monitoring activities related to irrigation cooperatives, based on Article 88 of the Cooperatives Law No. 1163, MoAF/TRGM published the Articles of Association of Limited Liability Irrigation Cooperatives in January 2024 and cooperatives continue to operate in accordance with this legislation. Article 2 of Law No. 7255, published on November 4, 2020, repeals DSI's oversight on irrigation cooperatives. The audit authority of the cooperatives is with TRGM.

soil degradation associated with mechanization due to old machinery, limited maintenance, inadequate selection, and a lack of knowledge on effective use. Technical and financial support will be provided to agricultural organizations for the establishment of common machinery utilization models, known as machinery parks, managed by agricultural organizations.[19] This approach facilitates farmers' access to machinery services and promote sustainable mechanization helping to improve water retention, and address drought and other relevant climate risks in the region. Beneficiary organizations will be encouraged to propose machinery service models benefiting members but also non-members to enhance financial sustainability. Activities under this subcomponent will include the acquisition of equipment/goods, procurement of services, small works, technical studies, and training activities.

33. The TRGM team will kickstart subcomponent implementation with awareness workshops & validation assessments. Following these activities, TRGM will issue a call for expressions of interest from agricultural organizations to participate in the machinery park grant program. The Machinery Matching Grant Manual will detail the eligibility criteria for agricultural organizations which will include: (i) Registration with TRGM; (ii) Minimum active membership of 25 farmer; (iii) Proper financial management evidenced by balance sheets; and (iv) Availability of land for the establishment of a common machinery park and administrative buildings. TRGM at the central level will be responsible for evaluating compliance with these criteria. Provincial Directorates of Agriculture and Forestry (PDAF) and District Directorates of Agriculture (DDA) will support the subcomponent implementation on the ground.

34. Agricultural organizations that meet the criteria will be assisted by external experts to develop a detailed plan for investment. TRGM will conduct workshops to guide organizations in plan preparation. Evaluation and approval of technically, environmental, and financially feasible investment plans will be conducted centrally by TRGM, with input from external experts. Selected agricultural organizations will receive grant funding covering 90 percent of the machinery park costs (acquisition of machinery/equipment), up to a maximum grant ceiling of US$1.2 million.[20] Beneficiaries are expected to contribute the remaining 10 percent in cash.[21] In addition, support for technical expertise in the implementation of the machinery park, for machinery repairs/maintenance, and for building/repair spaces for storing/parking the machinery will be provided by the project. All procurement under the subcomponent is to be done directly by TRGM. Beneficiary organizations will undergo capacity building before machinery delivery. Approximately 20 to 25 agricultural organizations are estimated to benefit directly, impacting at least 2,500 farmers. Training will be provided to at least 50 machine operators, with approximately 3,000 farmers receiving training on sustainable mechanization approaches. Targeted efforts will be made to ensure that female farmers significantly benefit from subcomponent activities.

35. **Climate Co-Benefits from the subcomponent activities are linked to sustainable mechanization alongside complementary approaches for soil management**.[22] Mitigation benefits will be achieved by using modern, energy-efficient equipment meeting fuel efficiency standards established by MoAF's Agricultural Machinery Test Center (AMTC),[23] alongside digital accessories like sensors and precision guidance systems. Tailored machine sizes and specifications suited to the region's soil conditions, coupled with training in soil conservation techniques, will mitigate land/soil compaction and erosion, reducing soil carbon losses. Training and capacity-building initiatives will encourage

[19] Covers organizations under the Cooperative Law No. 1163 dated 24/4/1969 (as subsequently amended); Agricultural Producers Associations/Unions Law No. 5200 dated 29/6/2004 (amended through Regulation on the Procedures and Principles of the Establishment of Agricultural Producers Unions, March 20, 2024); and Regulation on Establishment and Functioning of Animal Breeders' Associations Official Gazette No. 29813, 26 August 2016 (amended in 2021, Official Gazette No. 31357, 7th of January 2021).
[20] Ownership of the machinery acquired through the grant program will be with the beneficiary agricultural organization.
[21] The percentage contribution and/or the grant ceilings can be modified based on the project's implementation findings.
[22] Such as reduced tillage, crop residue management, cover crops, contour farming, etc., as applicable to the climate, geography, and soil characteristics of the region.
[23] Or to International Energy Standards as applicable.

optimal equipment operation, thereby reducing fuel consumption and lowering GHG emissions. Furthermore, sustainable mechanization will bolster farmers' resilience against droughts by enhancing soil water retention.

36. **Component 2: Supporting the Climate-Smart Recovery of the Livestock Sector (US$127.16 Million IBRD; US$24.33 Million Beneficiaries).** Component activities aim to support the recovery and modernization of the livestock sector in earthquake-affected provinces by adhering to building-back-better principles, under climate-smart livestock approaches and disaster risk principles. Component activities are to be implemented through two subcomponents, as presented below.

37. ***Subcomponent 2.1: Recovering the Productive Capacity of Livestock Farmers and Enterprises (US$76.16 Million IBRD, US$24.33 Million Beneficiaries).*** This subcomponent will be implemented by General Directorate of Livestock (HAYGEM). It will aim to facilitate the recovery of productive capacity and to enhance production efficiency and climate resilience of primarily small and medium-scale livestock farmers/enterprises involved in cattle, small ruminants, and poultry activities in earthquake-affected provinces. Activities include: (i) Implementing a grant program for renovating and modernizing infrastructure and equipment for primary livestock production, with an approximate budget of US$73 million; and (ii) Conducting awareness and training and monitoring and evaluation activities, and studies to support the above initiatives.

38. Within the grant program, the project will cover up to 75 percent of the farmer's financing requests, with the beneficiary farmer/entity contributing the remaining 25 percent in cash.[24] Investments will be implemented within a maximum period of 12-18 months, complemented by monitoring and training to ensure sustainability. The grant program will support two types of investments: (i) Repair/modernization of barns/pens/sheds (including manure management requirements), and fences (with consideration of energy-efficiency aspects); and (ii) Acquisition of equipment, such as machinery to modernize milking processes, feeding practices, animal health practices for effective manure management and energy efficiency.[25] Investment ceilings are outlined in Annex 1.

39. Eligibility criteria for the grant program include: (i) Natural persons and legal entities registered as farmers in the country's Livestock Information System; (ii) Farmers impacted by the earthquake in their essential productive assets, with evidence verifiable through victim records or specific certifications from official entities, and farmers/enterprises that did not experience earthquake damage but would like to renovate/modernize their livestock operation; and (iii) Production scale limits, as stated in Annex 1. The grant program will proceed in a similar way to other projects implemented by MoAF: (i) A call for proposals is announced;[26] (ii) Proposals are submitted to PDAF/DDAs; (iii) Evaluation of proposals by an assessment committee within the respective PDAF (proposals from women farmers head of household receiving additional scoring); (iv) A list of potential beneficiaries is presented to the HAYGEM central office for final approval. The grant program is expected to benefit approximately 7,000 livestock producers/enterprises. Training in improved animal husbandry practices and climate-smart livestock management approaches will benefit 3,600 farmers, through train-the-trainers' approaches. Targeted efforts will be made to ensure that female farmers significantly benefit from subcomponent activities.

40. **This subcomponent will generate both adaptation and mitigation Climate Co-Benefits.** Adaptation benefits will arise from investments in: (i) Shelter structures such as barns, pens, and sheds designed to reduce animals' exposure to extreme heat, preventing heat stress, improving resilience to diseases, and enhancing productivity. Climate-smart shelter design will include features like adequate space, air circulation, insulation, and water troughs for optimal animal cooling conditions; (ii) Equipment for silage production, processing, and storage, to ensure sufficient animal feed to adapt to reductions in forage yields due to drought and higher temperatures; and (iii) Training in

[24] The percentage contribution and/or the grant ceilings can be modified based on the project's implementation findings.
[25] Energy-efficiency aspects will be considered in the selection of equipment to be supported. Opportunities to finance equipment that facilitate female-labor activities will be considered as well.
[26] HAYGEM is coordinating with AFAD (Ministry of Interior, Disaster and Emergency Management Presidency) to identify the list of potential beneficiaries (as per affected damaged infrastructure) to improve the targeting of the grant program.

climate-smart livestock practices, covering good animal husbandry practices, paddock management, rotation to reduce soil carbon losses, and manure management, among others. Mitigation benefits will be achieved through investments supporting: (i) Manure management in barns and milk parlors under aerobic conditions to reduce methane emissions, and outsourcing poultry manure to biogas production; (ii) Utilization of solar energy to supply energy needs for barns, fencing, and in line with national energy guidelines; (iii) Adoption of energy-efficient barns, feed tools, equipment, LED lighting, and storage and distribution systems for animal vaccines, meeting international energy standards; and (iv) Improvements in pasture quality and grain silage processing to meet feed gaps, contributing to reducing enteric fermentation.

41. ***Subcomponent 2.2: Restoring Pastureland for Enhanced Livelihoods and Resilient Animal Production Systems (US$51 Million IBRD*)**. The subcomponent, to be implemented by the General Directorate of Plant Production (BUGEM), aims to support the sustainable management and use of state-owned pastures to revitalize livestock production systems crucial for farmers' livelihoods. Activities will cover: (i) Procurement of goods, equipment, and services, as well as small works required for implementing Pasture Management Plans (PMPs); (ii) Implementation of a pasture information system; (iii) Conducting assessments and studies; and (iv) Awareness and training activities.

42. The subcomponent will fund the implementation of more than 400 PMPs developed by MoAF aimed at enhancing pasture and grazing conditions across pastureland utilized by over 36,000 livestock farmers/villagers (ultimate beneficiaries of pastures improvements). Approximately 150 of these PMPs will be executed in neighboring areas to the earthquake-affected provinces (Sivas, Kayseri, Erzincan, and Mardin), prioritizing the restoration of degraded pasture areas and enhancement of grazing conditions via cultivation, fencing, and improving soil management efforts.

43. The PMPs for village or districts have been prepared within the framework of the Pasture Law 4342 and the associated Pasture Improvements and Management regulations. As per this regulatory framework, PMPs are to be prepared in public pasturelands to address issues of shortages in forage availability and overgrazing conditions leading to pasture degradation.[27] The PMPs to be financed by MoAF, will be prepared and implemented by MoAF/PDAFs working together with technical experts and informing Provincial Pasture Commissions (PPC)[28] and local authorities, and will be based on site studies and assessments and will apply technical criteria (e.g. maximum carrying out capacity, rotational periods, use of native forage species, drought tolerant varieties etc.) to ensure the sustainability of the pastures.

44. The PMPs cover a range of investments to be procured directly by BUGEM.[29] PMPs that include small investments on groundwater drilling wells, will be funded only in Project areas not sourcing water from internationally shared hydrological basins.

45. The implementation of PMPs prioritizes infrastructure and planting during the initial two years. PDAFs will ensure pasture maintenance and monitor equipment use (years 3 to 5),[30] while local authorities and pasture users will

[27] Public pastureland refers to pastures owned by the Treasury with the right to use them given to livestock farmers in villages/municipalities.
[28] The PPC are entities established under the chairmanship of Governors in each province and comprised of provincial public officials (MoAF; Rural Services Revenue Office; National Real Estate Directorate; Cadaster among other public entities) and 8 local stakeholders including 2 representatives from Chambers of Agriculture. The secretariat and document processing as well as the implementation of regulations, are carried out by MoAF/PDAFs.
[29] Such as: (i) Procurement of inputs & carried out practices for pasture improvements, rehabilitation & maintenance; (ii) Establish green infrastructure (e.g. nature-based solutions such as shrubs for erosion control, sediment trapping structures, etc.) and civil works to avoid pasture degradation; (iii) Construct/repair animal infrastructure damaged by the earthquake or needed (e.g. shaded areas, troughs, canopy, water pounds, road repairs to facilitate shepherd pasture accessibility); (iv) Purchase of equipment such as mobile caravans, portable shepherds tents and bags, solar panels, solar power toilets to improve welfare conditions of shepherds during grazing periods and small tools and machinery needed to improve pasture management; and (v) Purchase of production inputs such as climate adapted seedings and saplings, etc. needed to improve grassland productivity and planting of fodder crops if needed to reduce forage supply gap; and (vii) Implementing any additional measures needed as per result of technical or E&S assessments.
[30] The number of years for which maintenance costs are provided by the project would extend to year five, for the plans that are initiated on year 1 and potentially also year 2 or project implementation.

be tasked with overseeing the proper use of physical investments,[31] and will be encouraged to provide voluntary in-kind contributions during the implementation of the PMPs. The monitoring and reporting of PMP implementation will be done by PDAFs and be consolidated at the central level by BUGEM.

46. The subcomponent will also finance the establishment of a digital pasture information system in project areas, but with application nationally. This system will monitor pasture conditions and relevant ecological variables. Other activities to be funded under the subcomponent include M&E of PMP covering surveys at baseline and during implementation; assessment and research studies for native climate drought-resistant species and pasture composition species; propagation of better climate-adapted native species to be used to achieve objectives of the PMPs. Training events will be organized for MoAF technical professionals, who will then regularly train farming families and shepherds on the proper management of pastures to enhance their resilience and long-term sustainability.

47. **The implementation of PMPs and associated activities will yield significant climate Co-Benefits.** Improved/rehabilitated pastures will generate mitigation benefits by providing high-quality pasture lowers enteric fermentation and increasing availability of forage, extending grazing times (and reducing the need for manure storage and GHG emission associated with its management). Higher productivity from better feeding conditions will indirectly lower emission intensity per animal. Reducing overgrazing and improving grass cover will enhance soil organic carbon, contributing to carbon sequestration. Climate adaptation benefits will be achieved from improved water retention in ponds and filtration in soils, enhancing pasture resilience to droughts and shaded areas and drinking troughs to reduce vulnerability of animals to heat stress. Furthermore, a large part of PMPs support transhumance sheep/goat production; a greener expanded sheep and goat production, in the long-term, will reduce pressure to increase bovine beef production, which is a main source to GHG emissions in Türkiye.[32]

48. **Component 3: Project Management, Monitoring and Evaluation (M&E) (US$9.5 Million IBRD)**. Activities within this component will include: (i) Project management support for the Project Coordinating Unit (PCU) and implementing General Directorates, including capacity strengthening in technical, fiduciary, environmental and social (E&S) aspects; (ii) Ensuring compliance with E&S risk management, including grievance redress, gender considerations, and citizen engagement (CE); (iii) Preparing and implementing a project communication and visibility plan; (iv) Monitoring and evaluation (M&E); and (v) operational expenses.

49. **The PCU will coordinate, within MoAF, the process of developing policies and procedures for establishing an Environmental and Social Management System (ESMS), to support the implementation of projects funded with external financial sources.** As MoAF currently implements several World Bank funded operations, there is an emerging need for a clearly defined institutional set up with human resources, policies, and standard operating procedures to supervise and manage E&S risks and impacts of projects following World Bank and other international financing institutions' (IFI) E&S policies. Therefore, policies and procedures will be developed by MoAF in line with the Bank's E&S Framework (ESF) that would be necessary for the establishment of an ESMS at MoAF. Description of the process for developing the ESMS will be provided in the POM. The ESMS, once functional, will facilitate using "Borrowers' (MoAF's) Framework" for the World Bank and other IFI funded projects and enhance MoAF's capacity to assess and manage E&S impacts and risks in all projects. The table below presents a summary of the project costs.

[31] As per the Pasture Law, non-compliance by shepherds and farmers with the established grazing plans/periods and grazing management (as established in the PMPs) is to be reported by local authorities to the Provincial Governors who have the legal authority to sanction transgressors by limiting or revoking the right to pasture use privileges or through any other legal actions.

[32] Expanding the availability of lamb and goat meat to Turkish consumers has been a long-term policy objective of MoAF. This policy aims to address inflationary pressures resulting from the increasing supply-demand gaps for beef meat. By diversifying meat options, the government seeks to alleviate the strain on beef supply and stabilize prices, thereby contributing to a more sustainable and balanced meat market in Türkiye, while indirectly supporting low-carbon developments in the meat sector.

Table 1: Summary of Project Costs (US$ 000' Dollars)

Component Investments	Total Cost		World Bank		Beneficiaries[33]	
	Amount	%	Amount	%	Amount	%
A. Enabling Agriculture Service Provision for a Climate Resilient Agriculture Sector recovery						
1. Investing in Irrigation for Enhanced Water-Efficiency and Climate Resilience	80,000	28.9	80,000	100.0	0.0	0.0
2. Promoting Common Machinery Utilization Models for improved Access to Mechanization	35,891	13.0	33,341	92.9	2,550	7.1
Subtotal	115,891	41.9	113,341	97.8	2,550	2.2
B. Supporting the Climate-Smart Recovery of the Livestock Sector						
1. Recovering the Productive Capacity of Livestock Farmers and Enterprises	100,496	36.3	76,160	75.8	24,337	24.2
2. Restoring Pastureland for Enhanced Livelihoods and Resilient Animal Production Systems	51,000	18.4	51,000	100.0	0.0	0.0
	151,496	54.7	127,159	83.9	24,337	16.1
Subtotal	**267,387**	**96.6**	**240,500**	**89.9**	**26,887**	**10.1**
C. Project Management, Monitoring and Evaluation	9,500	3.4	9,500	100.0	0.0	0.0
TOTAL	**276,887**	**100.0**	**250,000**	**90.30**	**26,887**	**9.70**

50. **Citizen Engagement (CE).** The project has developed a stakeholder plan that will be further developed and refined during implementation to solicit unrestricted feedback actively and regularly through multiple channels from citizens and project beneficiaries on project activities as well as on the CE process itself. Throughout implementation, the project will consult with beneficiaries to inform and adjust program implementation as needed. Under the irrigation investments (Subcomponent 1.1), strong engagement with cooperatives will be pursued early in the process of evaluating irrigation reconstruction/modernization needs and all along implementation to ensure a strong ownership during irrigation construction and its subsequent management. For Subcomponent 1.2, machinery park investment plans are to be developed bottom-up, by agricultural organizations, with technical support from the project to ensure their technical, environmental, economic viability and social acceptance. Therefore, participatory workshops and fora will be organized with potential beneficiary organizations, for awareness creation and during the preparation and implementation of investment plans. Under Subcomponent 2.1 awareness activities will be organized to inform and solicit feedback from beneficiaries on the scoping of the grant support to be provided by the project. In the case of Subcomponent 2.2 activities, PMPs are to be implemented with strong participation and representation of the PPC and beneficiary communities. Through all the project components, farmers/enterprises and agricultural organizations (at the management levels but also members) and villagers will be invited to regular roundtables to provide feedback to the design, accessibility, and application processes of the support programs along all its components (particularly women and youth). The project will implement participatory approaches to monitoring progress. The project Results Framework includes CE indicators.

51. **Gender.** Women make up 15 percent of farmers in Türkiye, and a large proportion of the agriculture labor force are women, often in unpaid family farm roles. In the earthquake-affected provinces, the average employment rate in agriculture stands at 20.6 percent, with a higher rate of 36.8 percent for women's employment within the sector. Women heavily take part in agricultural production especially in family business as in greenhouse production.

[33] Expected cash contributions.

Women, largely refugee women, are also heavily present in seasonal agricultural work. For women in general, and particularly for refugee women, working hours tend to be long, and their wages are lower than those of men. Women as farmers and agriculture laborers face many constraints such as lack of targeted extension services, limited information transfer between sexes, limited access to financial services, loans, and credits, which is aggravated by limited mobility and time off from home and lack of information.[34] Women are poorly represented in cooperatives and leadership roles, exacerbating gender disparities in access to training, financial products, and assets. This is aggravated by a general absence of sufficient gender-disaggregated data to support informed decision-making.

52. The impacts of the earthquakes risk exacerbating gender disparities, including women's opportunities to access support to repair/modernize assets and knowledge needed to support a resilient and sustainable recovery. The project aims to bridge gender disparities by improving women's access to knowledge and financial support for asset rebuilding, while enhancing their participation across project activities. To achieve this, the project will:

(a) Incorporate gender criteria into the Terms of Reference (ToR) for assessments and studies commissioned by the project across its components. This means, in practice, exploring women's roles, risks, and gaps in accessing project's related assets and services, as well as leadership opportunities. The assessments will provide recommendations on: (i) assets benefiting women in agricultural roles (as family farmers and employees), which is particularly relevant in the case of Subcomponents 1.2 (on mechanization)[35] and 2.2 on livestock assets and equipment, (ii) narrowing knowledge gaps for women, with consideration of training topics and delivery options to optimize women participation; and (iii) enhancing women's leadership opportunities in cooperatives and activities commissioned by the project. Findings will inform support programs and project activities with progress reported to the World Bank.
(b) Require that firms bidding for and selected to carry out project works or services offer equal payment opportunities for women. This criterion specifically applies to works and services that require the employment of women for agricultural labor within the project.
(c) Integrate gender criteria into dissemination, awareness campaigns, and training programs by: conducting women-focused outreach activities, particularly as part of grant programs (Subcomponents 1.2 and 2.1); scheduling training and awareness sessions at times convenient for women; utilizing media and channels accessible to women farmers (e.g., text messages); employing female facilitators to encourage active participation; customizing training content for better comprehension by women; and including gender criteria in training events for extension professionals. Gender-disaggregated indicators for training activities have been included in the project's result framework.
(d) Include gender criteria in tender processes launched by the project in relation to specialized consultant services, to offer opportunities to female agricultural engineers, irrigation specialists, E&S specialists, among others.
(e) Disaggregate data collected by the project and assessment reports commissioned by the project, contributing to improved understanding of gender-specific constraints and informing opportunities for designing gender-centered policy interventions.
(f) Track progress on women access to financial support provided by the project to rebuild assets, with a specific indicator included in the project Results Framework.

[34] National Gender Profile of Agricultural and Rural Livelihoods: Türkiye. Country Gender Assessment Series. Food and Agriculture Organization (FAO), 2016. Available at: http://www.fao.org/family-farming/detail/en/c/854160/;/'; and Women in Rural Türkiye, Navigating Barriers in Access to Resources, Services, and Decision-Making. United Nations Entity for Gender Equality and the Empowerment of Women (UN Women), 2024. Available at: https://eca.unwomen.org/sites/default/files/2024-09/unwomen_womeninruralturkiye_report.pdf

[35] Studies across countries have found that increased households' use of tractors and/or combine-harvesters and other machinery leads to reduced engagement of women in agriculture activities (often unpaid activities) and increased their engagement in the non-agricultural sector.

53. **Climate Co-Benefits.** Given the high vulnerability of earthquake-affected areas to climate shocks, the project aims to improve agriculture climate resilience through climate-smart approaches embedded in the post-earthquake recovery process. The earthquake-affected provinces are particularly at risk of extreme heat and drought events, with high hazard levels in Hatay, Elazig, Sanliurfa, Gaziantep, Kilis, Adiyaman, Kahramanaras, and Adana. These regions also face high risks of heat waves. The overlap between agricultural activities, livestock distribution, and climate hazards in these areas makes the agricultural sector highly vulnerable to climate impacts, affecting rural livelihoods. Climate change is expected to exacerbate land degradation through soil erosion, fertility loss, and nutrient depletion, with negative impacts on agriculture and livestock productivity and the soils' capacity to serve as carbon sink. Detailed analysis of the climate Co-Benefits to be generated by the project are presented in Annex 3.

54. **Private Capital Mobilization (PCM).** Under Subcomponent 2.1, the project aims to assist livestock farmers and enterprises in earthquake-affected provinces in rebuilding their on-farm assets through matching-grant incentives. For assets where individual ownership is impractical or unfeasible in the post-earthquake context, Subcomponent 1.2 will provide incentives to agricultural organizations for the provision of machinery-related services via collective machinery ownership. In both cases, beneficiary matching contributions (private equity) are expected, with a total estimated contribution of US$26.88 million. Table 2 provides a detailed breakdown of beneficiary contributions by subcomponent.

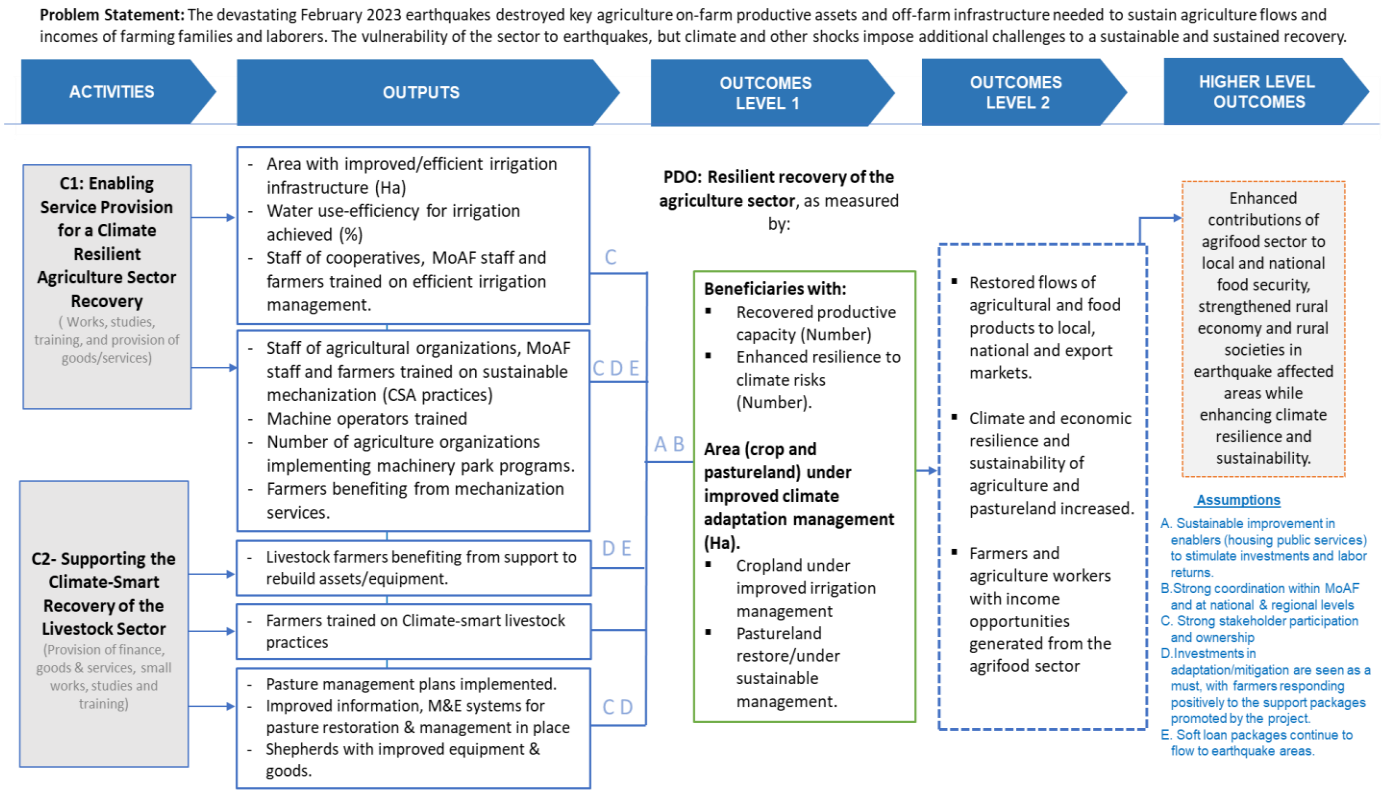
Table 2: Project and private sector contributions to matching grant programs

Private capital source	Private capital contribution product	Private capital amount (USD million)	Project subcomponent associated with PCM	Bank commitment amount under subcomponent associated with PCM (USD million)	PCM ratio (PCM/Bank commitment under subcomponent)	Notes to explain
Farmers/enterprises	Beneficiary contribution	2.55	SC1.2	33.341	7.64%	Matching grants
Farmers/enterprises	Beneficiary contribution	24.33	SC2.1	76.160	31.9%	Matching grants

C. Project Beneficiaries

55. The project beneficiaries include farmers, agricultural organizations, rural villagers, and shepherds in earthquake-affected provinces and in adjacent areas. Approximately 2,500 farmers will benefit from restored and improved irrigation services. About 20 to 25 agricultural organizations will benefit from the establishment of machinery parks, providing services to at least 2,500 farmers. An estimated 7,000 livestock farmers/enterprises will benefit from investments in restored on-farm infrastructure and key equipment. Around 3,600 farmers and 50 machine operators will receive training on proper land management, mechanization practices, and climate-smart approaches. Approximately 36,000 farmers in 410 villages/neighborhoods will benefit from pastureland restoration and improvement projects. Women farmers will benefit from access to training, grants for productive assets, and enhanced leadership opportunities. Over 2,000 shepherds will benefit from improved welfare conditions and training. Indirect benefits extend to providers of services and inputs locally and nationally, as well as rural populations in earthquake-affected areas, generating income opportunities through temporary jobs for reconstruction and modernization of agricultural infrastructure and activities.

D. Results Chain



E. Rationale for Bank Involvement and Role of Partners

56. **The 2023 earthquakes in Türkiye require massive public investments for recovery and reconstruction.** The financial impact was estimated at $103.6 billion.[36] In the agriculture sector, estimates suggest repairing damaged assets at US$1.3 billion, and financial losses at around US$5.1 billion.[37] Challenges include limited access to inputs and markets, damaged infrastructure, and labor shortages. Private investments are crucial, but public support is needed to enable sectoral recovery, encourage investments, and rebuild critical assets. The rationale for Bank involvement is twofold: (i) Contribute to accelerate ongoing government recovery efforts by scaling-up support and outreach; and (ii) Mainstream building-back-better and disaster risk reduction principles at the core of recovery/rebuilding efforts focusing on building mid-long-term resilience to potential future earthquake events, and to climate change. This is essential to reduce fiscal and food security risks, sustain livelihoods, and generate important environmental services.

F. Lessons Learned and Reflected in the Project Design

57. **The World Bank, alongside the rest of the international development community, has played a significant role in disaster risk management, drawing on decades of experience in post-disaster recovery and resilience-building, including in the agriculture sector**.[38] Key lessons learned from global experiences, which have informed the project's design, include:

[36] 2023 Kahramanmaraş and Hatay Earthquakes Report, Strategy and Budget Office, Government of Türkiye. March 2023.
[37] Türkiye Agriculture Sector Needs Assessment for the Earthquake-impacted Provinces. Food and Agriculture Organization of the United Nations, 2023.
[38] Agriculture guide for recovery implementation. April 2021. United Nations Development Program.

(a) *Applying building-back-better and disaster-risk-reduction principles to minimize future risk and strengthen resilience*. Recovery interventions in agriculture must prioritize the adoption of suitable technologies and practices when rehabilitating or replacing infrastructure and assets to mitigate future risks and minimize vulnerability to disasters. Additionally, these processes should aim to alleviate slow or reverse resource degradation, such as soil, water, and forests, to bolster resilience to future shocks and better serve rural communities reliant on them. It is crucial to consider risk-sensitive technologies and good practices during recovery efforts. Moreover, recovery interventions present an opportunity to reinvest in agriculture while also addressing climate change risks and mitigation.

(b) *Ensuring integrated interventions that combine technologies and practices in agriculture, livestock, natural resource management, etc., for a coherent approach to building resilience across farmers livelihoods.* This is relevant, as in most cases, disaster-impacted populations have multiple livelihood strategies that straddle various agriculture subsectors and often extend beyond them.

(c) *Adopting an ecosystem perspective to recovery interventions, integrating the management of land, water, and other key resources.* Promoting conservation and sustainable resource use in an equitable manner, such as through watershed-level and community-driven sustainable land management approaches, enhances resilience. Integrated water management systems also contribute to sustainable resource management, ensuring the long-term viability of agricultural systems.

(d) *Assuring community engagement, participation & accountability*. Involving local communities in decision-making processes fosters ownership and sustainability of post-disaster agriculture projects. Participatory approaches empower farmers to identify their needs, share traditional knowledge, and contribute to project design, implementation, and monitoring. Ensuring beneficiary participation at all project phases, coupled with a deep understanding of vulnerable groups and their roles, rights, and responsibilities in livelihoods, is key to ensuring accountability and long-term success.

58. **The project technical design builds on lessons emerging from the preparation and implementation of pasture management projects and deployment of grants in Türkiye.** MoAF's experience in the implementation of pasture improvement and management plans has highlighted the relevance of proposing more holistic plans, integrating productive aspects with ecological considerations, as well as integrating welfare considerations for shepherds and animals. Community participation and engagement has also been identified as critical for the sustainability of investments under those plans.[39] In the case of grant schemes, lessons identified at a global level include the importance of beneficiaries' cash contributions, even if small, as critical to ensure ownership and sustainable use of equipment and goods (Subcomponents 1.2 and 2.1).

59. **Operationally, the project implementation arrangements build on the recent emerging lessons from Türkiye Climate Smart and Competitive Agriculture Growth Project (TUCSAP)**. These lessons highlight the need to enhance capacity at the General Directorate level, not only at the PCU, and to implement a capacity building approach that integrates external expertise and builds long term capacity of the Ministry's staff for long-term sustainability. The enhancement of capacity needs to be done from the project's onset, through in-depth training programs and through a stronger engagement of GD's administrative units to support procurement and financial aspects. Other important lessons include the relevance of enhancing the effectiveness of Project Steering Committee (PSC) through result-based monitoring of the PSC's decisions by the PCU.

[39] Sustainable Rangeland Improvement Possibilities in Türkiye (2021). Turkish Journal of Agriculture Food Science and Technology, 9(9): 1714-1719, 2021.; and Lessons from World Bank Project in Mongolia https://ieg.worldbankgroup.org/blog/preserving-rangelands-people-and-climate-lessons-mongolia.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

60. **Responsibility for overall project implementation will be held by the Ministry of Agriculture and Forestry (MoAF) through its General Directorates.** The General Directorates directly involved in project implementation include the Agricultural Reform (TRGM), Plant Production (BUGEM), and Livestock (HAYGEM). The General Directorates will oversee specific project activities and ensure effective engagement with relevant MoAF units and provincial/local stakeholders. The EU and Foreign Relations General Directorate (ABDGM) will host the Project Coordinating Unit (PCU) responsible for overall project coordination. Project coordinating structures include the Project Steering Committee (PSC), which ensures high-level coordination and provides strategic advice; the Technical Coordinating Committee (TCM) and the M&E Technical Working Group, which are responsible for regular project coordination and with ad hoc representation from MoAF structures at the provincial level. Capacity building for implementation will occur both at the PCU and General Directorates level to strike a balance between overall project management functions at the PCU and direct implementation functions by General Directorates. See Annex 1 for further details.

B. Results Monitoring and Evaluation Arrangements

61. **The M&E process will be coordinated by the PCU and implemented by the General Directorates.** The PCU which will be supported by a dedicated team to carry out coordination functions. The PCU will coordinate with the General Directorates at the central level on M&E activities, including for collecting data on their respective activities and results indicators per the project's results framework. The M&E team, working in coordination with General Directorates, will be responsible for the development of methodologies, tools, and procedures, ensuring alignment with the standards established by the Ministry's M&E unit and with existing M&E processes for the implementation of support programs. M&E specialists will coordinate closely with designated focal points within the General Directorates for the aggregation and reporting of data. The M&E team will assist the PCU and General Directorates in the preparation and presentation of detailed progress reports. These includes reports to various stakeholders as required, as well as semi-annual reports to be submitted to the World Bank, offering a comprehensive overview of the project's progress in technical, administrative, and financial aspects.

62. **To streamline information management and ensure effective articulation among General Directorates, at both central and territorial levels, an integrated digital M&E system will be developed.** This system will be designed to centralize and promptly report all project-related information in real-time and will be designed to build upon and ensure synergies with the one currently being established under the TUCSAP project.

63. **A mid-term review will be conducted in the third year to assess project progress, with adjustments made based on its recommendations. A final evaluation in the last year will appraise overall accomplishments.** Independent specialists, recruited under Component 3, will conduct both evaluations. The final project assessment will cover the analysis of results and impacts, with high-level indicators defined as part of the evaluation methodology, detailed during the first six months of project implementation. Baseline studies conducted as needed. Regular project implementation support missions will complement the M&E process by verifying activities on-site.

C. Sustainability

64. **Technical.** The proposed project will prioritize disaster risk reduction and build-back-better principles to recovery of the agriculture sector to ensure mid and long-term gains. The project will facilitate access of producers

and agricultural organizations to good/assets, aligned with international and national energy efficiency standards (e.g., milking tanks, cold storage) and in support of sustainability approaches. It will support the recovery and enhancement of the machinery park in the affected areas, based on principles of sustainable agriculture to reverse the long-term trajectory of land and ecosystem deterioration. It will repair and improve damaged irrigation infrastructure to achieve water use efficiency and sustainability. Barn repairs will focus on designs that enhance seismic resilience and at the same time promote affordability. The project will support the scale-up of activities on which the MoAF has already developed expertise, while enhancing their climate and resilience focus.

65. **Institutional.** The project's implementation framework emphasizes ownership and engagement by assigning direct responsibility to General Directorates within MoAF. This institutionalization within existing structures ensures sustainable capacity building over the long term. The project aligns its capacity-building approach with emerging implementation structures from TUCSAP, while prioritizing the development of internal expertise in environmental, social, and fiduciary aspects.

66. **Financial.** The project management and M&E costs represent a relatively small proportion of the total project costs, with the government primarily supporting implementation through existing MoAF structures and staff. This approach contributes to significant fiscal efficiencies. Some investments supported by the project are fully covered by project funds, such as irrigation improvements, alleviating financial burdens on beneficiaries. In other cases, beneficiaries are expected to make cash contributions under grant programs. The Government has also aligned concessional finance and soft loans in earthquake-affected areas, enhancing the financial capacity of beneficiaries to co-finance investments.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

67. **Technical design.** The project's technical design leverages MoAF's existing expertise and aims to amplify successful initiatives while bolstering recovery efforts, emphasizing climate and seismic resilience. MoAF's long-term experience in the deployment of support programs is to be strengthened through strong climate-smartness and M&E efforts. The project has been designed to ensure complementarity between investments, particularly on livestock investments across subcomponents. Project preparation has been carried out in close technical collaboration within MoAF's General Directorates, to ensure appropriate design and inclusiveness across all the relevant subcomponents for strong ownership. The institutional arrangements include mechanisms to ensure efficient and effective coordination among implementing General Directorates. Stakeholder engagement through surveys and platforms allows for feedback and adjustments as needed. The project maintains a flexible approach to integrate emerging insights and stakeholder feedback during implementation.

Economic and financial analysis

68. **The incremental cost-benefit analysis of the project indicates a positive return on investment, considering a social discount rate of 10 percent[40] and an evaluation period of 20 years.** Economic indicators, such as Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit/Cost ratio (B/C), switching values-benefit, and switching value-cost, are estimated US$ 319.3 million, 18.8 percent, 1.57, -36 percent, and 57 percent, respectively. These results account for the total cost of the project, including contributions from beneficiaries, and the impact of GHG emission reductions valued using the shadow price of carbon according to the World Bank's guidelines. Even without

[40] Value used in other World Bank Projects in Türkiye.

considering the GHG reduction benefits, the project would maintain its economic viability. The sensitivity and scenario analysis, which considers hypothetical variations in variables and parameters potentially affecting investment returns, underscore the robustness of the analysis (see Annex 2).

69. **The estimated Economic Rate of Return exceeds the social discount rate considered in this analysis, indicating that the project is economically viable over a 20-year evaluation period.** In addition, most activities funded under Components 1 and 2 are projected to generate positive financial return mainly in the medium and long term. In economic terms, all activities are projected to yield positive returns over a 20-year evaluation period. This underscores the characteristic of investments that require time to generate results, particularly in the case of the improvement of the cattle, small ruminant and poultry production systems. Annex 3 provides findings regarding the substantial ecosystem benefits that the project can generate, particularly in terms of GHG reduction as indicated by the economic indicators.

70. **The project is aligned with the goals of the Paris Agreement, both on mitigation and adaptation, as follows:**

(a) **Assessment of emission risks and mitigation options**. The project activities are universally aligned and are expected to have no impact on GHG emissions but rather contribute positively towards Türkiye's low carbon pathway for the sector. Mitigation benefits are largely linked to project support for pasture rehabilitation and sustainable management which contributes to increase carbon sequestration while also increasing the availability of forage for grazing, thus safeguarding the livelihoods of farmers and transhumance shepherds who depend on these ecosystems. In addition, investments on improved quality of forage and manure management requirements will contribute to lower methane emissions. Sustainable mechanization will support recovery of production while reducing the pressure for chemical and pesticides input-use. Furthermore, the promotion of conservation agriculture practices in mechanization activities will contribute to reducing land degradation and increase soil carbon sinks. The project will also promote the mainstreaming of energy and fuel efficiency in farm equipment, cooling equipment (e.g., for vaccine and milk preservation), vehicles and the use of solar power as a renewable energy source by beneficiaries. It is estimated that the project will help avoid 247,554 tCO2-eq per year when compared to business as usual. The project will prevent carbon lock-in from energy-intensive systems or unsustainable farming practices to lower emissions/intensity alternatives. Annex 3 provides details on the project climate Co-Benefits and estimates of carbon emissions using the World Bank-FAO ExACT tool, integrated into economic benefit streams, following the Social Cost of Carbon Guidance.[41]

(b) **Assessment of climate risks and adaptation measures**. The project was screened for climate change risks using the World Bank Climate and Disaster Risk Screening Tool and found to have a moderate risk of climate hazards affecting its operation and Development Objective. Targeted provinces face high risks of drought and extreme heat, which could impact agricultural assets funded by the project. Risks mitigation measures incorporated in the project are reducing surface water losses in irrigation systems; promoting soil conservation practices; improving the water retention of pastures areas; repairs and modernization of barns to protect animals, and installation of fences on farm to improve rotational grazing to increase the soil water filtration capacity. Additionally, water drinkers and shaded areas in pastures, and barn repairs will reduce livestock exposure to adverse weather. Risks associated with exposure to river & coastal floods and earthquakes, if materialized, could affect project works (on-farm structures; irrigation infrastructure), measures incorporated in the project design to manage those risks include: (i) Incorporating risk considerations in the design studies for the construction of infrastructure (e.g. irrigation channels); (ii) Bringing up to seismic code and energy efficient standards all construction including barns; supporting use of adequate building materials for insulation (including eco-friendly materials if available)

[41] World Bank, 2017. Social Cost of Carbon: Guidance Note for Investment Project Financing, Washington DC.

to reduce energy demands; and (iii) Conducting construction in a dry season to minimize disruptions from heavy rain and flooding, etc. Within the notion of building-back-better, training activities will also help raise climate-risk awareness of farmers and help mainstreaming climate action in agricultural production. Given these considerations, the risks from climate hazards are not likely to have a material impact on the operation and its development objective and the project is considered aligned.

B. Fiduciary

Financial Management (FM)

71. **Some of MoAF's General Directorates with responsibilities in project implementation lack experience implementing World Bank-financed operations.** The ongoing TUCSAP project has disbursed limited funds, and the FM arrangements by General Directorates are gradually improving. The FM risk is considered substantial due to the involvement of multiple General Directorates and the implementation of grant schemes. The FM arrangements will be acceptable at entry upon completion of the action plan in Annex 1. The table below summarizes the initial assessment of various elements of the country systems to be used for FM:

Element of country system	Extent used for the proposed project
Budgeting	The national budgeting procedures will be used. The spending General Directorates must include the project activities in the National Investment Program and ensure sufficient allocation in the Budget Law for project expenditures each year. The project's planning will be coordinated by ABDGM (PCU).
Internal Controls	MoAF's existing controls, established under the Public Financial Management and Control Law No. 5018, will be used. Additional control points specific to the project transactions will be added as needed, detailed in the FM Manual. MoAF will also document the internal control framework, workflows, documentation, and fund flow mechanisms for the grant schemes.
Staffing	MoAF will appoint a sufficient number of qualified FM staff to the PCU for project FM and, ideally, dedicate staff in General Directorates to ensure coordination with the PCU. To handle the additional workload caused by the project, MoAF's PCU will strengthen the FM function with additional staff or consultants as necessary.
Accounting and Reporting	The accountant of the Ministry of Treasury and Finance (MoTF) maintains MoAF's accounts in Turkish lira using their Integrated Financial Management System. MoAF's PCU will establish a parallel system for project accounting and reporting in foreign currency to meet the project's specific reporting needs in sufficient detail on expenditures.
Flow of funds	A Designated Account (DA) will be opened at the Central Bank of Türkiye for transfers to and from the loan account. The DA will be managed by the PCU in ABDGM.
Auditing	The Treasury Controllers will be the auditors of the project as the external auditors for World Bank -financed projects implemented by line agencies.

72. The general FM requirements for MoAF throughout implementation are to: (i) Maintain an adequate project FM system; (ii) Maintain at least one dedicated FM staff and one FM consultant throughout the project; (iii) Prepare and submit interim unaudited financial reports quarterly to the World Bank within 45 days after each quarter; (iv) Have the project financial statements audited by the Treasury Controllers on terms of reference acceptable to the World Bank (the format of the financial statements is attached to the Minutes of Negotiations); (v) Submit annual audited project statements to the World Bank within six months of each fiscal year-end; and (vi) Make the project audit reports publicly available on MoAF's website.

Procurement

73. **The World Bank's Procurement Regulations for IPF Borrowers, dated September 2023 (Procurement Regulations) shall apply to the project**. Furthermore, the project will adhere to the World Bank's 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants' (revised as of July 01, 2016) ('Anticorruption Guidelines'). Procurement under the project will encompass a range of goods, works, and consultant services, primarily consisting of straightforward and lower-value contracts. Details regarding the expected procurement types, methods, and market approaches are outlined in Annex 1. MoAF has developed the Project Procurement Strategy for Development (PPSD), which includes the Procurement Plan for the initial eighteen months. This plan includes estimated costs, applicable procurement methods and market approaches, World Bank review requirements, timelines, and the responsible General Directorates for each procurement package. The procurement plan will be uploaded to the Systematic Tracking of Exchanges in Procurement (STEP) system and will be updated at least annually or more frequently as necessary.

74. **The procurement implementation under each project subcomponent will be the responsibility of relevant General Directorates within MoAF.** To enhance efficiency, achieve economies of scale, and reduce administrative burden, the General Directorates will adopt a centralized procurement approach, leveraging support from their administrative and technical departments, as well as PDAFs when necessary. They will also utilize the STEP system for planning, recording, and tracking procurement transactions. The PCU will coordinate and monitor the project's procurement activities.

C. Legal Operational Policies

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Area OP 7.60	No

D. Environmental and Social

75. **Both the environmental and social (E&S) risks are rated as "Moderate."** The project does not involve activities that have a high potential for harming people or the environment. The potential E&S risks and impacts are predictable and expected to be temporary and site-specific, without the likelihood of impacts beyond the actual footprint of the project. However, adverse residual E&S risks and impacts are expected due to unforeseen implementation challenges caused by the nature of some activities and also the post-disaster contexts the project will be operating in. Key Environmental risks include (i) Higher water use due to higher irrigation needs; (ii) Generation of construction waste; (iii) Unplanned and excessive use of agricultural chemicals; (iv) Soil degradation; (v) Emissions of dust and vehicle exhausts; (vi) Noise and vibration; (vii) Generation of hazardous and non-hazardous waste and soil pollution; and (viii) Habitat loss, fragmentation, and alterations in local ecosystems, potentially affecting biodiversity. Key Social risks include (i) Land related impacts due to land acquisition and changes in land use patterns; (ii) Social exclusion of vulnerable groups (e.g. women, Syrians under Temporary Protection (SuTPs) and other regufee groups) from accessing project benefits; (iii) Inadequate stakeholder engagement due to post-earthquake local contexts; (iv) Occupational Health and Safety (OHS)-related risks; (v) Associated community health and safety (CHS) risks; and (vi)

The risks of social tension and conflicts due to adverse impacts on land and social exclusion in the post-earthquake context.

76. **To address potential E&S risks and impacts, MoAF has prepared an Environmental and Social Management Framework (ESMF) including a project level Environmental and Social Management Plan (ESMP), Resettlement Framework (RF), Labor Management Procedures (LMP) and a Stakeholder Engagement Plan (SEP) prior to appraisal**. The ESMF includes eligibility criteria and a screening mechanism to ensure that the project will not finance any activities that may have negative impacts on cultural heritage and located in or near critical or natural habitats, or those with significant biodiversity impacts. The site-specific E&S instruments (ESMPs, Resettlement Plans) will be prepared based on the initial E&S assessments once the investments and their location details are finalized. Based on the E&S screening of the project investments, a site-specific ESMP, to be prepared by customizing the project level ESMP will be part of the bidding documents and construction contracts. The contractors will be responsible for project or site specific ESMPs and labor-related risk management measures including a Code of Conduct. MoAF will be responsible for monitoring the implementation of the ESMPs and reporting the status of implementation to the World Bank, as agreed in the Environmental and Social Commitment Plan (ESCP).

VI. GRIEVANCE REDRESS SERVICES

77. **Grievance Redress.** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result 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 AM 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 World Bank's Grievance Redress Service (GRS), visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank's Accountability Mechanism, visit https://accountability.worldbank.org.

VII. KEY RISKS

78. **The project's overall risk is rated substantial**. The risk rating summary is presented in the table below. Considerations made for each inherent risk category rated substantial and above are discussed under this section.

	Risk Categories Rating	**(H, S, M, or L)**
1.	Political and Governance	L
2.	Macroeconomic	S
3.	Sector Strategies and Policies	L
4.	Technical Design of Project or Program	S
5.	Institutional Capacity for Implementation and Sustainability	S
6.	Fiduciary: Financial Management and Procurement	S
7.	Environment and Social	M
8.	Stakeholders	M

9.	Overall	S

79. **Macroeconomic Risk is substantial.** Despite significant improvements in macroeconomic management, there are uncertainties and volatility in the macroeconomic outlook, associated with risks of currency depreciation and persistent inflationary pressures. It is anticipated that inflation will slow down in 2025 and 2026 but remain high by international standards. The team will closely monitor this risk during implementation and will adjust the rating, accordingly.

80. **Project Technical Design Risk is rated substantial.** This is due largely to the number of subcomponents with different implementation mechanisms, covering two grant programs, and direct investments by the government on public goods, that are to be maintained and properly managed by beneficiary communities to ensure their long-term sustainability. Furthermore, some of the implementing General Directorates have limited capacity with the implementation of similar investments, as in the case of the machinery parks. Technical risks are to be mitigated through: (i) Strong engagement of beneficiary communities from the start; (ii) Deployment of capacity-building programs; (iii) Strong monitoring systems to allow for the early identification of problems for timely remediation/action; (iv) In-depth assessments as needed; and (v) Strong engagement and collaboration with experienced institutions.

81. **Implementation and Sustainability Risk is substantial.** Inherent risks are considered substantial mainly due to the limited experience of MoAF's PCU and General Directorates with World Bank policies and procedures, and the need for coordination among General Directorates. These risks will be mitigated by continued strengthening of the capacity of participating General Directorates on World Bank ESF and procurement procedures, via: (i) Building on the experience under the TUCSAP (P175011) and TULIP projects (P172562-); (ii) Training through the PIU (Project Implementing Unit) Academy established by the World Bank; (iii) Specific in-depth training on project management and World Bank procedures to be commissioned to external consultants by the PCU at project start; and (iv) Establishing solid project coordinating structures at the operational and high-decision levels.

82. **Residual Fiduciary Risk is rated substantial.** This is due mainly to the involvement of multiple General Directorates, with limited experience with the implementation of World Bank financed projects, and therefore, lack of familiarity with the World Bank's procedures, particularly Procurement Regulations. It is anticipated that these General Directorates may have difficulties in the application of the World Bank's procurement rules and regulations, which may result in implementation delays in initial stages of the project. Furthermore, procuring many dispersed small value contracts poses a risk to efficiency and value for money. To manage and mitigate fiduciary risks, the project's implementation structures will be properly staffed, including with financial and procurement staff. Procurement processes will be consolidated into packages, and the General Directorates will clearly define the procurement implementation structure including staffing, roles and responsibilities and operation procedures. In-depth training on World Bank procedures will be deployed from the start.

VII. RESULTS FRAMEWORK AND MONITORING

PDO Indicators by PDO Outcomes

Baseline	Closing Period
Agriculture productive capacity in earthquake-affected areas recovered/rebuilt	
Beneficiaries with recovered operating capacity (Number)	
Sep/2024	Dec/2030
0	10,800
Enhanced Climate Resilience of the Agriculture Sector	
Area under improved climate adaptation management (Hectare(Ha))	
Dec/2024	Dec/2030
0	309,000
People with enhanced resilience to climate risks (Number)	
Dec/2024	Dec/2030
0	6,750

Intermediate Indicators by Components

Baseline	Closing Period
Enabling Service Provision for a Climate Resilient Agriculture Sector Recovery	
Area provided with new/improved irrigation or drainage services (Hectare(Ha))	
Dec/2024	Dec/2030
0	9,000
➢Area provided with improved irrigation or drainage services (Hectare(Ha))	
Dec/2024	Dec/2030
0	9,000
Irrigation efficiency (Percentage)	
Dec/2024	Dec/2030
0	25
Farmers trained in the application of climate-smart agriculture practices (Number)	
Dec/2024	Dec/2030

0	3,850
➢Farmers trained in the application of climate-smart agriculture practices (Female) (Number)	
Dec/2024	Dec/2030
0	962
Farmers benefiting of machinery services provided through agricultural organizations (Number)	
Dec/2024	Dec/2030
0	2,500
Machine operators trained (Number)	
Dec/2024	Dec/2030
0	50
Supporting the Climate-Smart Recovery of the Livestock Sector	
Livestock farmers/enterprises benefiting from project support to rebuilt/modernized productive assets (Number)	
Dec/2024	Dec/2030
0	7,000
Shepherds provided with services and key equipment/goods (Number)	
Dec/2024	Dec/2030
0	2,100
Farmers trained in the application of climate-smart livestock practices (Number)	
Dec/2024	Dec/2030
0	3,600
➢Farmers trained in the application of climate-smart livestock practices (Female) (Number)	
Dec/2024	Dec/2030
0	1,090
Pasture management plans implemented with community involvement (Number)	
Dec/2024	Dec/2030
0	410
Pasture information system upgraded and fully operational (Percentage)	
Dec/2024	Dec/2030
0	100
Project Management, Monitoring and Evaluation (M&E)	
Project Monitoring Information System developed and operational (Percentage)	
Dec/2024	Dec/2030
0	100
Project beneficiaries reporting that the project has established effective citizen engagement processes/ tools (Percentage)	

Dec/2024	Dec/2030
0	75
Female farmers benefiting from financial support provided by the project to repair/modernize assets (Number)	
Dec/2024	Dec/2030
0	1,800
Grievances addressed by the project in accordance with the stipulated service standards (Percentage)	
Dec/2024	Dec/2030
0	90

Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

Agriculture productive capacity in earthquake-affected areas recovered	
Beneficiaries with recovered operating capacity (Number)	
Description	This indicator measures the number of beneficiary farmers/farming enterprises that recovered productive capacity because of the project investments/support.
Frequency	Annually (starting year three)
Data source	Project M&E system
Methodology for Data Collection	This indicator is reported by applying a representative survey to the beneficiaries to determine if they have recovered their operational capacity considering specific criteria as follows: (i) Infrastructure damaged has been repaired completely, (ii) New equipment and/or machineries have been implemented, and (iii) The Infrastructure, equipment and machineries are used for productive activities.
Responsibility for Data Collection	PCU M&E Unit, in coordination with General Directorates
Enhanced climate resilience of the agriculture sector	
Area under improved climate adaptation management (Hectare(Ha)) CC	
Description	This indicator measures the area of crops and pastures where adaptation management practices have been applied to improve crop & livestock production systems.
Frequency	Annually (starting year two)
Data source	Project M&E system/Pasture Management Information System
Methodology for Data Collection	Project M&E system– For pastures, the indicator will be measured through field studies to verify if pastures are sustainably managed in areas where sustainable pasture management plans will be implemented. If the carrying capacity of pastures, measured as animal units per hectare, has increased by at least 30 percent, it will be considered under adaptation management. For irrigation area, where converted channels are installed and in operation is considered area under adaptation management.
Responsibility for Data Collection	PCU M&E Unit, in coordination with General Directorates
People with enhanced resilience to climate risks (Number) CC SC (Scorecard indicator)	
Description	The number of people benefitting from project investments that increase their resilience and response to climate risks.
Frequency	Annually (starting year two)
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared by PDA/DD and General Directorates
Responsibility for Data Collection	PCU M&E Unit, in coordination with General Directorates

Monitoring & Evaluation Plan: Intermediate Results Indicators by Components

Component 1: Enabling service provision for a climate resilient agriculture sector recovery	
Area provided with new or improved irrigation or drainage services (Hectare(Ha)) CRI	
Description	Measures in hectares the total area of land provided with new or improved irrigation or drainage services in operations supported by the World Bank.
Frequency	Biannual/Semiannual (starting year two)
Data source	Project M&E system
Methodology for Data Collection	The number of hectares under irrigation with the new, recovered, or modernized irrigation canal infrastructure is quantified.
Responsibility for Data Collection	PCU M&E Unit and TRGM
➢ **Area provided with improved irrigation or drainage services (Hectare(Ha))** CRI **(Subindicator)**	
Description	Measures in hectares the total area of land provided with improved irrigation or drainage services in operations supported by the World Bank
Frequency	Biannual/Semiannual (starting year two)
Data source	Project M&E system
Methodology for Data Collection	The number of hectares under irrigation with the recovered and modernized irrigation canal infrastructure is quantified
Responsibility for Data Collection	PCU M&E Unit and TRGM

Irrigation efficiency (Percentage)	
Description	This indicator measures the increase in irrigation efficiency realized by the reduction of conveyance losses by use of modern irrigation methods based on closed rather than open conveyance channels.
Frequency	Biannual/Semiannual, starting end of second year of project implementation.
Data source	Project M&E system
Methodology for Data Collection	The conveyance efficiency will be used to measure this indicator (volume of water that reaches the farm or field (Vf) divided by the volume water diverted from the source (taken from the primary canal- inlet, Vt) multiply by 100. The values and targets refer to efficiency increase, in absolute percentage points from baseline, averaged over project. Baseline at time of feasibility.
Responsibility for Data Collection	PCU M&E Unit and TRGM
Farmers trained in the application of climate-smart agriculture practices (Number) [cc]	
Description	This indicator measures the number of farmers benefiting from training on climate smart agriculture in crop production
Frequency	Biannual/Semiannual
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared TRGM/PDAFs/DDAs
Responsibility for Data Collection	PCU M&E Unit and TRGM
➢ **Farmers trained in the application of climate-smart agricultural practices (Female) (Number)** [cc]	
Description	This indicator measures the number of female farmers benefiting from training on climate smart agriculture in crop production
Frequency	Biannual/Semiannual
Data source	Project M&E system
Methodology for Data Collection	Project records
Responsibility for Data Collection	PCU M&E Unit and TRGM
Farmers benefiting of machinery services provided through agricultural organizations (Number)	
Description	This indicator measures the number of farmers that benefit from machinery/equipment service/access through agricultural organizations supported by the project.
Frequency	Biannual/Semiannual (starting year three)
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared TRGM/PDAFs/DDAs
Responsibility for Data Collection	PCU M&E Unit and TRGM
Machine operators trained (Number)	
Description	This indicator measures the number of machine operators trained in a range of areas/themes
Frequency	Biannual/Semiannual (starting year two)
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared TRGM/PDAFs/DDAs
Responsibility for Data Collection	PCU M&E Unit and TRGM
Component 2: Supporting a climate-smart recovery of the livestock sector	
Livestock farmers/enterprises benefiting from project support to rebuilt/modernized productive assets (Number)	
Description	This indicator measures the number of beneficiaries of direct support to improve assets/ equipment.
Frequency	Biannual/Semiannual (starting year two)
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared by HAYGEM/PDAFs/DDAs
Responsibility for Data Collection	PCU M&E Unit and HAYGEM
Shepherds provided with equipment/goods (Number)	
Description	The indicator measures the number of shepherds beneficiaries of investments to improve shepherd's welfare under pasture management plans.
Frequency	Biannual/Semiannual
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared HAYGEM/PDAFs/DDAs
Responsibility for Data Collection	PCU M&E Unit and BUGEM

Farmers trained in the application of climate-smart livestock practices (Number) [cc]	
Description	This indicator measures the number of livestock farmers benefiting from training on climate smart livestock practicies
Frequency	Biannual/Semiannual
Data source	Project M&E system
Methodology for Data Collection	Project records
Responsibility for Data Collection	PCU M&E Unit and HAYGEM & BUGEM
➢ **Farmers trained in the application of climate-smart livestock practices (Female) (Number)** [cc]	
Description	This indicator measures the number of female livestock farmers benefiting from training on climate smart livestock practicies.
Frequency	Biannual/Semiannual
Data source	Project M&E system
Methodology for Data Collection	Project records
Responsibility for Data Collection	PCU M&E Unit and HAYGEM & BUGEM
Pasture management plans implemented with community involvement (Number)	
Description	This indicator measures the number of pasture management plans approved by MoAF and are implemented under the coordination of PDAF, in close consultation with beneficiary communities and with local and/or national expertise, within and outside MoAF.
Frequency	Biannual/Semiannual
Data source	Project M&E system
Methodology for Data Collection	Progress reports prepared BUGEM/PDAFs/DDAs
Responsibility for Data Collection	PCU M&E Unit and BUGEM
Pasture information system upgraded and fully operational (Percentage)	
Description	This indicator measures the upgrade and operationalization of an information and monitoring system on pastures using up to date digital technologies.
Frequency	Annually (after year two)
Data source	Project M&E system
Methodology for Data Collection	The level of progress in the development of the system is reported considering the following criteria: (i) 25percent progress is reported when the system's design has been completed; (ii) 50percent progress is reported when all system's modules have been developed; (iii) 75 percent is reported when the system has been tested (beta version); and (iv) 100percent completion is achieved when the systems is fully operational (all modules).
Responsibility for Data Collection	PCU M&E Unit and BUGEM
Component 3: Project Management, Monitoring and Evaluation (M&E)	
Project Monitoring Information System developed and operational (Percentage)	
Description	This indicator measures the implementation of a M&E system to manage all information related to the project. This system will have a digital platform to manage all project information.
Frequency	Biannual/semiannual
Data source	Project M&E system
Methodology for Data Collection	The level of progress in the development of the M&E evaluation platform is reported taking into account the following criteria: (i) 25percent progress is reported when the system's design has been completed; (ii) 50percent progress is reported when all system's modules have been developed; (iii) The software has been tested (beta version); (iv) 75 percent is reported when the system has been tested (beta version); and iv) 100percent completion is achieved when the systems is fully operational (all modules).
Responsibility for Data Collection	PCU M&E Unit
Project beneficiaries reporting that the project has established effective citizen engagement processes/ tools (Percentage) [CE]	
Description	This indicator measures the satisfaction level of the beneficiaries with the Citizen Engagement process by the project, disaggregated by gender.
Frequency	Annually (starting second year of project implementation)
Data source	PCU records/survey results

Methodology for Data Collection	Beneficiary feedback survey
Responsibility for Data Collection	PCU M&E Unit
Female farmers benefiting from financial support provided by the project to repair/modernize assets (Number)	
Description	This indicator measures the number women benefiting from access to grant funding to repair and modernize assets
Frequency	Biannual/semiannual
Data source	Project M&E system
Methodology for Data Collection	The number of women leading the implementation of the on-farm investment plans financed by the Project is counted.
Responsibility for Data Collection	PCU M&E Unit
Grievances addressed by the project in accordance with the stipulated service standards (Percentage) [CE]	
Description	This indicator measures the percentage of grievances addressed and responded by the project in accordance with stipulated service standards.
Frequency	Biannual/semiannual
Data source	Project M&E system
Methodology for Data Collection	Data drawn from reports on the project grievance redress systems
Responsibility for Data Collection	PCU M&E Unit

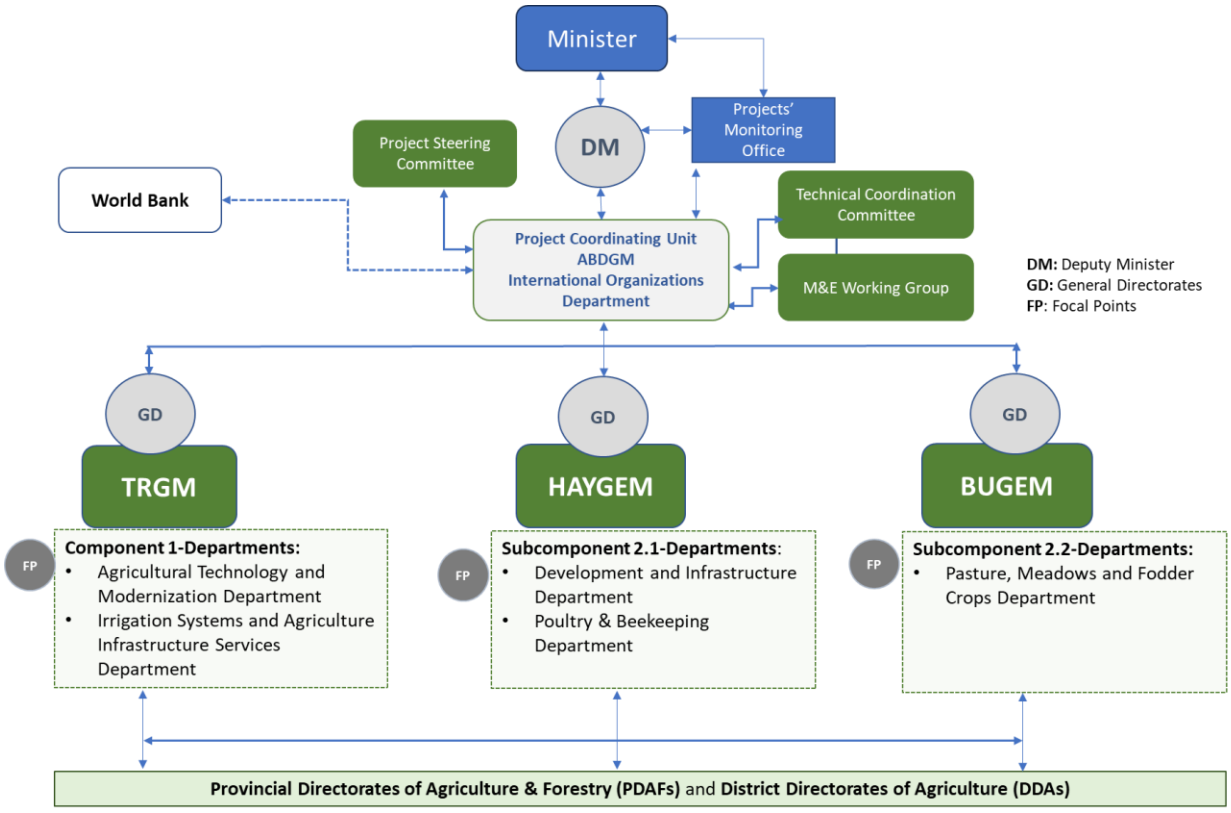
ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Republic of Türkiye
Agriculture Sector Recovery in Türkiye's Earthquake-affected Provinces

Implementation Arrangements

1. **Borrower and Implementing Agency**. The Republic of Türkiye, represented by the Ministry of Treasury and Finance (MoTF), will serve as the borrower of the IBRD Loan. The Ministry of Agriculture and Forestry (MoAF), along with its General Directorates and the Project Coordinating Unit (PCU), will have the primary responsibility for project implementation. These include the General Directorate of Agricultural Reform (TRGM) for Component 1, the General Directorate of Livestock (HAYGEM) for Subcomponent 2.1, the General Directorate of Plant Production (BUGEM) for Subcomponent 2.2, and the General Directorate of EU and Foreign Relations (ABDGM) hosting the PCU for Component 3. Figure A1.1 illustrates the overall implementation arrangements for the project.

Figure A1.1: Proposed project implementation structure[42]



2. **A Project Steering Committee (PSC) will be established within 60 days from loan effectiveness to ensure effective coordination at a higher level and provide strategic advice.** The PSC will have participation of senior leadership including Deputy General Directors from the relevant General Directorates (TRGM, BUGEM, HAYGEM, and ABDGM), as well as representatives of related institutions (e.g., DSI), invited to participate, when required. The PSC will be chaired by the line Deputy Minister of the MoAF, appointed by the Minister of Agriculture and Forestry, with the PCU acting as the Secretariat. The key functions of the PSC will be to review the annual workplans and budgets (AWPB), watch project implementation progress, ensure effective institutional coordination, and provide guidance as needed

[42] Figure displaying participating technical departments under implementing General Directorates, with responsibilities in project implementation.

for ensuring the delivery of project outputs and achievement of project outcomes. The PCU is to conduct results-based monitoring of the decisions taken by the PSC.

3. **A Project Coordinating Unit (PCU) responsible for overall project coordination is already established, at ABDGM.** The PCU is to oversee overall project implementation and management, ensuring compliance with project requirements and preparing all documents for submission to the WB. The project PCU was created in September 2023, to coordinate the project preparation process, with five MoAF staff fully assigned. This already established PCU provides the anchor to facilitate implementation as soon as the project reaches effectiveness. This PCU will be reinforced with specific financial, procurement, environmental and social expertise, leveraging synergies with TUCSAP project. Recruitment of external consultants to specifically support the project will gradually occur, with full recruitment targeted within 120 days after WB loan effectiveness.[43] The leading Deputy Minister will oversee PCU functions, and the coordination of the project is to be guided by a Project Director (PD). This PD is supported by a PCU Technical Team Lead experienced in implementing internationally funded projects.

4. **Implementing General Directorates.** TRGM, HAYGEM and BUGEM will be responsible of overseeing project activities and ensure effective engagement with MoAF's units and relevant stakeholders at the local level. Within 60 days from loan effectiveness, implementing General Directorates will designate focal points (FPs) to oversee component/subcomponent activities reporting directly to the respective Deputy General Director. Technical staff will be assigned by each General Directorate and department involved to undertake project implementation functions. General Directorates will bolster their teams with technical experts, either from internal MoAF staff or external consultants, as necessary. General Directorates will appoint focal point staff for M&E, environmental, social, and financial aspects, who are to work closely with PCU staff to define operational guidance in these areas. Procurement experts will be hired to support procurement functions a General Directorates level. At the local level, MoAF's Provincial Directorates of Agriculture and Forestry (PDAFs) and District Directorates of Agriculture (DDAs) will support central-level General Directorates in implementing project activities. Administrative departments/units within implementing General Directorates (particularly within HAYGEM and TRGM) will assist with budgetary and fiduciary matters as detailed in the Project Operational Manual (POM). Staff from these units will receive training on World Bank fiduciary procedures as required.

5. **Technical Coordinating Committee (TCM**). The TCM, led by the PCU Director or Technical Lead and with participation from focal points assigned to each subcomponent/component, will be established within 60 days from loan effectiveness to ensure effective project coordination. It will convene periodically to review project progress based on M&E results and address technical and administrative implementation aspects. Ad hoc Technical Committees will be formed for specific topics requiring strong alignment among MoAF's departments, operating under a flexible framework and for a defined period as needed. A permanent M&E Technical Working Group will be established to refine the overall M&E strategy, coordinate monitoring activities, and develop measurement approaches, data capture strategies, and evaluation plans. Each General Directorates will assign a focal point responsible for M&E aspects to this working group. Ad hoc representation from MoAF structures at the provincial level will be encouraged in project coordinating structures (TCM, ad hoc technical committees, and M&E Technical Working Group) as required. Table A1.1 provides details on different departments and their responsibilities for project implementation.

6. **Projects Monitoring Office (PMO).** This Office, established by MoAF and reporting directly to the Minister, is tasked with overseeing all projects implemented by MoAF, particularly those funded by international sources like the World Bank. Within the proposed project's scope, the PMO will facilitate smooth and efficient project execution, acting as a direct communication channel between ABDGM, the in-charge Deputy Minister, and the Minister.

[43] External consultants to be hired to support the PCU and General Directorates include, at a minimum: a project's technical lead, four procurement specialists, two financial specialists, a social specialist, an environmental specialist, a communications specialist, two M&E specialists, two translators and an administrative aid.

Table A1.1: Summary of Main Responsibilities of MoAF Structures in Project Coordination and Implementation[44]

MoAF's General Directorates	Departments	Key Responsibilities
Leading Deputy Minister Project Coordinating Unit (PCU)	The PCU is located at ABDGM reporting directly to the project's leading Deputy Minister	- The PCU Director, supported by the PCU Technical Lead is to be responsible for day-to-day project management and directly report to the Deputy Minister. - Responsible for overall project coordination and management - Reporting to the World Bank on implementation progress, including technical, fiduciary (procurement and financial management), E&S, and M&E aspects. - Preparation AWPB in close coordination with General Directorates.
General Directorate of Agricultural Reform (TRGM) Component 1	Irrigation Systems and Agricultural Infrastructure Services Department	- Responsible for implementation of Subcomponent 1.1, including the identification of the irrigation cooperatives to be benefitted from the project funds; the preparation of tender documents at the central level relevant to this subcomponent; and M&E of the investments and assessment of results/impacts in close coordination with the PCU.
	Agricultural Technologies and Mechanization Department	- Responsible for implementation of Subcomponent 1.2 including the identification of criteria and selection of the agricultural organizations to benefit from project support as well as the necessary mechanization and equipment and sustainable mechanization approaches; preparation of tender documents and technical specifications at the central level relevant to this subcomponent; the establishment of rules and procedures for the common use of machinery parks; and M&E of the investments and assessment of results/impacts in close coordination with the PCU.
General Directorate of Livestock (HAYGEM)	Project Development and Infrastructure Department	- Responsible for implementation of Subcomponent 2.1; prepares the ToRs for support programs which includes details of the investments to be covered under the grant program, targeted beneficiaries, selection and evaluation criteria, indicators for monitoring progress, etc.; prepares technical specifications for procurement at the central level relevant to this subcomponent; and is responsible for M&E of the investments and assessment of results/impacts in close coordination with the PCU and PDAFs/DDAs.
	Poultry& Beekeeping Department	- Responsible for implementation of poultry support under Subcomponent 2.1. including the preparation of the criteria for targeted beneficiaries of grant support; preparation of technical specifications for procurement at the central level relevant to this subcomponent and M&E of the investments and assessment of results/impacts in close coordination with the PCU and PDAFs/DDAs.
General Directorate of Plant Production (BUGEM)	Meadows, Pastures and Fodder Crops Department	- Responsible for implementation main activities of Subcomponent 2.2 which is related to pasture rehabilitation/improvements. - Define criteria for preparation and approval of pasture management plans (PMPs). - Commission studies & analysis to support pasture improvements. - Prepare tender documents and carry out the procurement process at the central level relevant to this subcomponent. - M&E of the investments and assessment of results/impacts in close coordination with the PCU.
Provincial Directorates of Agriculture and Forestry (PDAF) and District Directorates of Agriculture (DDAs)	In the 11 earthquake-affected provinces and additional adjacent areas.	- Responsible of beneficiary engagement on the ground - Carry out the implementation of call for proposals for grant programs (SC1.2 and SC2.1), undertake awareness activities, receive, and process support requests by beneficiaries, review compliance with eligibility criteria, etc. - Prepare the Pasture Management Plans (SC2.2) - Carry out monitoring and evaluation activities of all subcomponent investments. - Responsible for the preparation, approval, and acceptance of progress payment documents of the investments realized in the project area (SC2.1). - Others, as indicated in the POM.

[44] The detailed set of responsibilities is to be presented in the Project Operations Manual (POM).

7. **Synergies with TUCSAP's implementation structures**. The project will benefit from synergies with the implementation structures created for TUCSAP project, particularly during the first months of project implementation, until the recruitment process of external consultants is completed. ABDGM will host the PCU for both projects, therefore, collaboration and exchange of knowledge among both projects will be promoted.

8. **Project Operations Manual (POM).** MoAF will execute the project based on a POM in form and substance acceptable to the Bank. The adoption of POM is a condition of effectiveness, with MoAF intended to finalize and adopt it before the loan agreement signature. The POM will include: (i) A detailed description of all project activities, timetable, and targets (including broad descriptions of the Grant programs; with details on beneficiary selection, program implementation and management detailed in the Matching Grant Manuals)); (ii) Implementation arrangements and responsibilities, including PSC composition, PCU TORs, and General Directorates ' roles for subcomponent implementation; (iii) E&S requirements, including outline of the CE strategy; (iv) Disbursement and financial management procedures; (v) Applicable procurement rules and plans; (vi) Anti-Corruption guidelines; (vii) Coordination mechanisms; and (viii) Project monitoring, evaluation, reporting, and communication requirements. The POM will adopt an adaptive management approach to accommodate changes as needed during implementation.

9. **The Annual Workplan and Budget (AWPB) will be prepared by the PCU each year in collaboration with implementing General Directorates and reviewed during annual project meetings.** An advanced draft will be shared with the World Bank and the PSC for comments and information. Once approved, MoAF will include its AWPB in its Annual Investment Program, agreed upon with the Presidency of Strategy and Budget Office (SBO), and in the project's procurement plan. The detailed process for preparing, reviewing, and approving the AWPB will be outlined in the POM. Implementation modalities by components/subcomponents are as follows:

(a) **Subcomponent 1.1.** At the central level, TRGM will handle all tenders related to this subcomponent. TRGM will liaise with the PCU on procurement, financial, and E&S requirements, and will be responsible for processing payments. Technical coordination has been established with the General Directorate of State Hydraulic Works (DSI), including for the pre-selection of cooperatives benefiting from the project. A collaborative protocol will be signed between TRGM and beneficiary irrigation cooperatives upon selection of the cooperative to initiate the collaborative partnership. A transfer agreement among the parties will also be signed, before commencing construction work. Drafts of these documents are included in the POM, with final versions subject to the World Banks's no objection before implementation.

(b) **Subcomponent 1.2.** Activities will be implemented through a grant program benefiting agricultural organizations meeting requirements for machinery park implementation. TRGM will centrally conduct all tenders for equipment/machinery. Once beneficiary agricultural' organizations confirm their counterpart contribution (deposited in the project's account opened by TRGM), TRGM will procure the equipment/machinery, to be delivered to agricultural organizations for operation and maintenance. Beneficiary organizations will retain ownership of the provided machinery/equipment. A Machinery Matching Grants Manual will be prepared and adopted, as a condition to proceed with the implementation of the grant program by TRGM.

(c) **Subcomponent 2.1.** The subcomponent will primarily function as a grant program, with procurement being implemented by beneficiaries, with two payment modalities: cash payment of grant support to the beneficiary after executing the investment request (investment plan), or direct payment of the grant contribution to the company providing goods/services. Grant ceilings are established for the program (see Table A1.2). A Livestock Matching Grants Manual outlining implementation procedures will be prepared, as a condition to proceed with the disbursement of grants. For activities, other than grants, supported under the subcomponent all tenders will be managed centrally by HAYGEM.

(d) **Matching Grant Manuals for Subcomponents 1.2 and 2.1:** the "Livestock Matching Grants Manual" and the "Machinery Matching Grants Manual" are to detail procedures for selecting, appraising, and approving Matching Grant applications, and for supervising implementation of Investment Plans financed by Matching Grants, including: the eligibility criteria, the application, evaluation, selection, award process, and Matching Grants management procedures; the Matching Grant ceilings, and cost sharing percentages and requirements, for eligible grant investments; the detailed implementation requirements, including the criteria for Matching Grants record keeping, procurement, financial management, disbursements procedures (of grant funding in the case of the Livestock grants and of equipment/machinery delivery in the case of the Machinery grants), monitoring, evaluation, and reporting; and mandatory provisions that exclude the financing of Excluded Activities. The Manuals will also include the required templates/forms to be used by beneficiaries around the grant cycle.

Table A1.2: Grant amount ceilings under the livestock recovery grant program[45]

Type of Enterprise	Enterprise Capacity Range	Grant ceiling USD (75 %)
Cattle Dairy Farming	Businesses with 1-10 head of breeding cattle	11,095
	Businesses with 11-20 head of breeding cattle	22,190
	Businesses with 21-30 head of breeding cattle	51,775
	Businesses with 31-40 head of breeding cattle	73,965
	Businesses with 41+head of breeding cattle	110,947
Cattle Feedlot	Businesses with 0- 20 head of breeding cattle	11,095
	Businesses with 21- 40 head of breeding cattle	22,190
	Businesses with 41- 60 head of breeding cattle	51,775
	Businesses with 61- 80 head of breeding cattle	73,965
	Businesses with 81+ head of breeding cattle	110,947
Small Ruminant Farming	Businesses with 1-100 head of breeding small ruminants	22,190
	Businesses with 101- 200 head of breeding small ruminants	36,982
	Businesses with 201+ head of breeding small ruminants	55,473
Poultry Production[46]	Broiler chicken (5,000 – 100,000 units/period)	369,822
	Laying hens (5,000 – 100,000 units/year)	369,822
	Turkey (1,000 – 15,000 units/period)	369,822
	Goose (350 – 3,000 units/period)	369,822

(e) **Subcomponent 2.2.** The PMPs approved will be financed by the project and their implementation coordinated by PDAFs. The Department of Meadows, Pastures and Forage Plants in BUGEM will carry out the control and inspection activities and works along with technical experts leading technical audits. BUGEM centrally will coordinate with the PCU on all procurement, financial and environmental and social requirements and will be responsible for executing payments. BUGEM will collaborate with the General Directorate of Agricultural Research & Policy (TAGEM) and from the General Directorate of Forestry (OGM) for the collection of seeds and propagation of Atriplex species. For other plant species identified jointly by the TAGEM and BUGEM, as climate adapted to the region, TAGEM will conduct the propagation in initial stages and will transfer the material to the General Directorate of Agricultural Enterprises (TİGEM) for propagation at large scale (after year three). The project is to cover the costs of these activities. Collaborative protocols are to be established between BUGEM and these General Directorates for the

[45] The percentage contribution and/or the grant ceilings can be modified based on the project's implementation findings. These modifications will be made through an agreement between the MoAF and the Presidency of Strategy and Budget Office (SBO), and will be formalized through the issuance of a grant guidance document by MoAF or through regulatory acts, as applicable.

[46] Investments in rebuilding/repairing damaged equipment and infrastructure in poultry farming operations of middle-scale size is expensive, which explain the higher grant ceiling proposed. It is expected however that most of the beneficiaries will be well below that ceiling.

provision of planting materials required to implement the PMPs. Draft of the collaborative protocol is included in the POM.

10. **Implementation Support Plan.** The World Bank will provide implementation support in line with its procedures, standards, and requirements through an Implementation Support Plan. A task team with diverse skills will conduct technical due diligence, reviewing investments, feasibility studies, planning reports, tender packages, and E&S instruments. Intensive World Bank support is expected during the initial two years of operation. Project Reports will be periodically reviewed by the World Bank as part of implementation support missions, conducted at least twice a year. Project Reports will be reviewed periodically by the World Bank as part of project implementation support missions to be carried out at least twice a year.

Financial Management (FM)

11. The financial management (FM) arrangements for the project are assessed as Moderately Satisfactory. An action plan to improve these arrangements to an acceptable level is outlined at the end of this section. The Republic of Türkiye will be the Borrower of the IBRD loan, through the Ministry of Treasury and Finance (MoTF). Allocation of loan proceeds to the MoAF is to be done in accordance with the Law on Public Finance and Debt Management No. 4749. MoAF will oversee project implementation through its relevant General Directorates, which will act as spending units. These General Directorates will adhere to mechanisms outlined in the Public Financial Management and Control (PFMC) Law No. 5018, along with additional measures directed by the PCU as per the project's FM Manual.

12. **Investment Program and Budgeting.** MoAF operates under the Public Financial Management and Control (PFMC) Law No. 5018 and follows national planning and budgeting procedures. Expenditures for the project are limited to the ceiling indicated in the Investment Program. The Strategy Development Directorate (SDD) of MoAF holds overall responsibility for budget preparation and monitoring. SDD coordinates investment proposals from spending units to compile MoAF's final investment budget proposal, which is then sent to the Presidency of Strategy and Budget Office (SBO) in the third quarter of the year. Upon agreement, the institutional budget is included in the general budget and becomes effective upon enactment of the Budget Law by the Turkish Grand National Assembly before the new fiscal year. To incur expenditures in 2024 and beyond, MoAF must ensure the project is included in annual investment programs and that General Directorates have adequate budgetary allocations under Budget Code 7 for external/foreign resources expenditures. Implementing General Directorates must submit project budget and investment program proposals to the PCU for coordination, consolidation, and monitoring.

13. **Accounting System and Procedures**. MoAF, categorized among Chart I institutions in the PFMC Law, maintains its accounting in Turkish lira within the Integrated Public Information Management System of the MoTF, following a predetermined chart of accounts. The PCU, managed by MoAF, will oversee the Project Designated Account (DA) in the Central Bank and handle overall project reporting to the World Bank. Detailed project reporting in foreign currency isn't feasible within the existing accounting system, so the PCU, under ABDGM, will maintain a separate cash-based accounting system for fund flows in foreign currency and generate regular project financial reports. For this purpose, the PCU will use off-the shelf accounting and reporting software already procured for TUCSAP. As a transitional measure until the tailoring of the existing system is completed, the accounting and reporting will be done using Excel spreadsheets.

14. The PCU will customize TUCSAP's existing FM Manual for the project in coordination and collaboration with the spending General Directorates. This FM Manual will encompass: (i) Financial and accounting policies and procedures; (ii) FM unit organization, functions, staffing, and job descriptions, emphasizing segregation of duties; (iii) Transaction flows and templates; (iv) Disbursement procedures; (v) Project budgeting, planning, and financial forecasting; and (vi) Project reporting and auditing. The FM Manual, an integral part of the POM, will be finalized by Effectiveness and updated as necessary to accommodate changes during implementation.

15. **FM Staffing**. The PCU will hire a FM specialist to oversee project finances. Until recruitment, the PCU will assign dedicated staff temporarily for FM responsibilities and receive support from TUCSAP's FM consultants initially. Given the expected workload, the PCU may also recruit a specialist specifically for managing payments under HAYGEM's grant program. Additionally, General Directorates are strongly advised to assign staff from their administrative units to coordinate with the PCU FM unit, mirroring the approach in TUCSAP.

16. **Internal Controls and Internal Audit**. The internal control procedures will follow TUCSAP's example and will be described in the FM Manual. MoAF already adheres to internal control mechanisms outlined in the PFMC Law. Involved General Directorates will act as accountable spending units and utilize project funds according to agreed project documents. They will handle all procurement stages, verify goods and services receipt, and prepare supporting payment documentation. General Directorates will submit payment orders with supporting documents to MoAF's Accounting Officer (Sayman) after initial review and confirmation by the PCU FM unit. Upon PCU confirmation, authorized personnel will sign payment orders, and documentation will be sent to FM Specialists in General Directorates' Budget Units (BU). BUs will prepare payment orders/bank transfer orders for execution, with copies simultaneously provided to the PCU.

17. The "Sayman" will conduct basic controls on payment orders and forward them to the Central Bank of the Republic of Türkiye (CBRT) for processing from the DA. Turkish Lira accounting entries in line with national regulations will be executed by the "Sayman" based on approved payment orders. Expenditures in the project will undergo pre-financial control as per MoAF's directive, if applicable. The PCU will maintain a parallel project accounting system in foreign currency, detailed for project financial reporting. All procedures and workflows will be outlined in the FM Manual, finalized by project effectiveness. MoAF's Internal Audit Department is responsible for auditing selected processes of the whole Ministry based on their risk analyses and annual audit plans. For that reason, the project will not use the internal audit function of MoAF but consult them during implementation.

18. **Financial Reporting**. The PCU will maintain records and ensure proper accounting for funds provided on a cash basis. Interim un-audited financial reports (IFRs) will be prepared quarterly and submitted to the World Bank within 45 days after each quarter's end via the Client Connection system. The format and contents of the IFRs will be agreed upon with the World Bank and included in the Minutes of Negotiation.

19. The IFRs will encompass the following minimum reports: (i) Project Balance Sheet; (ii) Expenditure tables per activity, including explanation of significant variances between budgeted and actual figures; (iii) Expenditure tables per category, including explanation of significant variances between budgeted and actual figures; (iv) DA statement; and (v) Contract management tables.

20. **Disbursements and Fund Flow**. MoAF, via the MoTF, will establish a designated account (DA) in the loan currency at the Central Bank of Türkiye. Payments to contractors, suppliers, and consultants will be made directly from the loan account or the DA, authorized by responsible personnel. Advances will be requested from the DA based on project needs and planned expenditures. All transactions in this account will correspond to documented project income or expenditures. Withdrawal applications will require two signatures from the authorized list submitted by MoAF/PCU. Disbursements from the Loan Account will adhere to traditional World Bank procedures: Advances, Direct Payments, Special Commitments, and Reimbursements against Statements of Expenditures (SOEs), with withdrawal applications prepared and authorized by the PCU.

21. The project's Disbursement and Financial Information Letter (DFIL) will be provided to MoAF. Disbursements below specified thresholds outlined in the DFIL will be executed based on Statements of Expenditures (SOEs). MoAF will maintain full documentation supporting SOEs for at least seven years after World Bank receives the audit report for the fiscal year of the last withdrawal from the Loan Account. This information will be accessible for review during World Bank staff supervision and annual audits, focusing on the propriety of SOE disbursements and record-keeping quality.

22. **External Audit.** As part of the World Bank 's auditing requirements, the project financial statements will be subject to external auditing. The first set of audit reports will be submitted to the World Bank before June 30th of the year following the calendar year in which the first disbursement from the loan has been made. Annual project financial statements will be audited by the Treasury Controllers based on the International Standards on Auditing and in line with a term of reference acceptable to the World Bank. The audit reports, including a Management Letter (ML) providing recommendations for improving implementation, will be provided to the World Bank within six months of the end of each fiscal year. The audit reports, excluding the ML, will be publicly disclosed by the PCU and the World Bank in line with the World Bank's Access to Information Policy. The following table summarizes the audit requirements for the project:

Audit Report	Due Date
Project financial statements	Within six months of the end of each fiscal year and at the closing of the project

23. **Supervision Plan**. Throughout project implementation, the World Bank will supervise financial management arrangements in two ways: Firstly, during implementation support missions, it will review financial management and disbursement arrangements to ensure compliance with World Bank 's minimum standards. Secondly, it will scrutinize the project's quarterly interim un-audited financial reports, annual audited financial statements, and auditor's management letter. Additionally, a Bank-accredited Financial Management Specialist may be engaged as needed to support the supervision process.

24. **Action Plan**. The overall FM risk is substantial, and the FM arrangements are moderately satisfactory. The following action plan is prepared for adequate arrangements at entry:

Action	Responsibility	Deadline
The project will be included in the 2024 investment plan and the required budget allocations will be made on an annual basis	MoAF PCU in collaboration with participating General Directorates and SDD	Per national budgeting deadlines applied to general budget institutions
The accounting and reporting software under TUCSAP will be tailored	MoAF PCU	At implementation, no later than 60 days after effectiveness
The templates for the interim un-audited financial reports will be prepared	World Bank and MoAF PCU	By Negotiations
ToR for Financial Management Consultants will be prepared for immediate procurement after effectiveness, and included in the POM	MoAF PCU	By Effectiveness
Authorization procedures for disbursements will be completed	MoAF PCU in coordination with MoTF	After loan effectiveness
FM consultant recruited[47]	MoAF PCU	No later than 120 days after loan effectiveness
Final FM Manual prepared	MoAF PCU	By loan effectiveness
Matching Grant Manuals adopted	MoAF PCU in collaboration with relevant General Directorates	Condition for grant disbursements (MoAF intends toc them before or by loan signature).

Procurement Aspects

25. **Responsibilities and Applicable Regulations.** The General Directorates, in collaboration with PDA and DDAs, will be responsible for all procurement arrangements related to their investments. This includes drafting ToRs, technical specifications, bidding documents, and requests for proposals, as well as conducting consultant selection and procurement activities. They will also handle contract signing, payments, contract management, monitoring, reporting,

[47] A second financial specialist is to be recruited no later than at the start of the grant implementation program.

and all other procurement-related tasks outlined in the POM. To fulfill these duties, capacity building for procurement staff is crucial, both at the PCU and the implementing General Directorate levels. Therefore, qualified procurement specialists will be hired at both levels to ensure smooth project implementation. These specialists will adhere to World Bank's Procurement Regulations (Fifth Edition, September 2023) and follow the procurement methods specified in the approved procurement plan**.**

26. **Procurement under the project will encompass a range of Goods, Works, and Consultant Services, which are generally both not complex and fall within the scope of national competition.** Goods are expected to include procurement of agricultural machinery, equipment, etc., and to be procured through national competition. Works are expected to include: (i) Construction of irrigation networks, for which there are several private contractors in Türkiye that are likely to participate in the bidding process and so ensure that the most competitive bids will deliver value for money; and (ii) Establishment of shaded/cover areas, water drinkers/ponds, and shepherd infrastructure, among other small works that will be procured through national open RFB (Request For Bids) and RFQ (Request For Quote) methods depending on the estimated cost and scope of the works. Consultant services are expected to include preparation of designs and bidding documents for irrigation network, assessment studies, preparation of investment plans, trainings, and strengthening technical, fiduciary, E&S and M&E capacities and grievance redress and maintenance of a project communication and visibility plan, among others, which can be provided mostly through open national competition.

27. **Procurement methods and market approaches**. The procurement plan prepared by MoAF for the initial eighteen months of project implementation specifies the appropriate methods and approaches for each procurement activity. Goods and Works procurement will primarily utilize the open national market approach, ensuring compliance with World Bank 's Procurement Regulations. Simple off-the-shelf procurement and non-consulting services for training, events, and public awareness activities may follow the Request For Quote (RFQ) method. Construction works and procurement of goods will utilize the single-stage, one-envelope Request For Bids (RFB) method with an open national market approach. Consulting services from firms are expected to be procured through methods like Quality and Cost Based Selection (QCBS), Least Cost Selection (LCS), or Selection based on Consultant's Qualifications (CQS), using World Bank 's agreed Request For Proposals (RFP) documents. Individual consultants, especially for project management, monitoring, and evaluation, will be selected through open competition using World Bank -approved contract forms.

28. **Under Subcomponent 2.1, procurement by private sector beneficiaries will follow the Commercial Practices method.** This approach aligns with established procurement practices used by the private sector, as outlined in Paragraph 6.46 of the World Bank Procurement Regulations. Beneficiaries will conduct procurements in accordance with these practices, which are typically used by entities not subject to the Borrower's public procurement law. If grants involve procurement of solar energy-related goods and works for installing renewable energy systems, agreements with beneficiaries will include enhanced measures to mitigate the risk of forced labor, as mandated by the World Bank. The Livestock Matching Grant Manual to be prepared by HAYGEM will elaborate on the application of Commercial Practices, outlining measures, commitment letters, and sample documents.

29. **Complaint management**. The project is required to ensure that procurement-related complaints are recorded in the Systematic Tracking of Exchanges in Procurement (STEP) system. Both the World Bank and the MoAF will utilize STEP to track complaints. General Directorates will have the following responsibilities within STEP: (i) Promptly record all complaints related to the procurement process; (ii) For complaints regarding procurement processes for contracts subject to the World Bank's prior review, submit the General Directorate's proposed response to each complaint before issuing it to the complainant(s); (iii) Record the General Directorate's response to procurement process complaints upon issuance to the complainant(s); and (iv) Promptly register requests for debriefings and update STEP with the record of debriefings to interested parties, Procurement-related complaints arising from contracts where the World Bank's Standard Procurement Documents are required to be used will be handled in accordance with Annex III of the Procurement Regulations.

30. **Procurement Supervision**. The World Bank will supervise the procurement process under the project throughout its cycle. During the planning stage, this supervision involves reviewing the procurement arrangements, contract packaging, applicable procedures, and scheduling of the procurement processes to ensure compliance with the World Bank's Procurement Regulations. During implementation, procurement packages that are large in value, high in risk, and/or critically important will undergo the World Bank 's prior review. Other procurement activities will be subject to post-review on a sampling basis. Procurement progress and performance will be reviewed as part of the World Bank 's supervision, which will occur at least every six months. This supervision aims to ensure transparency, efficiency, and adherence to procurement guidelines throughout the project's duration.

ANNEX 2: Economic and Financial Analysis

COUNTRY: Republic of Türkiye
Agriculture Sector Recovery in Türkiye's Earthquake-affected Provinces

Summary

1. **The incremental cost-benefit analysis of the project indicates a positive return on investment, considering a social discount rate of 10 percent[48] and an evaluation period of 20 years.** Economic indicators, such as Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit/Cost ratio (B/C), switching values-benefit, and switching value-cost, are estimated at US$ 319.3 million, 18.8 percent, 1.57, -36 percent, and 57 percent, respectively. These results account for the total cost of the project, including cash contributions from beneficiaries, and the impact of greenhouse gas (GHG) emission reductions. The sensitivity and scenario analyses, which explore hypothetical variations in variables and parameters that could affect investment returns, demonstrate the robustness of the results.

Methodological approach

2. **Ex-ante cost-benefit analysis involved the calculation of key economic and financial metrics, such as NPV, IRR, B/C, payback period and switching values to assess potential returns across the entire project, its components, and primary activities.** The financial analysis offers insights into the returns generated by activities supported by the project, examining them from the perspectives of private enterprises, producer organizations, and beneficiaries. In contrast, the economic analysis highlights the genuine societal benefits, which hold particular significance for policymakers and organizations operating within the public investment framework.

3. **The analysis considered the following general investment parameters as the base scenario:** (i) An evaluation period of 20 years, (ii) A social discount rate and cost of capital at 10 percent and 12 percent, and (iii) A 6-year effective project implementation timeline. To assess the robustness of the results, sensitivity and scenario analyses were performed. These evaluations examined the potential impact of changes in key variables, including benefits, production costs, evaluation period and social discount rates.

4. **The analysis considered both, the direct investment costs, and operational costs of the project, as well as expected contributions from beneficiaries, detailing these expenses in a cash flow assessment.** To ensure an accurate evaluation of the project's benefits and costs, adjustments were made to reflect the timing of all financial flows. These adjustments accounted for disbursement delays, projected adoption rates, and the distribution of benefits throughout the project's implementation phase, particularly in relation to the characteristics of the production system expected to benefit directly from the project. Additionally, the analysis incorporated the value of reducing GHG emissions, using a low social price of carbon recommended by the World Bank as baseline scenario.

5. **Investment/farm models considered for the EFA.** The analysis relied on tailored investment/farm models described in the following table, each proposed to align with the technical specifications of every component of the project supporting investments.

[48] Value used by other World Bank projects in Türkiye.

Table A2.1: Project Investment Models

Subprojects/activities	Incremental benefits/Costs
Component 1. Enabling Service Provision for a Resilient Agrifood Sector Recovery	
Crop production with rehabilitated irrigation systems	Benefits: Recovery of crop yields to pre-earthquake levels and an improvement in productivity through enhanced efficiency in irrigation water use (10 to 15 percent). Costs: Production and maintenance costs are increasing due to the use of new technologies in the irrigation systems. Indicative cropping pattern: fruits (orchard), vegetables (tomato), grains (maize), oilseeds (sunflower), legumes (chickpeas), tubers (potato).
Farm mechanization services for primary crop production - Soil preparation and crop management	Benefits: Revenues are projected to increase due to enhanced yields (10 to 15 percent) as a direct result of the potential use of modern machinery and equipment. Costs: Production costs are increasing due to the use of new machinery and associated technologies and practices. However, there is a potential reduction in the cost of fertilizer use due to improved soil management. Indicative cropping pattern: grains (maize, wheat), vegetables (tomato), oilseeds (sunflower), legumes (chickpeas), tubers (potato), and fruits (orchard).
Farm mechanization services for primary crop production – Crop harvesting	Benefits: Revenues are projected to increase due to reduced harvest losses (10 to 15 percent) and increased prices (5 to 10 percent) because of improved product quality through the potential use of modern harvesting machinery and equipment. Costs: Production costs are increasing due to the use of new machinery and associated technologies and practices. Indicative crops: grains (wheat, maize), oilseeds (sunflower), and tubers (potato).
Component 2. Climate-Smart Recovery of the Livestock Sector	
Cattle and small ruminant production.	Benefits: Animal stock and productivity (meat and milk production) are expected to return to pre-earthquake levels, with further improvements anticipated due to increased production efficiency from modernized infrastructure, technology transfer, and the training of beneficiaries (0 to 15 percent). The income of beneficiaries could improve following the implementation of technologies and practices that treat manure from stables, barns, and corrals, which can potentially be marketed. Costs: Production, maintenance, and replacement costs of new infrastructure rise slightly due to the adoption of new technologies. Indicative animal products: milk (cattle, sheep, and goat), meat (cattle, sheep, and goat).
Poultry production	Benefits: Animal stock, yields, and prices of meat and eggs are expected to return to pre-earthquake levels, with further improvements anticipated due to increased production efficiency from modernized infrastructure, technology transfer, and the training of beneficiaries (0 to 15 percent). The income of beneficiaries improves following the implementation of technologies and practices that treat excreta from barns, which can be marketed as poultry manure, the organic fertilizer with the highest nutrient content. Costs: Production, maintenance, and replacement costs of new infrastructure rise slightly due to the adoption of new technologies. Indicative products: meat (broiler chicken, turkey, and goose), eggs (laying hens).
Sustainable pasture management	Benefits: Productivity of grazing animals, measured in kilograms of meat and milk per hectare, is expected to increase (0 to 20 percent) due to enhanced pasture carrying capacity (20 to 25 percent). This improvement results from the implementation of sustainable pasture management practices. Costs: Maintenance costs for the sustainable management of the pasture systems. Indicative products: milk (cattle, sheep, and goat), meat (cattle, sheep, and goat).

6. **Results.** The table below presents the estimated values of standard project worth measures for the overall project investment.

Table A2.2: Ex-ante cost-benefit analysis – Summary of results of the Economic indicators

NPV (US$ million)	IRR (percent)	B/C	Payback period (years)	Switching value – benefits (percent)	Switching value – costs (percent)	Cash inflow (US$ million)	Cash outflow (US$ million)
Economic indicators (10% of social discount rate)							
319.3	18.8	1.57	8.8	-36	57	883.1	563.8

7. **The project's EFA points to a promising return on investment. This analysis takes into consideration the overall project cost, which includes contributions from beneficiaries.** Key economic indicators, such as NPV, IRR, B/C ratio, and the payback period, have been calculated at US$ 319.3 million, 18.8 percent, 1.57, and 8.8 years, respectively. These findings include an assessment of specific ecosystem services, such as the reduction in GHG emissions, which are valued using the social price of carbon as recommended by the World Bank.

8. **Sensitivity and scenario analyses were conducted to evaluate the potential variations in crucial parameters that could affect the project's returns, particularly considering the substantial uncertainty in the investment parameters employed.** As part of these analyses, one specific scenario involved reducing the evaluation period from the base scenario of 20 years to just 10 years. This was done to test the potential reduction in the return on investment according to changes in production dynamics in the short, medium, and long term. The results, as displayed in the table, reveal a substantial decrease in the economic return on investment when the evaluation period is shortened.

Table A2.3: Sensitivity/scenario analysis – Effects of a change in the evaluation period

Indicators	10 years	15 years	20 years (base scenario)
	Economic indicators		
NPV (US$ million)	-58.4	173.4	319.3
IRR (percent)	6.30 percent	16.4 percent	18.8 percent

9. **Table A2.4 illustrates the effects of variations in the social discount rate on the estimated economic indicators to assess the risks associated with the macroeconomic context, that may affect the economic viability of the project.** A higher social discount rate leads to a lower NPV, which could affect the return on investment of the project. The results show that the project would maintain its economic viability in a scenario where the social discount rate increases up to 12 percent.

Table A2.4: Sensitivity/scenario analysis – Effects of a change in social discount rate

Scenario	ENPV (US$ million)
Economic indicators	
Base scenario – social discount rate (10 percent)	319.3
High social discount rate – 12 percent	209.3
Low social discount rate – 8 percent	465.7

10. **Table A2.5 provides a comparison of the ENPV and EIRR values under different scenarios, including low and high shadow prices of carbon and without considering the valuation of carbon.** More information on this analysis can be found in Annex 3. In all scenarios, the investment would have promising economic returns.

11. **A sensitivity analysis was conducted to assess the impact of changes in key parameters on the estimated Economic Internal Rate of Return (EIRR).** Table A2.6 presents the results of this analysis, showing how the EIRR

responds to progressive decreases and increases in the values of key parameters, such as crop yields, prices, and production costs, as well as combined effects of these variables. This analysis offers insights into the robustness of the project's estimated returns against potential changes in crucial parameters.

Table A2.5: Economic indicators in different scenarios

Indicators	Without considering GHG emission reduction	Shadow price of carbon	
		Low price (base scenario)	High price (optimistic scenario)
ENPV (US$ million)	218.8	319.3	419.9
EIRR (percent)	16.1 percent	18.8 percent	21.4 percent

Table A2.6: Sensitivity analysis – Effects of changes in selected key parameters

Parameter	EIRR values (percent)						
	-20%	-10%	-5%	0%	5%	10%	20%
Benefits (yield, prices)	15.2%	17.1%	18.0%	18.8%	19.5%	20.2%	21.5%
Production costs	21.1%	19.9%	19.2%	18.8%	18.2%	17.7%	16.6%
Combined effect (crop yield, price, production cost)	18.6%	18.3%	18.6%	18.8%	19.0%	19.2%	19.5%

12. **The results of the sensitivity analysis suggest that changes in benefits, whether through crop yields or prices, and variations in production costs, could have a substantial impact on the EIRR of the project.** This indicates that economic returns may be vulnerable to market fluctuations or weather events affecting productive activities. Monitoring these factors and making necessary adjustments to the project plan is crucial to mitigate potential adverse effects on profitability particularly in the medium and long term.

Results – Disaggregated

13. **The cost-benefit analysis was broken down into segments to assess the returns on investment for various types of activities supported by the project.** Measures of project worth were independently computed for each project component, subcomponent, and primary activity. The following table shows the economic return on investment for each component.

Table A2.7: Economic indicators by project component

Item	Economic indicators				
	NPV (US$ million)	IRR	B/C	Switching value - benefit	Switching value - cost
Component 1	80.1	20.1 percent	2.0	-50%	101%
Component 2	239.2	18.4 percent	1.5	-33%	49%

14. **The economic analysis revealed that Component 1 and Component 2 are expected to generate positive returns over an evaluation period of 20 years.** Due to the nature of the investments, Component 2, which is oriented towards the recovery of livestock systems, is expected to have lower yields than Component 1. This is because the recovery of animal production, especially in cattle, small ruminant and poultry production, is slower and will be only consolidated in the medium and long term.

15. **Returns by investment/farm models.** To determine the relative profitability of different types of investment/farm models from the perspective of the private sector, the measures of project worth were calculated separately, assuming a cost of capital of 12 percent. Potential and preliminary financial returns for different investment

models under Components 1 and 2 are shown in Table A2.8. Crop production activities with rehabilitated irrigation infrastructure and poultry raising would have the highest return on investment.

Table A2.8: Financial Internal rate of return (models based on Table A2.1 above)

Investment model	Expected Financial Internal Rate of Return - FIRR (percent)
Component 1	
Crop production with rehabilitated irrigation systems	22.6 percent
Farm mechanization services for primary crop production	12.8 percent
Component 2	
Cattle production	12.3 percent
Small ruminant production.	11.8 percent
Poultry production	21.6 percent
Sustainable pasture management	11.4 percent

Conclusions

16. Based on the findings of the ex-ante C/B analysis, the overall project investment is expected to yield a positive economic return. The estimated IRR exceeds the social discount rate considered in this analysis, indicating that the project is economically viable over a 20-year evaluation period.

17. Additionally, most activities funded under Components 1 and 2 are projected to generate positive financial outcomes, primarily in the medium and long term. In economic terms, most activities are expected to yield positive returns over a 20-year evaluation period. This underscores the nature of investments that require time to generate results, particularly in the case of cattle, small ruminant herds and poultry.

ANNEX 3: Climate Change and Greenhouse Gas (GHG) Analysis

COUNTRY: Republic of Türkiye
Agriculture Sector Recovery in Türkiye's Earthquake-affected Provinces

Climate Change Vulnerability and Adaptation

1. **Climate impacts are evident in Türkiye, with projections indicating further changes in temperature and precipitation.** Access to water is a significant concern for Turkish farmers, especially in drought-prone regions like earthquake-affected areas. Mean annual temperatures have risen, with earthquake-hit provinces increasing by 0.52°C per decade (1971 to 2020), exceeding the national trend of 0.41°C.[49] Rainfall, averaging 574 millimeters annually, is below the Organization for Economic Co-operation and Development (OECD) average, with declines in the Mediterranean and Southeastern Anatolia, overlapping earthquake zones. A good part of the earthquake-affected provinces is in the medium-risk zone of the subtropical Mediterranean, making it highly vulnerable to both climate change and variability and therefore, facing future challenges like water scarcity, prolonged dry spells, and intensified droughts.[50]

2. **Extreme heat and drought pose the most critical threats to the earthquake-affected provinces.**[51] The combination of rainfall deficit and high temperature leads to serious drought risks (Figure A3.1a), especially impactful in agriculture, which is vital socially and economically (Figure A3.1b). Most earthquake-affected provinces rely heavily on rainfed agriculture, with only 2 to 4 percent of land irrigated (Figure A3.1a). Higher temperatures and evapotranspiration rates will increase demand for crop irrigation, further straining water resources due to inefficient irrigation practices. Drying natural water streams affect grazing animal access to water, while extreme weather and higher temperatures pose health risks to animals (from heat stress, metabolic disorder, oxidative stress, and immune suppression) increasing disease incidence (including of zoonosis diseases) and dead. Lack of shelter exposes animals to heat stress. Additionally, earthquake-affected areas face various natural hazards like earthquakes, wildfires, and floods, each posing distinct threats across different provinces.

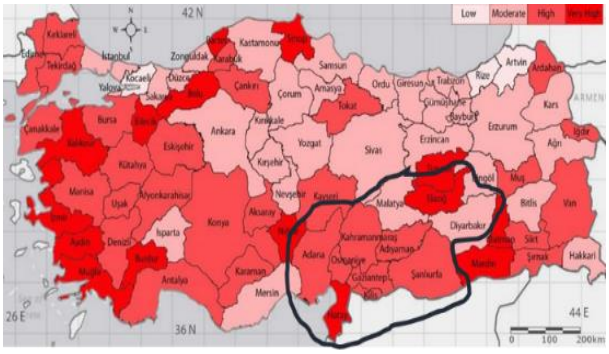
3. **Agriculture is economically vital in earthquake-affected provinces, and any decline in productivity due to climate or natural hazards directly affects livelihoods.** About 58 percent of farms in these provinces are small dual crop-livestock holdings, covering less than 5 hectares.[52] The sector drives rural development, employment, and contributes significantly to food processing and local and export markets. Pre-earthquake, these provinces accounted for 16.9 percent of agricultural land, 14 percent of cattle, 18 percent of small ruminants, and 12 percent of food businesses. Some affected areas coincide with the country's poorest and least developed regions, primarily rural areas where agriculture is the main income source for the poorest communities.

[49] https://climateknowledgeportal.worldbank.org/country/turkiye/trends-variability-historical
[50] Under a high emissions scenario, a projected increase of 2.7°C in mean annual temperature and a 3 percent decrease in precipitation by 2050 could have detrimental effects on agricultural activities. A temperature rises of 2°C would likely result in a 58 percent increase in agricultural drought frequency and a 2 percent extension in drought duration.
[51] https://thinkhazard.org/en/report/249-turkey/
[52] Farmer Registry System 2019

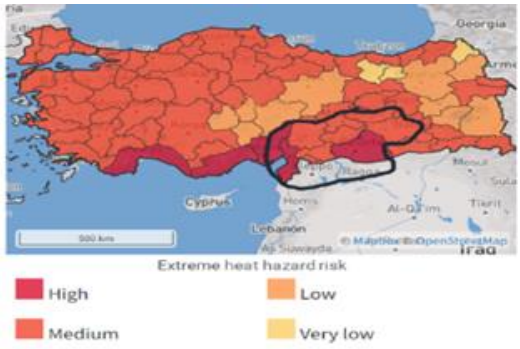
Figure A3.1(a): Principal climate and natural hazard risks in Türkiye and earthquake-affected provinces, A3.1(b): Agricultural production areas[53]

(a) Distribution of principal climate risks

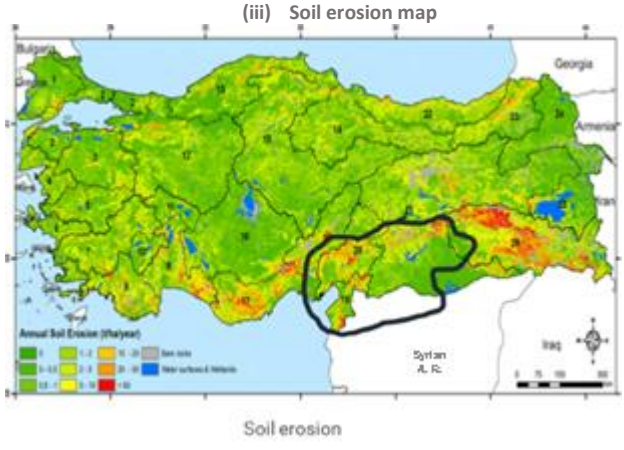
(i) Drought harzard map based on Drought Hazard Index



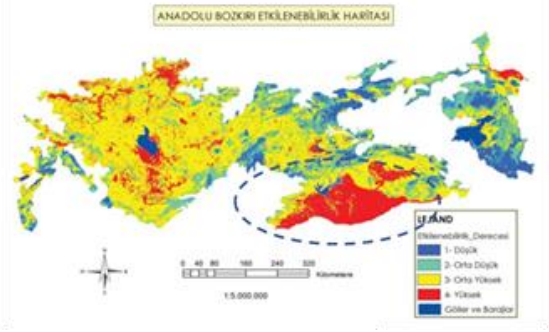
(ii) Extreme heat hazard risk map



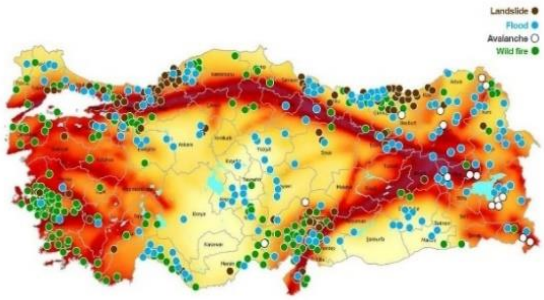
(iii) Soil erosion map



(iv) Anatolian Steppes climate vulnerability map (circled overlap with earthquake-affected area, red highest risk)



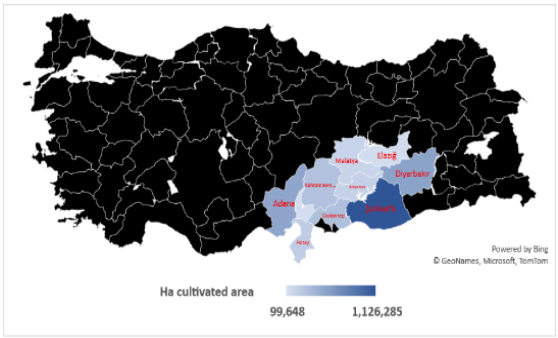
(v) Distribution of Natural Hazards occurrences in 2021



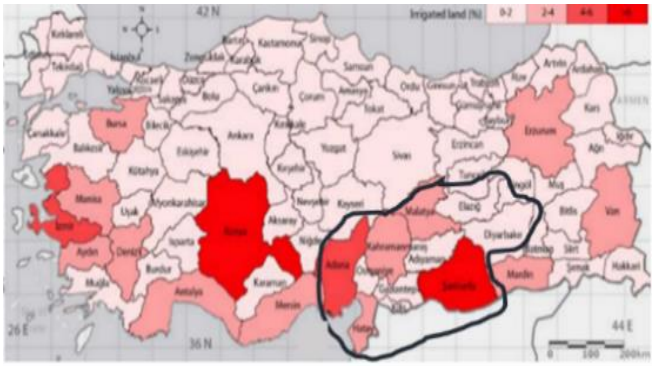
[53] Source: Figures A3.1(a) (i) and (ii): ThinkHazard extreme heat risk https://thinkhazard.org/en/. Figure A3.1(a)(iii): Cilek, Ahmet & Kirkby, Mike & Irvine, Brian & Donmez, Cenk. (2020) Spatial and temporal evaluation of soil erosion in Türkiye under climate change scenarios using the Pan-European Soil Erosion Risk Assessment (PESERA) model, Environmental Monitoring and Assessment. 192. 1-22. Figure 3.1(a) (iv) Ecosystem-based Adaptation (EbA) Strategy for Anatolian Steppes Ecosystems 2022-2026. Figure A4.1(a) (v) AFAD Disaster Risk Map https://www.afad.gov.tr/afet-analiz. Figure A3.1(b) (i), (iii), (iv): Turkstat 2021 agricultural and livestock data. Figure 34.1(b) (ii): Dabanlı, İsmail. (2018) Drought Risk Assessment by Using Drought Hazard and Vulnerability Indexes.

(b) Landscape production characteristics

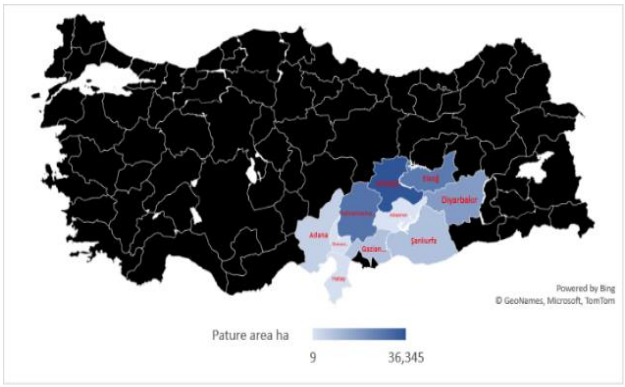
(i) Agriculture culvtivated area (Hectareas (Ha))



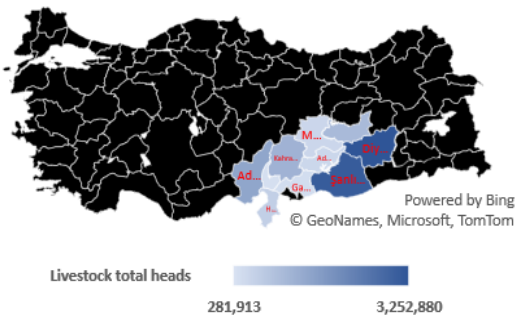
(ii) Irrigation land (%)



(iii) Pasture area (Hectareas (Ha))



(iv) Livestock total head numbers



4. **Pastureland in Steppe ecosystems is crucial for supporting livestock communities, including transhumance communities, but it suffers greatly from drought conditions.** Livestock rearing in earthquake-affected areas relies heavily on extensive farming practices for ovine and cattle, utilizing rangelands and harvested residues from agricultural areas for feed. Drought leads to yield losses and reduced availability of forage and agricultural residues, directly impacting livestock production. Climate change and human activities have disrupted steppe pasture ecology, reducing its forage production capacity. More frequent and severe droughts, along with extreme heat events, have decreased milk and beef productivity, affecting local food supplies and small herders' livelihoods. Additionally, some earthquake-affected areas, like Hatay, Osmaniye, Adana, Kahramanmaras, Malatya, and Elazig, face high vulnerability to erosion. Climate change is expected to worsen land degradation by intensifying soil erosion, depleting soil nutrients and fertility, ultimately impacting productivity and soil carbon storage capacity**.**

5. **Türkiye has acknowledged the climate vulnerability of its agriculture sector, evident in its policy documents.** As indicated in paragraphs 11 and 18 (PAD Sectoral Context Section), policies aim to bolster the sector's resilience to droughts by advocating enhanced irrigation practices, improved water resources management and promoting adaptation measures, such as crop rotation, agrotechnical development of forecasting, and soil conservation practices to reduce drought, water, and wind erosion.[54]

[54] The updated 2023 NDC places specific emphasis on promoting Ecosystem Based-Adaptation.

Table A3.1 Climate vulnerability and impacts on agriculture in earthquake-affected provinces.

Climate change vulnerability	Impact		
	Cultivation	*Livestock*	*Livelihood*
Drought/Water Scarcity/Seasonal Water Variability	- Reduced crop yield, higher risk of losses of rainfed crops - Low quality of crop outputs - Higher risk of land degradation and erosion.	- Reduced: o Forage quantity & quality o Crop residues for feed o Water availability for animals in grazing areas - High risk of erosion/degradation in grasslands.	- Reduced productivity of crop and livestock products mean less income. - Increased food prices impacting economic access to key staple crops and protein and less physical availability leads to food insecurity.
Extreme Heat	- Increased irrigated water demand. - Plant stress, reduce photosynthesis.	- Increased animal physiological stress - Higher risk of animal diseases and mortality.	
Natural Hazards (Particularly earthquake)	- Damage and loss of agricultural with some events more widespread such as earthquakes and others more localized i.e., floods & others.	- Loss of animals and livestock infrastructure - Higher risk to animal disease and losses of time sensitive products i.e., milk and beef.	

Climate Change Mitigation

6. **Türkiye's ambitions a 41 percent reduction in GHG by 2030 -unconditional- compared to business-as-usual (BAU).** Agriculture contributes 12.8 percent of GHG emission in Türkiye, with enteric fermentation as the most significant contributor, comprising 47 percent of the sector's emissions, followed by manure management at 12.8 percent.[55] Agriculture is responsible for 62.4 percent (1,500 kt) of total methane emissions in Türkiye.

7. **Türkiye's main mitigation policy in the agriculture sector as highlighted in the 2023 updated NDCs covers a range of actions focusing on livestock and fertilizer management, but the country is also investing on a set of complementary mitigation options.** Relevant mitigation options on livestock and fertilizer management include: (i) Regulating animal feed rations and enhancing feed quality; (ii) Enhancing practices in cattle breeding, feeding and regulation of the number of animals, (iii) Improvements of methane reduction from proper manure management; (iv) Improving and reducing the use of nitrogen fertilizers; (v) Train farmers on new methods and technologies among others. There are important mitigation opportunities also in the sector linked with the conservation of natural resources, particularly soil health, through improved pasture and land management practices as well as support to low carbon transition including energy consumption in the sector.[56]

8. **Summary of results of the GHG analysis**: The anticipated climate Co-Benefits from mitigation contributions are summarized in Table A3.3. The assessment of GHG impacts generated from the project are based on the Ex-Ante Carbon-balance (EX-ACT V9) with refinement emission factors for enteric methane to reflect improvements in grazing quality and quantity. The project implementation period is 6 years, with a 14-year capitalization phase for carbon mitigation, aligned to the EFA. The analysis indicates that over a 20-year period, the project generates a net carbon sink of around **4.95 million** tCO_2-eq compared to the baseline situation. The project will avoid/reduce **247,554** tCO_2-eq per year as summarized in Table A3.3.

[55] Türkiye. 2023 National Inventory Report (NIR). https://unfccc.int/documents/627786
[56] World Bank Türkiye CCRD Report

Table A3.3: Summary of Results from Mitigation co-benefit potential from Ex-ante GHG assessment

SC	*Invest. allocated US$ Mil*	*Without project*	*With project*	*Balance (net)*	*Average annual*	*Brief overview of assumptions in the analysis*[57]
		tCO_2eq entire period			*tCO_2eq*	
SC 1.1	80	223,316	174,291	-49,024	-2451	Crop area 9,000 ha improved irrigation. Without project low carbon input. With project medium carbon input. Fertilizer reduction 5% with project compared to without project. Pumps use solar energy and displace grid electricity.
SC 1.2	30.6	355,927	305,388	-50,540	-2,527	Cropland mechanized area 15,000 ha. With project Medium Carbon input and reduced tillage compared to low carbon input and full tillage without project. Fertilizer reduction 5% with project compared to without project. Fuel efficiency use[58] with project increased by 15% for equipment for preparation, cultivation & fertilization due to tailored machinery capacity& operational training.
SC 2.1	76.7	9,096,601	8,163,213	- 933,389	- 46,669	The livestock population increased by 10% to reflect pre-earthquake recovery levels according to the EFA. Enteric fermentation methane emission and manure management factors adjusted according to values proposed in the Türkiye resilient and net zero development pathway assessment.[59] Manure management in barn set at 20%, without project considered solid storage unconfined piles vs dry lot in paved confinement area with project. Solar energy fences and vaccine cooling estimates from literature. EE of equipment supported by the project was assumed to be 15% compared to older used equipment.
SC 2.2	50	12,888,319	8,970,392	-3,917,927	-195,896	Improved grasslands in 240,000 ha initial status high intensity grazing lands and continuing like this without project. With project increase grassland carry capacity preventing degradation. Drainage and other civil works to rehabilitate severe degraded grasslands 60,000 ha to non-degraded status. Enteric fermentation methane emission factor adjusted according to values proposed in the Türkiye resilient and net zero development pathway assessment.
TOTAL	**237**	**22,654,163**	**17,613,283**	**-4,950,880**	**-247,554**	

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[57] Refer to the technical report and Ex-Act files for more technical details.
[58] Based on data for fuel uses for farm operation source: Downs, H.W. and Hansen, R.W., Estimating Farm Fuel Requirements no. 5.006, 2006. Colorado State University.
[59] Low Carbon Pathways Towards 2053 Modeling Exercise for the AFOLU sector commissioned by the World Bank in Türkiye, which assumes improvements in enteric fermentation and manure management.

Table A3.2: Summary of Indicative Climate Co-Benefits and GHG Assessment Assumptions

C/SC	Adaptation	Mitigation
C 1: Enabling Service Provision for a Climate Resilient Agriculture Sector Recovery		
SC1.1. Investing in Irrigation for Enhanced Water-Efficiency and Climate Resilience	Conversion of earthen to closed irrigation channel and trainings will increase resilience of 2,500 farmers to cope with water fluctuations from less precipitation and increase drought variability by ensuring that increased water demands from crops due to higher temperatures are met and from increase efficiency in crop irrigation, safeguarding productivity.	Effective management of irrigation systems lowers the energy required to pump water. Use of energy efficiency pumps and solar energy panels displaces fossil fuels and reduces GHG emissions. Improved water management will increase soil carbon compared to rainfed conditions by as much as 5% in the long term.[60]
SC1.2. Promoting Common Machinery Utilization Models for Improved Access to Mechanization	Appropriate farm machinery will enhance efficiency & timeliness of agricultural operations to cope with extreme weather events & climate-related shocks increasing resilience of farmers to crop losses. Training on conservation practices improve soil health and increase soil water filtration to reduce farmers vulnerability to drought. Joint machinery models will lead to more farmers increasing their adaptation capacity as more farmers have access to farming equipment and sustainable mechanization training/knowledge.	Reductions in fuel consumptions will be achieved by (i) tailoring and sizing farm machinery to crop production process, (ii) deploying more efficient and digitally- farm machinery which can lead to 35-40% less fuel per ton of crop produced and (iii) training of machine operators and appropriate maintenance. Training on conservation farming practices enhances soil carbon sequestration.
C 2: Supporting the Climate-Smart Recovery of the Livestock Sector		
SC2.1 Recovering the Productive Capacity of Livestock Farmers and Enterprises	Shelter structures i.e., barns, pens and sheds reduce exposure of animals to extreme heat, preventing heat stress, increasing resilience of animals to diseases, and improving productivity. Climate smart shelter design featuring adequate space to avoid overcrowding, sufficient air circulation and appropriate insulation, water troughs etc. ensure optimal animal cooling conditions. . Silage production and processing will help farmers cope with decrease grazing forages due to droughts. Training programs on CSA-livestock practices are to contribute to efficient herd management and reduced emissions.	Investing in energy efficient in barn i.e., use of LED lighting and in feed equipment and animal vaccines storage and distribution in accordance with international standards together with investments in solar energy to electrify barns, fencing and vaccine cool storage in accordance with national energy guidelines will reduce dependence on grid electricity and fossil fuels. Manure management in barns, milk parlors and poultry under aerobic conditions reduces methane emissions. Improved silage processing increases supplementation in animal feed to help reduce enteric fermentation. Overall, the combined reduction of GHG emissions and expected productivity gains reduces carbon intensity of animal products.
SC 2.2 Restoring Pastureland for Enhanced Livelihoods and Resilient Animal Production Systems	Rehabilitating natural pasture areas with native locally climatically adapted species will increase pasture's climate resilience and reduce climate vulnerability of livestock farmers/enterprises. Improved pasture drainage and water filtration capacity will increase resilience to droughts. In grazing areas constructions of (i) "cool off" shaded will reduce heat stress of grazing animals and (ii) water troughs will ensure that water needs for animals are met within short distances reducing animals' vulnerability to heat and droughts. Improving shepherds' living conditions while grazing animals will reduce their exposure to climate factors.	Sustainable management of pastures will restore soil's carbon storage capacity and increase availability and high-quality of forage, reducing enteric methane production. Solar panels installed throughout pastures meet energy needs for water pumping for animal troughs displacing fossil fuels and for shepherd access to electricity for radios, charging phones etc.

**Based on GIZ (2022)* What is Climate Smart Agriculture? At https://www.giz.de/en/downloads/ICCAS_What%20is %20Climate%20Smart%20Agriculture_FS_EN_2018. pdf on 2

[60] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8362179/#:~:text=Overall%2C%20irrigated%20agriculture%20increased%20SOC,10%20cm%20depth%20(14.8%25.