Food and Agriculture Organization of the United Nations

ÇEKEREK

BASIN REHABILITATION PROJECT

FEASIBILITY REPORT

MARCH, 2021

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DEFINITIONS & ABBREVIATIONS

DSI	General Directorate of State Hydraulic Works
EBDA	Eastern Black Sea Development Agency
EBDP	Eastern Black Sea Development Plan
EIA	Environmental Impact Assessment
FAO	Turkey Office of Food and Agriculture Organization of the United Nations
FRS	Farmer Registration System
GDFRA	General Directorate of Forestry and Rural Affairs
GDM	General Directorate of Meteorology
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
ISKUR	Turkish Employment Agency
IUCN	International Union for Conservation of Nature
IWMP	Integrated Waste Management Plan
MoAF	Ministry of Agriculture and Forestry
MRE	Mineral Research and Exploration
NGO	Non-Governmental Organization
GDF	General Directorate of Forestry
OHS	Occupational Health and Safety
ORBIS	Forestry Information System
OSKI	Ordu Water and Sewerage Administration
R&D	Research and Development
SES	Socioeconomic Status

SME	Small and Medium Size Enterprises
SPA	Special Provincial Administration
TEPAV	Economic Policy Research Foundation of Turkey
TOBB	Union of Chambers and Commodity Exchanges of Turkey
TRGM	General Directorate of Agricultural Reform
TULIP	Turkey Resilient Landscape Integration Project
TurkStat	State Statistical Institute
UN	United Nations

PROJECT SUMMARY

a. Project ID Card

i. Main Project Details

Project Title/Investment Schedule (if any) Project No.	Çekerek Basin Rehabilitation Project
Sector/Sub-Sector:	AGRICULTURE/ Irrigation-Plant Production-Stockbreeding–Forestry TRANSPORTATION/ Road Transportation
Project Beneficiaries:	Ministry of Agriculture and Forestry- General Directorate of Forestry, General Directorate of Agricultural Reform, General Directorate of State Hydraulic Works Ministry of Interior - Special Provincial Administrations
Location:	Akdağmadeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Saraykent, Sorgun and Merkez districts, Yozgat province; Yıldızeli district, Sivas province; Artova, Sulusaray and Yeşilyurt districts, Tokat province; Alaca and Ortaköy districts, Çorum province
Implemented By:	Ministry of Agriculture and Forestry, General Directorate of Forestry; General Directorate of State Hydraulic Works General Directorate of Agricultural Reform Yozgat Governorate (Special Administration) Çorum Governorate (Special Administration) Tokat Governorate (Special Administration)
Cost and Main Items:	669.946.974 TRY Green and Sustainable Rural Development Activities Climate Resilient Grey Infrastructure Activities İnstitutional Coordination, Project Management Sustainability and Monitoring-Evaluation Activities

Projected Outputs	Rehabilitation and sustainable use of natural resources in the basin, Improvement of socioeconomic status of rural people, Improvement of gender equality, Strengthening of inter-institutional coordination and capacities, Identifying of pre-project situation and post-implementation improvements and presenting of quantitative data by means of monitoring and evaluation works.
Overall Schedule and Starting/End Date:	The project will start in 2021 and finish in 2027. The term of the project shall take effect after entering into a Loan Agreement with the World Bank for external funds following the inclusion of the Project into "the Investment Programme for 2021" and the publication of the programme.

ii. Purpose and Rationale

The greatest problems currently faced by Çekerek Basin are the unsustainable use of natural resources, decline in plant and animal production, inability to use nature's potential to the fullest, inadequate agricultural development, and rural migration.

The aim of the project is to contribute to environmental protection and poverty reduction in the basin by means of ensuring sustainable use of flora, soil, and water resources as well as improving livelihoods with various income-generating activities.

iii. Terms of Reference

This feasibility report covers a feasibility study the format and scope of which were designated by the Circular of the Presidential Office No. 2019/21 to analyze the feasibility of the sub-projects and activities planned to be carried out in Çekerek Basin to achieve the goals set out in the aforementioned subtitle and the purpose of the project, and analyze if their outcomes can help achieve the goals and purpose.

iv. Association with long- and short-term goals

Based on the information, documents and analyses set out in the analytical table of the project's conformity with the high-level policy documents presented in Section 1.1. and Annex-2, the outcomes of the outputs of the sub-projects to be executed under the Project would not only conform to the eleventh five-year development plan and the objectives and policies concerning the subject of the project set out in strategic plans of

the project partners but also contribute to the fulfillment of the objectives and policies on the basis of Çekerek Basin and at the national level. The analyses, which were performed to identify the correlation and conformity with the main policy documents, are presented in the analytical tables set out in Section 1.1 and Annex-2.

The state of the project in terms of realizing development plans and sectoral plans was analyzed in Section 1.1 on the basis of the following: Eleventh Development Plan (2019-2023), Medium-Term Programme (2020-2022), Ministry of Agriculture and Forestry Strategic Plan (2019-2023), General Directorate of Forestry Strategic Plan (2019-2023), General Directorate of State Hydraulic Works Strategic Plan (2019-2023), Çorum Special Provincial Administration Strategic Plan (2020-2024), Tokat Special Provincial Administration Strategic Plan (2020-2024), Yozgat Special Provincial Administration Strategic Plan (2020-2024), TR72 Regional Plan – Kayseri, Sivas, Yozgat (2014-2023), TR83 Regional Development Plan (Amasya, Çorum, Samsun, Tokat), Republic of Turkey Climate Change Action Plan (2011-2023), National Strategy and Action Plan to Combat Desertification (2015-2023), National Basin Management Strategy (2014-2023), National Rural Development Strategy (2014-2020), National Strategy for Regional Development (2014-2023), Turkish National Forestry Programme (2004-2023), World Bank's Turkey Forest Policy Note -2017, Turkish National Water Plan (2019-2023). Also, it was determined that it would ensure that the goals related to the basin are achieved and contribute to the achievement of the goals on the national level.

v. Financial Sources and Plan

The project is going to be financed by a loan to be obtained from the World Bank with a term of 25 years (Libor+1 = 1.44%) and no payment for 6 years, and beneficiary contributions for income-generating projects to some extent and public funds. The loan to be obtained has been designated as USD 64.763.037 (TRY 496.855.546). It is estimated that the loan will be paid back over the course of 19 years starting from year 7.

vi. Analytical Outcomes of Project

	No-Project Case	**Maintenance & Repair/Expansion**	**Second Alternative**	**Alternative**
Investment Cost	809.256.551	144.208.763	169.104.390	2.683.638.439
Net Present Value (Commercial/Economic)	771.232.385	137.432.892	161.158.760	2.573.853.220
Internal Rate of Return (Commercial/Economic)	--			1,208693%
Time Frame for Repayment (Commercial/Economic)	77			2525

	No-Project Case	Maintenance & Repair/Expansion	Second Alternative	Alternative
Cost-Benefit Ratio (Commercial)	3,30%3,30%		3,30%3,30%	3,30%3,30%
Cost-Benefit Ratio (Economic)	4,46%4,46%		4,46%4,46%	4,46%4,46%
Major Non-Monetized Benefits and Costs	269.931.335		56.405.566	900.848.627
Non-Numerical Major Considerations	115.684.858		24.173.814	386.077.983

vii. Survey Details

✓ Prepared by and Date of Preparation:

Department of Soil Conservation and Watershed Rehabilitation, General Directorate of Forestry, Ministry of Agriculture and Forestry

✓ Contact Person/Contact Details

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b. Rationale of Project

The problems and project rationales identified as a result of the needs analysis set out in Section 1.6 are summarized as follows:

- Flood and overflows occurring within the basin,
- Shortage in sustainable use of natural resources especially forests,
- Decline in vegetative production and animal breeding
- Failure to fully realize the natural potential,
- Migration,
- Deficiencies in development of agriculture

The target group of the project is the local people (forest and non-forest village community), communities of the local towns and districts living in the project basin, and it is intended to solve the aforementioned problems.

c. Description and Scope of Project

General Purpose of Study: The aim of the project is to contribute to environmental protection and poverty reduction in the basin by means of ensuring sustainable use of flora, soil, and water resources as well as improving livelihoods with various income-generating activities.

Specific Objective of the Project: To improve livelihoods and achieve the average welfare level in the country by income-generating activities for the people of Çekerek Basin to be supported by rehabilitated natural resources, sustainable land use, landslide and flood

control and adequate infrastructure for water, sanitation and local mobility.

Type of the Project: It is an Integrated Basin Rehabilitation Project.

Components of the Project:

Component 1: Green and Sustainable Rural Development

Component 2: Climate-Resilient Gray Infrastructure

Component 3: Institutional Coordination, Project Management and Sustainability

Size of the Project: Çekerek Basin, where the project would be carried out, covers a total of 14 districts including 8 districts in the province of Yozgat, 1 district in the province of Sivas, 3 districts in the province of Tokat and 2 districts in the province of Çorum. The basin has 876.551 hectares of land and a population of 226.000 people.

Term of the Project: 7 years

Location: Yozgat province Akmağdeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Saraykent, Sorgun and Merkez districts; Tokat province Artova, Sulusaray and Yeşilyurt districts; Sivas province Yıldızeli district; Çorum province Alaca and Ortaköy districts

Technical Content of the Project: The project consists of sub-projects to be run by the General Directorate of Forestry, Special Provincial Administrations, the General Directorate of State Hydraulic Works and the General Directorate of Agricultural Reform. To provide convenience and achieve efficacy in planning and implementing the project, some themes have been introduced based on components and sub-components established after the activity/sub-project proposals of the organizations were reviewed in line with the objectives of the Project. The titles of the sub-projects, their outputs and characteristics are presented in the table of the Annex-1.

Component 1: Green and Sustainable Rural Development

Sub-Component 1.1: Upper basin landscape and rural livelihoods (General Directorate of Forestry)

1.1.1. Erosion, landslide and flood control works

1.1.2. Climate-smart pasture management

1.1.3. Forest rehabilitation, protection and sustainable management

1.1.4. Income generation and livelihood diversification for forest villages

Sub-Component 1.2: Climate-smart agriculture and sustainable value chains (General Directorate of Agricultural Reform)

1.2.1. Sustainable and climate-smart agricultural practices

1.2.2. Income generation and livelihood diversification for rural areas

1.2.3. Sustainable agricultural value chains

Component 2: Climate resilient grey infrastructure

Sub-component 2.1: Resilient infrastructure (Special Provincial Administrations)

2.1.1. Reservoirs

Sub-component 2.2: Resilient infrastructure for disaster risk and water security (General Directorate of State Hydraulic Works)

2.2.1. Irrigation works

2.2.2. Multi-purpose reservoirs

2.2.3. Resilient infrastructure for flood and sedimentation control

Component 3: Institutional Coordination, Project Management and Sustainability

Sub-Component 3.1: Technical assistance and institutional capacity building for integrated landscape management

Sub-Component 3.2: Project management, environmental and social management and monitoring and evaluation

Inputs and Outputs of the Project: Çekerek Basin Rehabilitation Project includes various types and a large number of sub-projects ranging from the development of natural resources to the improvement of livelihoods. The details on the project themes, their inputs and outputs are presented in the Table of the Annex-1 under the columns of "Sub-Project Title" and "Project Characteristics".

- Rehabilitation and sustainable use of natural resources in the basin,
- Improvement of socioeconomic status of rural people,
- Improvement of gender equality,
- Strengthening of inter-institutional coordination and capacities,
- Identifying of pre-project situation and post-implementation improvements and presenting of quantitative data by means of monitoring and evaluation works.

Target Group of the Project: The target group of the project is the people of villages (forest and non-forest), towns and districts situated within the project basin.

Project Owner/Implementer: The project is going to be implemented by other implementing organizations under the coordination of the General Directorate of Forestry affiliated to the Ministry of Agriculture and Forestry.

d. Analysis Results of Feasibility Study

As a part of the feasibility study, the analytical methodologies and approaches were adopted as summarized below to analyze and make an assessment of the project. This set of approaches should be adopted for the investment and operational phases of the sub-projects, too.

Integrated basin management at the landscape level is an approach to coordinate the sustainable management and planning of natural resources at the basin level with the involvement of all partners. This approach entails making a plan to respond to the expectations of all segments of the society within the basin. To adopt this approach for the investment and operational phases of the project, capacity building and technical assistance activities have been programmed under the Component 3. To this end, "the National Integrated Basin Landscape Development Strategy" and "Çekerek Basin Master Plan Including a Micro-Basin Plan" have been drawn up in an effort to effectively implement the programmes and sub-projects of other components and promote the achievement of expected outputs and achieve the complementarity and consistency of development responses to the basin in the first year of implementation of the project to be implemented for the first time with multiple organizations.

The project cycle management and system approach is an important analytical and implementation instrument for any project. To be kicked off by a needs analysis for the stakeholders, the project cycle involves solutions to respond to needs, goal-oriented planning and implementation, assessment or verification of impacts and achievement of sustainability and their interactions with one another to implement the investment and operational phases based on a systematic management model. The systematic approach will enable to prevent problems thanks to feedbacks and measures and thus achieve the objectives as a result.

With regards to the process of transition to programme-based budgeting, the budget for 2021 will be drawn up on a programme basis under the Approval of the Presidential Office No. 67 of 8/7/2019. Accordingly, programmes, sub-programmes and activities will be put to use based on the analytical budgeting classification of the public agencies. The classification of components, sub-components, thematic groups and projects, which was adopted for this feasibility study concerning the project, can be easily adapted to the current Programmes and Sub-Programmes upon the approval of the Presidential Office.

Result orientation is an important and modern approach to be considered for any feasibility study. A result-oriented approach, which is a principle to set modern performance indicators for any feasibility analysis, has been adopted in a way to follow the hierarchy of project, outputs, outcomes, objectives and goals as a result. This methodology should be adopted for the investment and operational phases, too.

All the analyses and assessments made as a part of the feasibility study are based on widely-acknowledged methodologies. The methodologies have been described under each title analyzed and assessed. The selection of methodologies was based on the sources set out on the website of the Presidency of Strategy and Budget and the EU practices.

The objectives and goals of the project depend on the achievement of sustainability for the operational phase of the sub-projects. While all instruments of sustainability were utilized for the feasibility study, the activities to provide sustainability in the investment and operational phases of the projects to be run under the Component 3: "Institutional coordination, project management and sustainability" are to be executed. To this end,

sustainability is to be achieved in economic, environmental and social aspects as a process of growth in which the current needs would be met without adversely affecting the needs of the next generation.

The feasibility report relies on the feasibility and implementation documents of the past basin rehabilitation projects. Some comprehensive efforts were exerted in a hierarchical structure based on components, sub-components and thematic groups, and their outcomes were incorporated into the feasibility study. The structure and the efforts were built on modern approach methodologies and principles and procedures of management and coordination required by the fact the project is to be a basin project, and on other requirements.

The outcomes of the feasibility study, which was conducted based on the aforementioned approaches and methodologies, should be reviewed in environmental, social and economic aspects. As thoroughly noted in the relevant sections, the analytical results show that the project is feasible from the environmental, social and economic perspectives. In addition, the analyses and assessments of conformity with high-level policy documents based on the feasibility format and methodologies adequate for the requirements of the Circular of the Presidential Office No. 2019/21, and the analyses over adequacy of the institutional structure and capacity of the project partners, the analyses over challenges posed by sub-projects and response to needs and the outcomes of all other analytical, comparative and investigative analyses set out in the feasibility report point to the fact that the project is feasible.

e. Project İmpact

The environmental, social and economic impacts of the project are summarized in the following paragraphs.

Environmental Impacts

The projects proposed by a variety of organizations and agencies as a part of the Çekerek Basin Rehabilitation Project may cause undesired adverse environmental impacts that would lead to economic and social consequences. The methodology of environmental analysis was adopted in accordance with the EIA Regulation, the Strategic EIA Regulation and other regulations introduced in line with the Environment Law. Regardless of being subject to the EIA Regulation, all positive and adverse impacts of all the projects on the environment during the investment and operational phases and all reduction measures have been established under 11 themes in consideration of the characteristics of each project based on an analytical methodology. The environmental impacts will be within acceptable limits as long as the reduction measures are adopted and effectively supervised by the relevant authorities and organizations. The impacts of the construction phase will be temporary. The impacts of the operational phase will be permanent and long term while they can be avoided, minimized or mitigated in an effective way depending on the establishment of an adequate environmental and social management system. The reduction of environmental and water pollution, rehabilitation of forests and mitigation of pressure on

forests as a result of saving woods to burn, and protection of local lands from erosion and flood are the positive environmental impacts of the project.

Social Impacts

In the construction phase, all the projects may be expected to prevent access to roads for the local community and put human health and animal welfare at risk unless safety measures are taken. In addition, infrastructure and cultural heritage are at risk during the construction efforts. At this point, there is a risk for potential conflicts between workers and local communities including abuse of women. However, the project will have a positive impact in the medium term on public health and safety with natural disasters taken under control. The improvement of the living standards will facilitate access to education and healthcare services. The project, which is to improve livelihoods and infrastructure, is expected to offer positive socio-economic contributions to the local community. The projects are expected to have a positive impact on the living quality of poor forest communities who are one of the top vulnerable groups. Diversification in agriculture and animal breeding is expected to lead to industrial growth and thus create jobs. Increased job opportunities will pave the way for the integration of women, vulnerable groups and high number of young unemployed people in the Basin to the economy. All projects are expected to make a long-term impact on the basin in a way to reduce emigration, which is highly common right now. A need for new investments may arise as population and tourism growth puts more pressure on natural resources and infrastructure. Apart from their positive impacts on the local communities, they are expected to improve the employability and transportation/accommodation conditions of seasonal agriculture workers. Almost all of the socio-economic indicators of the local communities (including demographics, life quality, financial, competitive and innovative capacity, healthcare, education and employment) are below Turkey's average, and the project investments are expected to raise the socio-economic level of the Basin in the long term.

Economic Impacts

The impacts of consolidated public projects are multilateral and comprehensive. The impacts of sub-projects may vary by extent and duration depending on their type. Subject to the feasibility study, the projects to improve livelihoods of the local communities can make an impact in the short term. In the short term, they are also expected to reduce emigration, improve living standards and boost the agricultural productivity. With the infrastructure projects commissioned, it will be possible to make an assessment of longer-term impacts. For instance, road construction and rehabilitation projects will strengthen the commercial and economic ties of the basin with the rest of the country and make it more affordable to sell local agricultural products to other markets. In the same vein, reservoir and disaster prevention projects will improve the agricultural productivity and reduce costs. This will help the local products penetrate into other markets thanks to their competitive price. To this end, Çekerek Basin Rehabilitation Project includes short- and long-term outcomes that financially and commercially leverage one another with its sub-projects.

1. DEFINITION AND SCOPE OF PROJECT

1.1. Project's Compliance to Policy Documents

The methodology adopted to analyze and make an assessment of the project's conformity with the policy document was built on "the Strategic Planning Guideline for Public Administrations" for terms and procedures and on "the Programme-Based Performance Budgeting" and other publications released on the website of the Presidency of Strategy and Budget. The correlation between the project and policy document has been established based on a match of subjects and hierarchy between the outputs and outcomes of the sub-projects to be executed under the components of the project and priorities, objectives and goals of the policy documents. Having established the correlation, the outputs and outcomes of the sub-components, which are thematic groups of sub-projects, were reviewed for their conformity with the priorities, objectives and goals of the policy documents and they were found to be in conformity. Based on this methodology, an output is a final product and service manufactured and provided as a result of any activity carried out by a public organization using an input to some extent while an outcome is the expected impact of public services on the target group.

1.1.1. Methodology

The analysis and assessment of the project's conformity with the policy documents were built on the following outlined methodology:

- Establishing policy documents to be taken into consideration,
- Establishing priorities, objectives and goals of the policy documents,
- Setting outputs and outcomes of sub-projects under the components of the project,
- Making an assessment of whether the outputs and outcomes foster the priorities, objectives and goals,
- Defining conformity with the policy documents.

The five-year development plans drawn up and implemented by Turkey boost the country's productivity in every aspect and thus set forth an economic and social development process in which the country produces more values to become internationally competitive based on its domestic technological breakthrough. Development plans are also focused on improving competitiveness and efficiency. As a result, macro-level policies and objectives of the development plans must be taken into consideration for any level of plan and project implementation. The strategic plans of the public agencies are management instruments that set their priorities and sub-goals to adopt the policies in the five-year development plan and achieve the macro-level goals. The methodology, the steps of which were mentioned above based on the hierarchy, was fully adapted to the Eleventh Development Plan (2019-2023) and the strategic plans of the GDF, TRGM, DSI, Special Provincial Administrations that serve as project partners. The priorities, objectives and goals of other development plans and sectoral policy documents that overlap with that of the sub-components of the project were determined and their conformity was analyzed in general terms on the basis of thematic groups.

1.1.2. Main policy documents

The list of high-level documents to be taken into consideration for the analysis and assessment of the project's association and conformity with the policy documents has been drawn up based on the Strategic Planning Guideline for Public Administrations and other documents released on the website of the Presidency of Strategy and Budget and it is as follows:

1. Development plans and strategic plans
   - Eleventh Development Plan (2019-2023),
   - Mid-Term Programme (2020-2022),
   - Strategic Plan of Ministry of Agriculture and Forestry (2019-2023),
   - Strategic Plan of General Directorate of Forestry (2019-2023),
   - Strategic Plan of General Directorate of State Hydraulic Works (2019-2023),
   - Strategic Plan of Çorum Special Provincial Administration (2020-2024),
   - Strategic Plan of Tokat Special Provincial Administration (2020-2024),,
   - Strategic Plan of Yozgat Special Provincial Administration (2020-2024),,
2. Sectoral Strategy Plans
   - TR72 Regional Plan – Kayseri, Sivas, Yozgat (2014-2023),
   - TR83 Regional Development Plan (Amasya, Çorum, Samsun, Tokat),
   - Climate Change Action Plan of the Republic of Turkey (2011-2023),
   - National Strategy and Action Plan to Combat Desertification (2015-2023),
   - National Basin Management Strategy (2014-2023),
   - National Rural Development Strategy (2014-2020),
   - National Strategy of Regional Development (2014-2023),
   - National Forestry Programme of Turkey (2004-2023),
   - World Bank-Turkey Forestry Policy Note-2017,
   - National Water Plan of Turkey (2019-2023).

1.1.3. Priorities, goals and objectives of main policy documents

The conformity of the Eleventh Development Plan and the objectives and policies of the project partners under their strategic plans, which are the main high-level policy documents, with the high-level policy documents of the project presented in Annex-2 was determined in the analytical table.

1.1.4. Outputs and results of sub-projects on the basis of project components

The analytical table on the project's conformity with the high-level policy documents as set out in Annex-2 covers the outputs and outcomes of the sub-projects under the components and thematic groups of the project.

1.1.5. Evaluation of outputs and results in terms of supporting priorities, goals and objectives

The conformity of the outcomes of the outputs of the sub-projects with the high-level policy documents namely the eleventh five-year development plan and the objectives and policies of the project partners set out in their strategic plans has been analyzed based on the following project components and thematic project titles.

Component 1: Green and sustainable rural development

Sub-Component 1.1: Upper basin landscape and rural livelihoods

1.1.1. Erosion, landslide and flood control works

The output of each project in the thematic groups titled "Erosion, landslide and flood control works" that cover sub-projects intended to achieve erosion control and prevent landslides and floods, which is the mandate of the GDF, is presented in the table of the Annex-2. The project outputs of this thematic group will enable to make sure that locations at risk for landslides and floods are climate resilient and sedimentation is under control. At the micro basin level, this outcome will help achieve the objectives and policies of the Eleventh Development Plan to protect agricultural lands and establish infrastructure resilient to natural disasters and climate change. In addition, this outcome will help combat erosion to reduce loss of soil as set out in the strategic plan and improve rangeland rehabilitation efforts.

1.1.2. Climate-smart pasture management

There are pasture treatment projects to be carried out by GDF (General Directorate of Forestry) under the thematic group titled “Climate-smart pasture management”. Outputs specified in the table in Annex-2 will be achieved as a result of the realization of these projects. The project outputs in this thematic group will be restoration and increased functionality of natural ecosystems (forests, pastures). As it is seen, the project outputs within this thematic group ensures that the goals of the Eleventh Development Plan and GDF strategic plan are achieved on a micro basin basis.

1.1.3. Forest rehabilitation, protection and sustainable management

While the thematic group of "forest rehabilitation, protection and sustainable management" includes a variety of sub-projects that the GDF is responsible to execute, their outcomes are identical to the outcomes of the outputs set out in the table of Annex-2. The outcome of the outputs to arise in case the sub-projects in question are executed is the rehabilitation of the forests in the basin, capacity built for sustainability, and reduced the adverse pressure on the forests. This outcome will not only help achieve the objective of the Eleventh Development Plan to boost the contribution of the forests to the economy by means of sustainable forest management but also contribute to the achievement of the strategic goals of the GDF across the country under its strategic plan as set out in the table.

1.1.4. Income generation and livelihood diversification for forest villages

Agriculture is one of the few sectors designated as a prioritized domain of improvement while it is not one of the prioritized sectors in the Eleventh Development Plan. Setting development priorities, objectives and policies of Turkey in a five-year span from 2019 to 2023, the Eleventh Development Plan largely covers objectives such as provision of agricultural aids, protection of small-scale enterprises, revenue improvement for farmers, improvement of income distribution in rural areas, and diversification of agricultural production. The strategic plan of the GDF is also intended to promote the socio-economic development of forest villages, mainstream the wooden ecotourism services, diversify non-wooden forest products and boost production. This also covers most of the projects to be executed under the theme of "income generation and livelihood diversification for forests villages". The outputs of these projects set out in Annex-2 make sure that the livelihoods of the local communities in forestlands are improved in a sustainable way and offer a substantial contribution to the achievement of the objectives of both high-level policy documents at the basin level.

Sub-Component 1.2: Climate-smart agriculture and sustainable value chains

1.2.1. Sustainable and climate-smart agricultural practices

The theme of "sustainable and climate-smart agricultural practices" includes sub-projects for the improvement and diversification of vegetative production and achievement of its sustainability as a result as noted in the table of Annex-2. The outputs of these projects will make sure that vegetative agriculture is improved in a sustainable way. Among the objectives deemed important regarding agriculture, which has been designated as a priority for improvement in the Eleventh Development Plan, are improvement of agricultural productivity by means of good agricultural practices, improvement of efficacy of agricultural aids, establishment of a dynamic structure for cost and income of farmers in a supply-demand equilibrium, improvement of vegetative production, its promotion by branding and marketing, promotion of greenhouse cultivation and introduction of modern greenhouses and regeneration of cultivation lands for crops with high added value such as hazelnut. With regards to sustainability, the strategic plan of the Ministry of Agriculture and Forestry sets the objectives to secure the supply of vegetative products, quantify the potential impacts of the climate change on agriculture and develop recommendations to take measures. It is clear that the aforementioned outcome of the outputs of the projects that are entirely under the responsibility of the TRGM would be a major contribution to the achievement of the objectives and policies, which are set out in the development plan and the strategic plan, for the basin.

1.2.2. Income generation and livelihood diversification for rural areas

All of the sub-projects under the theme of "income generation and livelihood diversification for rural areas" are about animal breeding. The outcome of the outputs of these projects, which are partially set out in the table of Annex-2, is "the improvement of production based on animal breeding in a sustainable way". Animal breeding is one of the top agricultural activities promoted by the Eleventh Development Plan. The plan sets numerical goals per small-scale family business and designates the promotion of animal breeding as an objective. In addition,

the Strategic Plan of the Ministry of Agriculture and Forestry sets forth the expectations to improve animal breeding based on the objectives to secure the supply of animal products, improve income-generation and employment opportunities in rural areas, and diversify the rural economy. This thematic group will also strenghten the rural infrastructure with the projects that will be implemented by Special Provincial Administrations. The outcomes that the sub-projects bring about will help achieve the objectives of the plan and the strategy at the micro basin level and contribute to their achievement at the national level.

1.2.3. Sustainable agricultural value chains

The thematic group of "sustainable agricultural value chains" includes projects focused on value chains that would enhance the added value of agricultural products. These projects will make sure that sustainable agricultural value chains are developed at the micro basin level. The Eleventh Development Plan has set major objectives and policies such as establishment of mechanisms to help agricultural products attain their deserved added value based on sustainable value chains, promotion of activities to safeguard the income of agricultural producers, and incorporation of mechanisms that empower women's entrepreneurship into the scope of value chain development. The projects to be executed under this thematic group will serve as an implementation of the aforementioned objectives and policies at the micro basin level.

Component 2: Climate-Resilient Gray Infrastructure

Sub-Component 2.1: Resilient infrastructure

2.1.1. Reservoirs

There is reservoir projects to be carried out by the Special Provincial Directorates of Yozgat province under the thematic group titled “Reservoirs”. The expected outcome of these projects is that “A resilient infrastructure was developed to ensure safety of drinking water and utility water.” This outcome will help achieve the goals of policy documents such as ensuring that the people have access to safe and healthy drinking and utility water and that the living conditions are enhanced by improving rural infrastructures of the provinces. Besides, it will support such efforts on a national level.

Sub-Component 2.2: Climate-resilient rural road system

2.2.1. Irrigation works & 2.2.2. Multipurpose reservoirs

Projects under the thematic group titled “Irrigation works (and several important irrigation system projects to be conducted by Special Provincial Administrations) and Multipurpose reservoirs”, which will be carried out by DSI (State Hydraulic Works), consist of reservoirs and irrigation systems. Relevant goals of main policy documents include making investments and effectively using water in agriculture to improve irrigation areas. Construction of reservoirs will help achieve these goals in micro basin.

2.2.3. Resilient infrastructure for flood and sedimentation control

One of the thematic groups that include projects that the DSI is responsible to execute is "resilient infrastructure for flood and sedimentation control". To this end, many flood control

structures will be built. The outputs of the projects will make sure that climate resilience is achieved for the prevention of floods and control of sedimentation. This outcome will make a substantial contribution to the achievement of the following objectives set out in the high-level policy documents:

- Protection, effective use and management of agricultural lands.
- Establishment of infrastructure and sustainable production and consumption mechanism resilient to natural disasters and climate change.
- Taking under control any damage caused by floods to settlements and agricultural lands.
- Construction of rehabilitation and flood control facilities in rivers and sustainment of current facilities.

Component 3: Institutional Coordination, Project Management and Sustainability

The component 3, which is under the responsibility of OGM, includes the capacity building and technical assistance program to be implemented in the investment phase regarding institutional coordination, project management and sustainability, and project management, environmental and social management and monitoring and evaluation. A cooperation with Turkey Office of FAO can be made in capacity building and technical topics. The regulations for this component will be detailed in the Project Operational Manual, which is requested by the World Bank.

Sub-Component 3.1: Technical assistance and institutional capacity building for integrated landscape management

Within the scope of sub-component 3.1, institutional capacity building activities will be carried out for the preparation of the institutional framework, the distribution of integrated landscape management and implementation tools, and technical support and integrated landscape management.

Sub-Component 3.2: Project management, environmental and social management and monitoring and evaluation

Within the scope of sub-component 3.2, OGM project coordination unit, central level project implementation units and basin level regional technical support unit will be established; office equipment will be purchased for the project coordination unit and the regional technical support unit; monitoring and impact assessment, grievance and redress and citizen participation, environmental and social protection management, monitoring and investigation activities will be carried out, office and vehicle will be rented, field staff accommodation and subsistences will be covered and annual surveys will be conducted.

1.1.6. Compliance to policy documents

As it is evident from the information, documents and analyses set out in the analytical table of the project's conformity with the high-level policy documents presented above and in Annex-2, the outcomes of the outputs of the sub-projects to be executed under the Project would not only conform to the eleventh five-year development plan and the objectives and policies concerning the subject of the project set out in strategic plans of the project partners but also

contribute to the fulfillment of the objectives and policies on the basis of Çejerek Basin and at the national level.

1.1.7. Compliance to sectoral policy documents

TR72 Regional Plan - Kayseri, Sivas, Yozgat (2014-2023)

Project outputs will help achieve the following goals in TR72 Regional Plan (Kayseri, Sivas, Yozgat):

In the context of competitiveness, Priority Area / Improvement of Traditional Sectors (Agriculture, Stockbreeding, and Mining)

- Ensure that agricultural businesses in the region reach an optimum size, are modernized, and their infrastructure is strengthened so that they become competitive;
- Promote agricultural environment, public health, food quality and hygiene, animal welfare, animal health, plant health, waste management, and good agricultural practices;
- Diversify economic activities for the population that leave rural areas/agriculture in the region;
- Ensure that local products have geographical indication and are branded and commercialized.

In the context of social development, Priority Area / Improvement of Governance with Human Capital, Social Capital, and Institutional Capacity

- Conduct works to reduce outward migration from the region;
- Increase employment opportunities, investigate the reasons for unregistered employment, and take measures to promote registered employment in the region;
- Overcome labor shortage and take necessary measures to prevent employed workers from leaving the labor force in the region.

Priority Area / Improvement of Quality of Life

- Improve disadvantaged groups' social cohesion and participation in social life; develop an approach based on gender equality and equality of opportunity in all areas;
- Conduct works to improve and enhance living conditions in the region; develop the physical, social and cultural infrastructure of the region with an approach that takes into consideration the disadvantaged groups.

Priority Area / Improvement of the Quality of Education

- Develop labor market for the primary sectors in the region by promoting vocational education.

In the context of environment sustainability and sustainable energy, Priority Area / Improvement of Air Quality and Mitigation of the Impact of Climate Change

- Develop cooperation mechanisms and strengthen coordination among local and regional key stakeholders in terms of mitigating climate change and air pollution.

Priority Area / Governance and Efficient Use of Water Resources

- Develop basin-based water and environmental management practices among the regions of various levels;
- Develop information infrastructure for basin-based management of water resources; promote the use of geographic information systems;
- Raise awareness about the controlled and efficient use of water resources; develop infrastructure in a way to prioritize agriculture and industry.

Priority Area / Preservation of Natural Habitats and Cultural Heritage

- Protect endemic species (flora and fauna) and their habitats in protected areas;
- Consider tourism potential of the protected areas in the region, prioritizing National Parks, while preserving their nature;
- Increase protection measures in areas frequently hit by natural disasters;
- Protect cultural heritage and increase its national and international popularity.

In the context of urban and rural infrastructure, Priority Area / Increase Accessibility to the Region and Strengthen Intra-city Transport Infrastructure

- Develop connections between road, rail and air transport in the region;
- Improve coordination among transport institutions.

Priority Area / Build Logistics Capacity

- Improve logistics infrastructure in areas with intense economic activities such as mining, industry, and agriculture.

TR83 Regional Development Plan (Amasya, Çorum, Samsun, Tokat)

Project outputs will help achieve the following strategic goals in TR83 Regional Plan:

- Establish an effective spatial organization;
- Improve human resources and social structure;
- Increase competitive power of businesses in international markets,
- Protect and improve ecologic balance of the environment;
- Strengthen institutional structure.

Climate Change Action Plan of the Republic of Turkey (2011-2023)

The outcomes of the project activities will enable to make locations at risk for landslides and floods resilient to the climate, take sedimentation under control, restore the natural ecosystem

by means of pasture rehabilitation projects and ecosystem reservoirs, rehabilitate forests, develop plant-based agriculture in a sustainable way, construction of irrigation reservoirs, and prevention of floods. This will contribute to the achievement of the following objectives set out in the Climate Change Action Plan of Turkey:

- Limiting the adverse impacts of the climate change caused by land use and changes in forests, pastures, agricultural lands and settlements,
- Making a plan for the sustainable use of water in agriculture,
- Protecting soil and agricultural biodiversity from the impacts of the climate change,
- Integrating adaptation to the climate change into ecosystem services, biological diversity and forestry policies,
- Holistic management of water bodies in water basins for the purpose of adaptation to the climate change.

National Strategy and Action Plan to Combat Desertification (2015-2023)

The restoration of natural ecosystems (forests, pastures), monitoring forest ecosystems, sustainable improvement of livelihoods for local forest communities and execution of the project in cooperation with the World Bank will contribute to the achievement of the following strategic objectives set out in the National Strategy and Action Plan to Combat Desertification:

- Improving the conditions of ecosystems affected and likely to be affected,
- Improving the living conditions of the population affected and likely to be affected,
- Providing domestic and global benefits in efforts to combat desertification, conservation of biological diversity and climate action,
- Mobilizing resources necessary to promote the execution of the agreement based on an effective partnership between the domestic and international actors, and having Turkey lead the bilateral, regional and global collaborations to this end, and share its know-how and experience with other parties,
- Influencing processes and actors and thus mainstreaming efforts to combat desertification and land degradation, and providing assistance and contributions as a functional objective.

National Basin Management Strategy (2014-2023)

The thematic groups, outputs and outcomes of the project will make major contributions to the achievement of the following objectives set out in the National Basin Management Strategy:

- Strengthening the legal and institutional capacity and achieving coordination and cooperation among partners for sustainable management of basins,
- Sustainable management and use of water resources of basins,
- Prevention of degradation of basins and natural resources, and of erosion, and rehabilitation and sustainable use of degraded basins,
- Conservation and management of biological diversity, natural and cultural landscape assets in basins, and sustainment of ecosystem services,

- Raising the awareness of basin communities, improving their quality of life and prosperity, and reducing the pressure on natural resources,
- Integration, improvement and mobilization of mechanisms to prevent and combat natural disasters and their damages as a part of basin management,
- Incorporation of potential impacts of the climate change and adaptation to it into the basin management, and development of adaptation and combating mechanisms.

National Rural Development Strategy (2014-2020)

The outputs and outcomes of the project will contribute to the achievement of the following objectives set out in the National Rural Development Strategy:

- Achieving sustainability for forest resources,
- Providing safe settlement conditions to combat natural disasters,
- Achieving sustainability for soil and water resources,
- Rehabilitating pastures,
- Improving the competitiveness of agricultural and food industries,
- Diversifying the rural economy,
- Making effective use of agricultural lands,
- Improving the drinking water infrastructure.

National Strategy of Regional Development (2014-2023)

The project conforms to the following objectives set for the improvement of the rural environment and conservation of natural resources:

- Promoting the cultivation of perennial plants and feed crops as a part of erosion action,
- Developing green development programmes based on sustainability for mountainous and forest villages,
- Introducing programmes to incentivize water saving methods,
- Promoting the renewable energy generation for environmentally-friendly energy use,
- Promoting the cultivation of perennial plants and feed crops as a part of erosion action.

National Forestry Programme of Turkey (2004-2023)

Adapting locations at risk for landslides and floods to the climate, taking sedimentation under control, restoring the natural ecosystem and rehabilitating forests will

contribute to the adoption of the following policies set out in the National Forestry Programme of Turkey:

- Conservation of biodiversity and natural fabric in forests and their protection from biotic and abiotic stresses,
- Improvement of existing forests,
- Expanding forest lands with facilities in adequate non-forest locations,

- Making sustainable use of ecological, economic, social and cultural benefits of forests at local, national and global levels, and sharing them on an equitable basis and utilizing them for the public interest.

World Bank-Turkey Forestry Policy Note-2017

This project will enable to perform activities to plant trees more resilient to drought and truly understand their impacts on the ecosystem in an effort to have the private sector engage in the process and thus scale up the afforestation, develop the private forestry industry, and provide all environmental services in an uninterrupted manner, which are some of the objectives set by the World Bank for Turkey.

National Water Plan of Turkey (2019-2023)

The project will contribute to the adoption of the policies set out in the National Water Plan of Turkey by construction of irrigation reservoirs, prevention of floods and improvement in resilience to the climate change with sedimentation control and development of infrastructure resilient enough to secure the drinking and domestic water supply.

- Supply-demand equilibrium and water supply / Retention reservoirs and storage systems should be built for rain-induced flood control in urban areas, and technical solutions such as coverage systems and river rehabilitation to reduce the runoff coefficient should be offered, along with the introduction and implementation of Flood Management Plans.
- Water efficiency/Leakage in drinking water networks of municipalities should be managed more effectively and financial assistance mechanisms should be introduced to do so.
- Mechanisms should be developed to technically and financially support the adoption of methods that would increase water efficiency.

1.2. Organizational Structures and Applicable Legislation

1.2.1. Organizational Structures

The GDF, DSI, TRGM and Special Provincial Directorates that will support the Çekerek Project by sub-projects that will be covered by their own budgets have appointed central and rural departments, which have a mandate similar to the theme of the project, to perform procedures and provide coordination and management services about the sub-projects in the investment and operational phases. Other departments and physical resources of the project partners, too, will assume roles and functions in the investment and operational phases of the project. The sub-projects listed in Annex-1 and commissioned to the partners to execute and make sustainable in the investment and operational phases of the project are going to be executed under the following sub-components and themes:

Component 1: Green and Sustainable Rural Development

Sub-Component 1.1: Upper basin landscape and rural livelihoods

1.1.1. Erosion, landslide and flood control works

1.1.2. Climate-smart pasture management

1.1.3. Forest rehabilitation, protection and sustainable management

1.1.4. Income generation and livelihood diversification for forest villages

Sub-Component 1.2: Climate-smart agriculture and sustainable value chains

1.2.1. Sustainable and climate-smart agricultural practices

1.2.2. Income generation and livelihood diversification for rural areas

1.2.3. Sustainable agricultural value chains

Component 2: Climate-smart grey infrastructure

Sub-component 2.1: Resilient infrastructure

2.1.1. Reservoirs

Sub-component 2.2: Resilient infrastructure for disaster risk and water security

2.2.1. Irrigation works

2.2.2. Multipurpose reservoirs

2.2.3. Resilient infrastructure for flood and sedimentation control

In the aforementioned classification, each sub-component covers the projects tot be executed by a different project partner and to be commissioned to that project partner. The classification sets not only thematic but also institutional responsibilities. Institutional responsibilities by components:

Sub-Component 1.1: Upper basin landscape and rural livelihoods, **General Directorate of Forestry**

Sub-Component 1.2: Climate-smart agriculture and sustainable value chains, **General Directorate of Agricultural Reform**

Sub-component 2.1: Resilient infrastructure – **Special Provincial Administrations**

Sub-component 2.2: Resilient infrastructure for disaster risk and water security, **General Directorate of State Hydraulic Works**

The departments commissioned by the project partners to fulfill tasks and obligations under the components and their organizational structures are described below and their capabilities to fulfill their tasks and obligations as a part of the project are analyzed.

General Directorate of Forestry - Component 1.1: Upper Basin Landscape and Rural Livelihoods

The General Directorate of Forestry is a public organization with a dedicated budget founded in line with the Presidential Decree No.4, composed of central and rural offices, affiliated to the Ministry of Agriculture and Forestry, equipped with a public entity, and based in Ankara. The central administration of the GDF consists of a general directorate and central-level service

departments. The rural administration consists of regional and rural directorates and offices of forestry. The central administration is equipped with the Department of Inspection Board, the Department of Legal Affairs and the Department of Internal Audit along with 18 other departments and a total of 118 divisions affiliated to them. The rural administration consists of 28 regional directorates and 12 research institutes affiliated to the central administration including 9 regional ones for forestry and 3 for specific tasks across the country. The organizational chart is as follows. Çekerek Basin, which is the project site, is situated within the jurisdiction of Kayseri and Amasya Regional Directorates of Forestry. The organizational chart is presented in Figure 1.

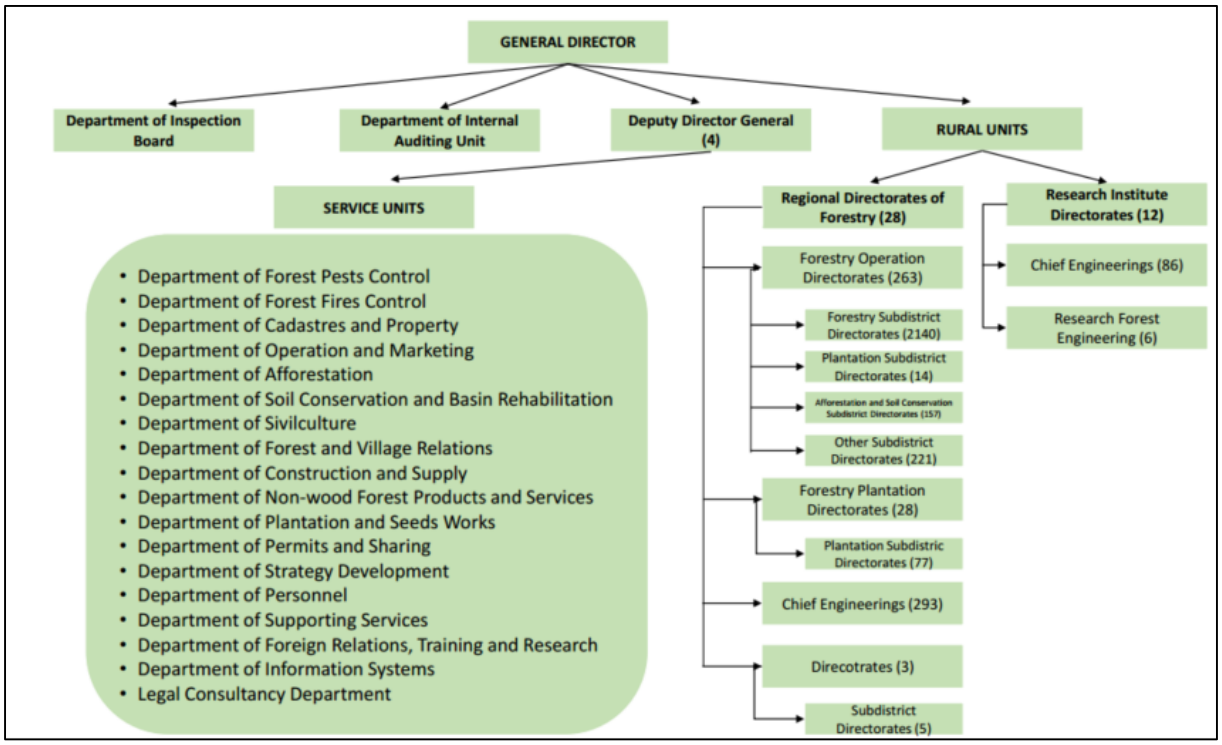

Figure 1 Organizational Chart of the General Directorate of Forestry

The assessment on how the tasks commissioned to the GDF by the Presidential Decree No.4 and tasks and responsibilities commissioned as a part of the project are part of its mandate given by the applicable legislation is presented in Section 1.2.2 titled "Applicable legislation" and the table of Annex-3.

The GDF has central and rural administrations that effectively execute activities under its mandate. The physical resources of the central and rural administrations including information technologies, machinery and other physical assets help fulfill the tasks and responsibilities to the full extent and deliver operational tasks even under tough weather and terrain conditions.

Having well-qualified human resources with an outstanding sense of duty is another institutional hallmark of the GDF. The GDF has 34.054 staff members as of late 2019. Relying

on highly-qualified staff members whose number is insufficient, the directorate delivers successful performance in line with its mandate imposed by the applicable legislation, being in charge of 22.740,297 hectares of forests that account for 29.2% of the country's territory.

Under the project, the GDF is to execute a wide range of and numerous projects from infrastructure resilient to the climate change to improvement of the prosperity of the target group under the themes of erosion, landslide and flood control works, sustainable management of forest and forest-connected pastures, forest rehabilitation, protection and sustainable management, and income generation and livelihood diversification for rural areas. All the sub-projects that it assumes are the ones that the GDF is highly experienced about. The GDF has the institutional structure and capability to fulfill the tasks and responsibilities assumed under the project in line with the schedule presented in Annex-4. The GDF also assumes management and coordinate roles as a part of the project. The structure and requirements of these roles are indicated in section 10 under the title of "Project management and implementation programme". The GDF has the experience and institutional infrastructure to execute its management and coordination roles, which it had assumed before under similar projects, with more awareness and better performance. In addition, the management and coordination capacity building measures of the GDF for the World Bank projects are going to be planned under the Component 3.

General Directorate of Agricultural Reform - Component 1.2: Climate-smart agriculture and sustainable value chains

The General Directorate of Agricultural Reform is one of the central service departments of the Ministry of Agriculture and Forestry. Therefore, not only the TRGM's institutional structure and resources but also the Ministry's central departments and rural offices will play a role in the fulfillment of the tasks and responsibilities assumed by the TRGM under the project. The Ministry of Agriculture and Forestry is a public organization with a dedicated budget founded in line with the Presidential Decree No. 1 on the Organization of the Presidency, equipped with a public entity, and based in Ankara. The Ministry comprises central, rural and international offices. The organizational chart of the General Directorate of Agricultural Reform is presented in Figure 2.

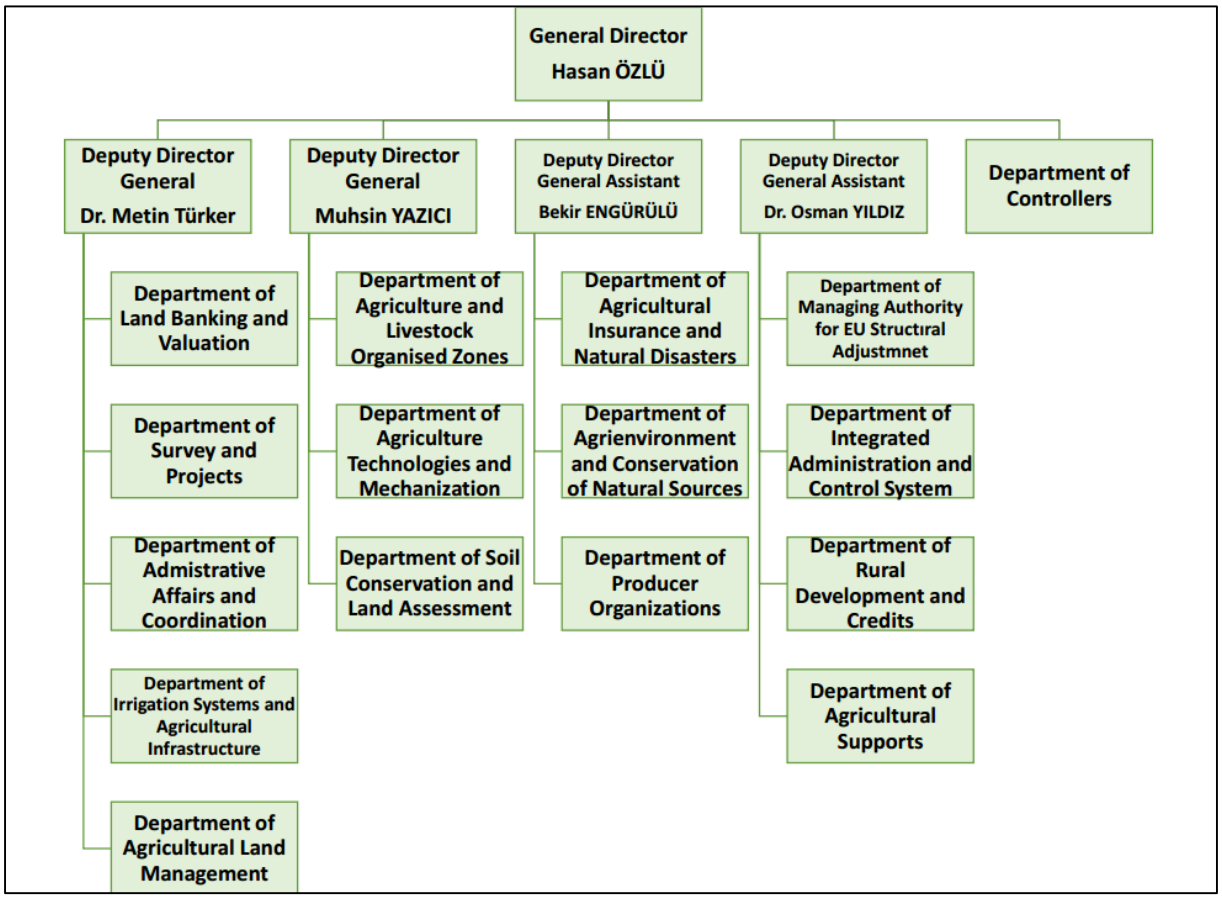

Figure 2 Organizational Chart of the General Directorate of Agricultural Reform

The assessment on how the tasks commissioned to the TRGM by the Presidential Decree No.1 and tasks and responsibilities commissioned as a part of the project are part of its mandate given by the applicable legislation is presented in Section 1.2.2 titled "Applicable legislation" and the table of Annex-3.

The Ministry has central and rural administrations that effectively execute activities under their mandate. The information technologies, physical assets and other physical resources of the central and rural administrations help fulfill the tasks and responsibilities to the full extent.

Having highly-qualified human resources with capabilities to execute tasks in various professional disciplines is one of the strong suits of the Ministry. The Ministry has a total of 64.489 staff members including 5716 in central offices and 58.773 in rural offices as of late 2019.

With regards to the roles and responsibilities to be assumed under the project, the TRGM has a great deal of experience in various disciplines and the wide range of sub-projects to be executed under the themes of sustainable and climate-smart agricultural practices, income generation and livelihood diversification for rural areas, pasture rehabilitation and management, and sustainable agricultural products. The Ministry (TRGM) has the institutional structure and capability to fulfill the tasks and responsibilities assumed under the project in line with the schedule presented in Annex-4.

Special Provincial Administrations -Component 2.1: Climate-smart grey infrastructure

Duties and responsibilities of Special Provincial Administrations are regulated with the Special Provincial Administration Law No. 5302, Article 6 titled "Duties and responsibilities of Special Provincial Administrations". Yozgat, Tokat, Sivas and Çorum Special Provincial Administrations are project partners that carry out their duties and responsibilities as per Law No. 5302.

Service organization of a special provincial administration consists of a general secretariat and departments of financial affairs, health, agriculture, zoning, human resources, legal affairs. The general provincial council determines norm staff and decides on the establishment, abolishment, or merging of departments depending on the need, taking into account the population, physical and geographic structure, economic, social and cultural characteristics, and development potential of the province.

The sub-projects undertaken by special provincial administrations as part of the project include implementations that are among their usual operations and within the scope of their experience. These include works such as reservoirs and irrigation systems. Special provincial administrations conduct these infrastructure works by themselves or using contractors, depending on their capacity. Special provincial administrations are not expected to encounter any adversities while investing in the sub-projects they undertook in line with the work schedule provided in Annex-4.

General Directorate of State Hydraulic Works - Component 2.2: Resilient infrastructure for disaster risk and water security

The General Directorate of State Hydraulic Works (DSI) is a public organization with a dedicated budget founded in line with the Presidential Decree No.4, affiliated to the Ministry of Agriculture and Forestry, equipped with a public entity, and based in Ankara. The aforementioned decree gives four main mandates to the directorate to provide protection from floods, mainstream irrigated farming, generate hydroelectric power and provide drinking water.

DSI consists of central and rural administrations. The central administration has the general director's office and departments as well as central divisions with an equal status based in Ankara. The rural administration consists of 26 regional directorates including two temporary ones that are all largely situated based on the river basins across Turkey, and of branch offices commissioned in specific geographical locations serving on behalf of a regional directorate or of autonomous chief engineering offices. The organizational chart is as follows. Çekerek Basin, which is the project site, is located within the jurisdiction of Samsun 7th Regional Directorate, Ankara 5th Regional Directorate, Kayseri 12th Regional Directoeate and Sivas 19th Regional Directorate. The organizational chart of the State Hydraulic Works is presented in Figure 3.

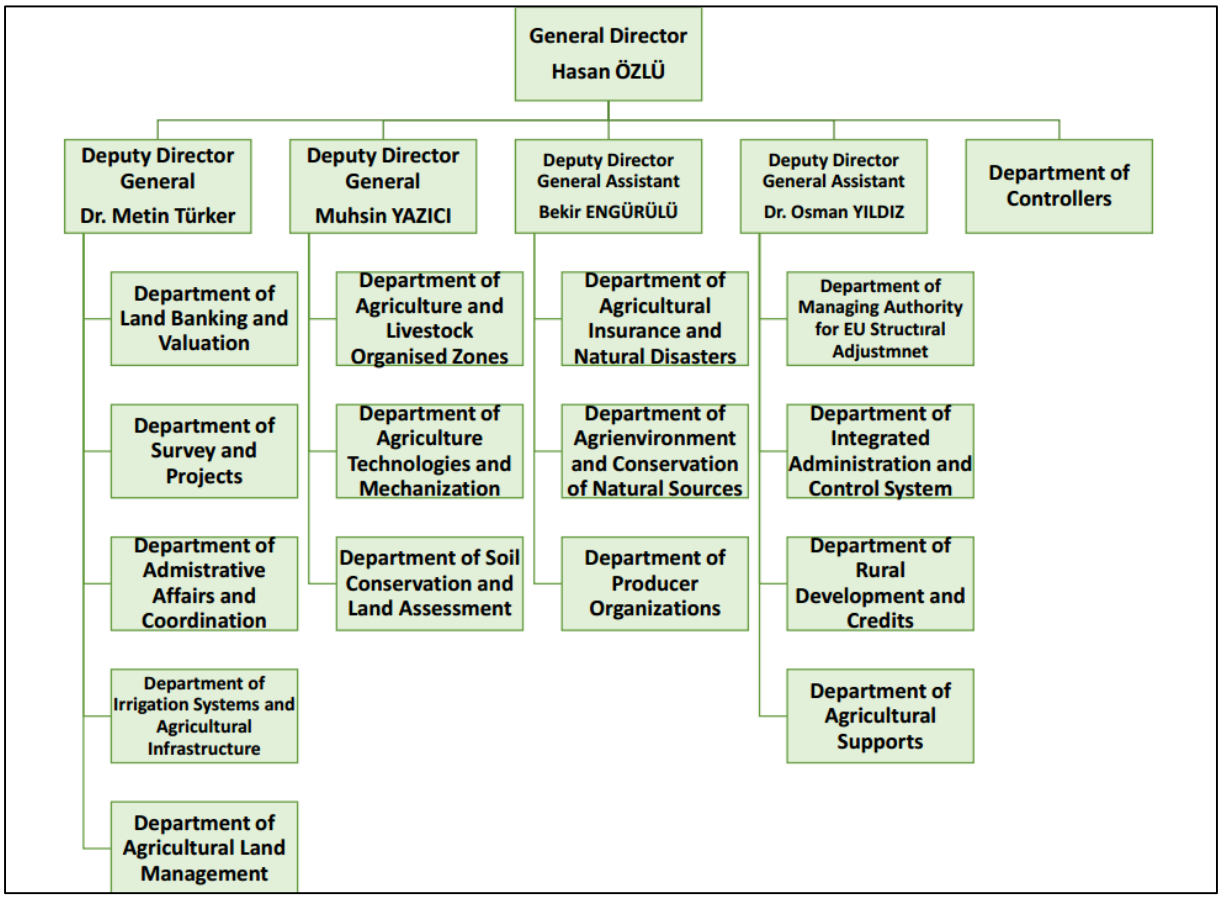

Figure 3 Organizational Chart of the General Directorate of State Hydraulic Works

The assessment on how the tasks commissioned to DSI by the Presidential Decree No.4 and tasks and responsibilities commissioned as a part of the project are part of its mandate given by the applicable legislation is presented in Section 1.2.2 titled "Applicable legislation" and the table of Annex-3.

DSI has central and rural administrations that effectively execute activities under their mandate. The physical resources of the central and rural administrations including information technologies, machinery and other physical assets help fulfill the tasks and responsibilities to the full extent and deliver operational tasks even under tough weather and terrain conditions.

Having highly-qualified human resources with capabilities to execute tasks in various professional disciplines is one of the strong suits of DSI. DSI has 22.790 staff members as of late 12.31.2019.

The duties and responsibilities of DSI as part of the project include reservoir and irrigation facility projects under the thematic group titled “Irrigation works” as well as dam and reservoir projects under the thematic group titled “Multipurpose reservoirs”. DSI is highly experienced for such projects. DSI has the institutional structure and capability to fulfill the tasks and responsibilities assumed under the project in line with the schedule presented in Annex-4. In

addition, DSI began to run a rehabilitation project on irrigation in cooperation with the World Bank in 2019. This experience will give DSI a major advantage to execute to the project.

The institutional structure devised by GDF for the coordination and management of the project is described in detail in Title 11, "Project Management and Implementation Program", of this feasibility report. The institutional structure established by project partners for project implementation is not limited to those given above. Relevant departments of the project partners will undertake duties and responsibilities, either directly or indirectly, in implementing sub-projects and ensuring sustainability during investment and operating phases.

1.2.2. Applicable Legislation

The analysis of the applicable legislation on how the roles and responsibilities to implement and execute the sub-projects are part of the remit of the project partners is presented in Annex-3 based on each project partner in line with the project components and sub-components. In addition, the incentive legislation that the sub-projects is subject to has been reviewed and the state of being qualified for any incentives has been elaborated in the following section. The conclusions made as a result of the analysis over the roles of the project partners are briefly presented below:

General Directorate of Forestry

In addition to the management and coordination of the project, the GDF has roles and responsibilities to execute sub-projects planned under the following sub-components in the investment and operational phases for matters that fall within its remit and jurisdiction:

- Erosion, landslide and flood control Works (soil conservation Project, erosion and flood control projects)
- Climate smart pasture management (pasture rehabilitation projects)
- Rehabilitation, protection and sustainable management of forests (afforestation projects, rehabilitation projects, sapling production Project, road construction for forest rehabilitation, PV system, solar energy water heating systems, exterior thermal sheathing)
- Income generation and livelihood diversification for forest villages (construction of picnic and recreational sites, truffle graft sapling production, cultivated mushroom, rose hip production, medicinal and aromatic plants, fruit growing, dairy cattle improvement, scientific beekeeping, village ovens, lavender).

The roles and responsibilities of the General Directorate of Forestry are governed by the article 334 of the Presidential Decree No. 4 on the Organization of Affiliated, Related and Associated Institutions and Organizations with Ministries and Other Institutions and Organizations". The reviews, assessments and conclusions on whether the sub-projects to be executed by the GDF under the project fall within the remit of the GDF or not are presented below.

The sub-paragraph (a) of the paragraph 1 of the article 334 of the Presidential Decree grants the GDF the mandate to protect forest resources from natural disasters. The roles and responsibilities set out in the sub-paragraph (c) to perform afforestation, erosion control and pasture rehabilitation efforts, combat desertification and engage in flood and avalanche control

works, develop and implement integrated basin projects are the legal basis to confirm that the sub-projects planned under the theme of "erosion, landslide and flood control works" fall within the remit of the GDF.

The legal basis that affirms that the pasture rehabilitation sub-projects under the theme of "sustainable management of forest and forest-connected pastures" is the phrase "pasture rehabilitation" set out in the sub-paragraph (c) of the paragraph 1. One of the main objectives of the ecosystem reservoir projects to be executed under the same theme is to prevent heavy rain in upper basins from turning into flood in lower basins and combat desertification by erosion control. Therefore, ecosystem reservoir projects fall within the remit of the GDF. In addition, the sub-paragraph (d) of the paragraph 1 includes provisions as a legal basis for the execution of the aforementioned projects.

The sub-paragraph (a) of the paragraph 1 covers the projects with outputs and outcomes to contribute to the theme of conservation, rehabilitation and sustainable management of forests. These projects are related partially to conservation and rehabilitation of forests and partially to reduction of pressure on forests as a means of wood supply. The projects focused on indirectly reducing the pressure on forests fall within the remit of the GDF as a part of the mandate to support forest communities as set out in the sub-paragraph (j). The sub-paragraph (e) covers the sub-projects concerning nurseries set out under this theme.

The theme of "income generation and livelihood diversification for rural areas" includes many income-generating and livelihood-improving sub-projects intended to build recreational sites or improve the existing recreational sites and growing vegetative products. The sub-paragraph (j) of the paragraph covers all the sub-projects in this regard and serves as the legal basis for the GDF to execute them. Of the projects that support forest communities, those solely focused on women respond to an important priority by promoting the policies of all public agencies including the GDF intended to empower women in Turkey.

In the light of the findings above, it is clear that all of the sub-projects that fall within the scope of "sub-component 1.1: upper basin landscape and rural livelihoods" under the component 1 titled "green and sustainable rural development" and that the GDF is responsible to execute also cover the mandate of the GDF set out in article 334 of the Presidential Decree No.4 on the Organization of Affiliated, Related and Associated Institutions and Organizations with Ministries and Other Institutions and Organizations". In addition, the Law No. 6292 on Supporting the Development of Forest Villagers, Valuation of Areas Taken out of Forest Area Borders on Behalf of the Treasury and Vending of Agriculture Lands Owned by the Treasury has provisions that grant the GDF a mandate to support rural communities in and next to state-owned forests.

The article 58 of the Forestry Law No. 6831 serves as the legal basis for the GDF to execute integrated projects and handle coordination and management of such projects at the basin level in cooperation with other relevant organizations as a part of basin rehabilitation. The article says: "Being a part of a forest regime or to be carried out in any location of reafforestation at the basin level, any activity of afforestation, erosion and flood control, avalanche and landslide prevention, ecosystem conservation and development and improvement of living conditions for

basin communities shall be carried out under the coordination of the Ministry of Environment and Forestry as a part of integrated projects drawn up in cooperation with relevant organizations. The article also points out that repairment, reinforcement and maintenance of railways, roads and rural routes that go through any state-owned forest shall be handled by relevant organizations after informing the general directorate of forestry.

General Directorate of Agricultural Reform

In addition to the management and coordination of the project, the TRGM has roles and responsibilities to execute sub-projects planned under the following sub-components in the investment and operational phases for matters that fall within its remit and jurisdiction:

- Sustainable and climate-smart agricultural practices (Back to the village, soil analysis and irrigation systems projects),
- Income generation and livelihood diversification for rural areas (improving breeding, improving barn conditions, poultry farming, beekeeping, greenhouse, aromatic plants, fruit growing, vineyards, agriculture efficiency, forage crops, good farming and organic farming practices, mushroom groving, pasture rehabilitation projects),
- Sustainable agricultural value chains (noodle making machine and grape juicers),

The roles and responsibilities of the General Directorate of Agricultural Reform are governed by the article 417 of the Presidential Decree No.1 on the Organization of Presidency. The reviews, assessments and conclusions on whether the sub-projects to be executed by the TRGM under the project fall within the remit of the TRGM or not are presented below.

The theme of "sustainable and climate-smart agricultural practices" have sub-projects to grow various vegetative products. The outputs and outcomes of these projects promote sustainable and climate-smart agricultural practices. The sub-paragraph (a) and the sub-paragraph (b) of the paragraph 1 of the article 417 of the Presidential Decree cover these projects and serve as a legal basis for the TRGM to fulfill the mandate to execute the projects.

The theme of "income generation and livelihood diversification for rural areas" includes projects focused on improving breeding, improving barn conditions, poultry farming, beekeeping, greenhouse, aromatic plants, fruit growing, agriculture efficiency, forage crops, good farming and organic farming practices, mushroom groving, pasture rehabilitation. The outputs and outcomes of these projects promote income generation and livelihood diversification for local communities, which are the target group. The roles and responsibilities to execute these sub-projects clearly cover the mandate of the TRGM set out in the sub-paragraph (a) and the sub-paragraph (b) of the article 1.

The theme of "sustainable agricultural value chains" includes projects focused on culvitation plants and equipment for agricultural products. These projects have important functions in terms of making agricultural production sustainable by contributing to the marketing of agricultural products. The projects under this theme fall within the remit of the sub-paragraph (a) and the sub-paragraph (j) and of the mandate of the TRGM.

In the light of the findings above, it is clear that all of the sub-projects that fall within the scope of "sub-component 1.2: climate-smart agricultural and sustainable value chains" under the component 1 titled "green and sustainable rural development" and that the TRGM is responsible to execute also cover the mandate of the TRGM set out in article 417 of the Presidential Decree No.1 on the Organization of Presidency.

Special Provincial Administrations (Yozgat, Tokat, Amasya)

Special provincial administrations have the duty and responsibility to implement the sub-projects, planned under the following sub-components, during the investment and operating phases of the project:

- Reservoirs (reservoir project),

Duties and responsibilities of special provincial administrations are regulated with the Special Provincial Administration Law No. 5302, Article 6 titled “Duties and responsibilities of Special Provincial Administrations”. The investigation, evaluation and determination on whether the sub-projects, which will be implemented by Yozgat, Tokat and Çorum Special Provincial Administrations as part of the project, fall within the responsibility of special provincial administrations are given below.

As the name suggests, the thematic group titled “Reservoirs” includes one reservoir project. Clause (b) of Article 6, “Duties and responsibilities of Special Provincial Administrations”, of Law No. 5302 gives special provincial administrations the authority to carry out and implement these projects.

The projects included in the thematic group titled “Income generation and livelihood diversification for rural” under Sub-component 1.2 are sub-projects of Special Provincial Administrations. Clause (a) and Clause (b) of Article 6, “Duties and responsibilities of Special Provincial Administrations”, of Law No. 5302 give special provincial administrations the authority to carry out and implement these projects.

- Recreation areas and picnic sites

The projects included in the thematic group titled “Resilient infrastructure for flood and sedimentation control” under Sub-component 2.2 are sub-projects of Special Provincial Administrations. Clause (a) and Clause (b) of Article 6, “Duties and responsibilities of Special Provincial Administrations”, of Law No. 5302 give special provincial administrations the authority to carry out and implement these projects.

- Building small- and medium-scale irrigation facilities in agricultural areas
- Irrigation facility and modernization project
- Irrigation pond
- Trapezoidal irrigation channel construction

In the light of the above-mentioned determinations and evaluations, there is no doubt that the sub-projects under the following thematic groups legally fall within the responsibility area of Special Provincial Administrations: “2.1.1. Reservoirs” which fall under Sub-component 2.1.

Resilient infrastructure of Component 2. Climate-smart grey infrastructure; “Income generation and livelihood diversification for rural” under Sub-component 1.2; and “Irrigation Works” under Sub-component 2.2.

General Directorate of State Hydraulic Works

In addition to the management and coordination of the project, the DSI has roles and responsibilities to execute sub-projects planned under the following sub-components in the investment and operational phases for matters that fall within its remit and jurisdiction:

- Irrigation works (reservoir and irrigation facility projects),
- Multi-purpose reservoirs (dam and reservoir projects),
- Resilient infrastructure for flood and sedimentation control (flood and sedimantation control projects).

The roles and responsibilities of the General Directorate of State Hydraulic Works are governed by the article 211 of the Presidential Decree No. 4 on the Organization of Affiliated, Related and Associated Institutions and Organizations with Ministries and Other Institutions and Organizations". The reviews, assessments and conclusions on whether the sub-projects to be executed by the DSI under the project fall within the remit of the DSI or not are presented below.

The thematic title “Irrigation works” includes reservoir and irrigation facility projects. Clause (b) clearly gives DSI the duty and responsibility to establish irrigation facilities. While this clause and other relevant clauses do not clearly include reservoir investments within DSI's area of responsibility, the reservoirs under this thematic title are for irrigation and qualify as irrigation facilities.

The theme of "multi-purpose reservoirs" includes many reservoir projects. Given the purposes of these reservoirs and objectives that the outputs and outcomes to be generated once they are built will promote, there is no hesitation about the execution of these projects falling within the remit of DSI as described in the sub-paragraphs (a), (b), and (c).

The sub-paragraphs (a), (b), and (c), which describe the roles of DSI, point to the sub-projects under the theme of "resilient infrastructure for flood and sedimentation control", and indicate that these projects fall within the remit of DSI.

In the light of the findings above, it is clear that all of the sub-projects that fall within the scope of "sub-component 2.1: resilient infrastructure for disaster risk and water security" under the component 2 titled "gray infrastructure resilient to the effects of the climate change" and that the DSI is responsible to execute also cover the mandate of the General Directorate of State Hydraulic Works set out in article 121 of the Presidential Decree No.4 on the Organization of Affiliated, Related and Associated Institutions and Organizations with Ministries and Other Institutions and Organizations".

Incentives

While the sub-projects fall within the remit of the legislation on investment incentives and agricultural investment incentives, they are not qualified to be granted any incentive instruments on the following grounds:

- The article 29 of the Cabinet Resolution No. 2012/3305 of 6/15/2012 on Public Aids for Investments under the title of Use of Other Aids reads: "Any investment spendings already made as a part of aids covered by this resolution shall not be also made based on aids from other public agencies and organizations. One shall not lodge an application in the Ministry to use any aids covered by this resolution for the purpose of any investment spendings already provided or to be provided with aids from other public agencies and organizations."
- The article 9 titled "Those Not Qualified to Use Aids" of the Resolution on Promotion of Agriculture-Based Economic Investments and Rural Economic Infrastructure Investments Under Rural Development Aids, which entered into force upon the Presidential Decree No. 2800 of July 28, 2020, governs the provision that no natural or legal entity that is granted funds by any public agency and organization or has a financial link with any of them shall not use any of the aids.

1.3. Project's Association with Past, Ongoing and Planned Projects of Institution

The basin rehabilitation projects, which are drawn up in consideration of the correlation between rural poverty and degradation of natural resources in Turkey, are presented below along with their characteristics in Table 1.

- Eastern Anatolia Water Basin Rehabilitation Project financed by the World Bank,
- Anatolian Water Basin Rehabilitation Project financed by the World Bank
- Erosion Control, Management of Natural Resources and Rural Development Project for Kop and Burnazdere Basins of Bayburt financed by GTZ,
- Çoruh River Rehabilitation Project financed by JICA,
- Murat River Rehabilitation Project financed by IFAD.

Table 1 Details on Basin Rehabilitation Projects

Project Title	Eastern Anatolia Water Basin Rehabilitation Project	Anatolian Water Basin Rehabilitation Project	Erosion Control, Management of Natural Resources and Rural Development Project for Kop and Burnazdere Basins of Bayburt	Çoruh River Basin Rehabilitation Project	Murat River Basin Rehabilitation Project
Main Funder	World Bank	World Bank	GTZ	JICA	IFAD
Implementing Agencies	Ministry of Forestry, Ministry of	Ministry of Environment and	TEMA Foundation in Bayburt	Ministry of Forestry and	Ministry of Forestry and

Project Title	Eastern Anatolia Water Basin Rehabilitation Project	Anatolian Water Basin Rehabilitation Project	Erosion Control, Management of Natural Resources and Rural Development Project for Kop and Burnazdere Basins of Bayburt	Çoruh River Basin Rehabilitation Project	Murat River Basin Rehabilitation Project
	Agriculture and Rural Affairs	Urbanization, Ministry of Agriculture and Rural Affairs		Hydraulic Works, Ministry of Food, Agriculture and Livestock, Provincial Special Administrations	Hydraulic Works, General Directorate of Forestry
Project Term	1993-2001	2005-2011	2001-2008	2012-2021	2013-2021
Status	Completed	Completed	Completed	Ongoing	Ongoing
Target Location	3 Provinces: Elazığ, Malatya and Adıyaman Implemented in: 11 provinces	6 provinces: Samsun, Tokat, Sivas, Kayseri, Çorum and Amasya	Bayburt	Artvin, Bayburt and Erzurum	Districts and villages of Elazığ, Bingöl and Muş at a high altitude
Total Size of Implementation Sites	160.000 ha	202.000 ha	14.700 ha	429.774 ha	288.000 ha
Number of MBs	Planned: 54 Implemented: 86	28	2	13	34
Average Size of MBs	1840 ha/MB	7210 ha/MB	7350 ha/MB	33.060ha/MB	8470 ha/MB
Main Objective/Goal	Sustainable natural resource rehabilitation and reduction of rural poverty in selected MBs of upper basins around Eastern and Southeastern Regions.	Sustainable natural resource rehabilitation and management in selected MBs of Anatolia and Black Sea Region.	Development of a model and an ecologically well-functioning approach to natural resources for rural development.	Contribution to the environmental protection and poverty alleviation by integrated rehabilitation and sustainable use of vegetative, soil and water resources in Çoruh River Basin and diversification of income-generating activities.	Prevention of degradation of natural resources in provinces of Elazığ, Muş and Bingöl that are located within Murat River basin, and poverty alleviation for communities residing at a high altitude.

Project Title	Eastern Anatolia Water Basin Rehabilitation Project	Anatolian Water Basin Rehabilitation Project	Erosion Control, Management of Natural Resources and Rural Development Project for Kop and Burnazdere Basins of Bayburt	Çoruh River Basin Rehabilitation Project	Murat River Basin Rehabilitation Project
Project Components or Sub-Projects	Components: 1. Basin rehabilitation 2. Income-generating activities 3. Planning and management 4. Applied research 5. In-situ conservation of genetic resources	Components: 1. Rehabilitation of degraded natural resources 2. Income-boosting activities 3. Building policy and regulatory capacity to meet the EU standards 4. Awareness-raising, capacity-building and repetition strategy 5. Project management and auxiliary services	Components: 1. Erosion control 2. Agricultural productivity and strengthened diversity 3. Capacity building for public agencies and non-governmental organizations about conservation and use of resources 4. Mainstreaming the project experience and public relations	Sub-Projects: 1. Erosion control and prevention of natural disasters 2. Improving the living conditions/livelihoods of the local community 3. Capacity building	Components: 1. Management of natural resources and environment 2. Investments in natural resources and environmental assets 3. Investments in improvement of livelihoods
Project Budget	USD 78.3 million Loan used: USD 47.97 million	USD 44.91 million USD 20 million in loans, and USD 7 million in GEF Grant	Nearly EUR 5 million	JPY 6.150.000,000	Nearly USD 51 million

The fact that the coordination of the Çekerek Basin Rehabilitation Project, which is intended to be implemented by multiple organizations for the first time, is handled by the General Directorate of Forestry (GDF) is of capital importance. The conclusion booklets designed for the ongoing and completed projects run by the GDF and lessons learned from the past projects are important for the feasibility of this project. In addition, the lessons learned from the past projects will contribute to the sustainability of the Çekerek Basin Rehabilitation Project.

1.4. Project's Association with Other Institutions' Projects

1.4.1. Project of Other Institutions to Simultaneously Run on Sidelines of Project

The management and coordination of the Çekerek Basin Rehabilitation Project will be handled by the General Directorate of Forestry. The project partners to execute the sub-projects are the General Directorate of Forestry, the General Directorate of Agricultural Reform and the General Directorate of State Hydraulic Works. Special Provincial Administrations are organizations that support this project with sub-projects determined by their own budgets..The efforts to identify and eliminate any problems concerning the mutual relations of the sub-projects under the mandate and responsibility of the project partners and their impacts on one another have been exerted in the preparatory phase of the project under the coordination of the GDF. At this point, the projects were reviewed, analyzed and justified in terms of their impacts on one another to make the following conclusions:

- Prioritization needs of the sub-projects to be made available for investments and operations for their mutual dependence,
- Impacts of sub-projects on one another and measures,
- Concurrent investment and operational requirements of sub-projects.

The analytical table on the sub-project association presented in Annex-5 shows conclusions about the association of the sub-projects with one another based on the thematic groups. These conclusions were also taken into account for the work plan drawn up for the investment phase of the sub-projects as a part of the feasibility study. Some major conclusions made as a result of the assessments shown in the table are as follows:

- Erosion, landslide and flood control works are of importance for the sustainability of all projects.
- The pasture rehabilitation efforts to be exerted by the GDF and the TRGM should be prioritized since they would promote animal breeding activities.
- The products to be generated by production/processing plants and agricultural and animal breeding practices under the theme of sustainable agricultural value chains will be processed and utilized.
- A work plan is going to be drawn up by the project management team based on the aforementioned priorities.

1.4.2. Measures Adopted under Project to Avoid Physical Overlap with Projects of Other Institutions

As the Çekerek Basin Rehabilitation Project includes multiple organizations and sub-projects, interorganizational communication has been made robust in an effort to exchange information in the planning phase, develop joint decision-making processes and avoid any overlap of projects and additional cost. These factors are to be taken into consideration in the implementation phase of the projects, too.

The project sites are home to power transmission lines, energy plants, water-sewerage conveyance lines, irrigation canals, pipelines, roads, railways, telecommunication lines, an

airport, mining and geothermal investments, a port, a dam and similar sites. Most of the sub-projects proposed under the Çekerek Basin Rehabilitation Project are the projects that were previously drawn up by the relevant organizations, and they were selected under the coordination of the GDF. This largely prevented any overlap of projects. Any overlap to arise in the investment phase after the final projects are designated will be resolved based on engineering methods upon the reception of permits necessary to do so, and the project will be put into effect. Any overlapping projects will be dismissed when needed and whenever possible.

While each organization has its own procedure concerning project overlaps, the organization in charge is likely to give an affirmative opinion about them. To have an affirmative opinion, engineering efforts that would not make any physically and functionally adverse impact on the project will be made to ask for an opinion about the project design.

1.5. Past Studies and Other Efforts Concerning Project

The idea behind the project results from the need for change triggered by some natural disasters and socio-economic status of the local communities. How the idea behind the project emerged and the efforts made afterwards are summarized below:

- The Çekerek Basing Rehabilitation Project was deemed appropriate by the Ministry of Agriculture and Forestry on 26.11.2019, and preparations started within the framework of relevant legislation;
- The Department of Soil Conservation and Basin Rehabilitation of the General Directorate of Forestry was assigned to coordinate project preparations, which concern many institutions as well as Ministries including the Ministry of Agriculture and Forestry;
- The kickoff meeting for the Çekerek Basing Rehabilitation Project was held on 01.12.2019 with the attendance of all stakeholders, where the institutions were assigned to relevant operations;
- Technical staff of the institutions conducted detailed studies in the basin and one-on-one interviews with the locals for the operations they will carry out;
- Besides, provincial organizations conducted interviews with mukhtars as part of needs assessment. They identified problems in interviews with mukhtars and other target groups, using problem identification methods, and identified projects that are needed in the region, using needs assessment methods. Specialist groups from project owning institutions visited the field and conducted field surveys for location selection;
- A letter was submitted to the Ministry of Treasury and Finance on 30.04.2020 so that the project can be conducted with a foreign source of finance and the source can be chosen;
- Meetings were conducted with the General Directorate of Sectors and Public Investments (Department of Agriculture) of PSB (Presidency of Strategy and Budget).

1.6. Project Need/Demand

A needs analysis was performed as a method to identify needs or demands for the project. The steps taken in this regard are as follows:

1. Problem analysis
2. Stakeholder analysis
3. Target group and setting the demands of the beneficiaries

Problem analysis

Prior to the inception of a problem analysis performed as a part of the project, a variety of preparations had been made along with the review of secondary to establish the status quo. The review established the views of the communities, groups or organizations, who were focused on a specific idea, about what the critical problems are for the whole region. The adverse aspects of the current state and a relation of causality with the current problems were established as a part of the problem analysis.

Meetings were conducted with the following as part of project preparations: relevant general directorates of the Ministry of Agriculture and Forestry (General Directorate of Forestry, General Directorate of Agricultural Reform, General Directorate of State Hydraulic Works), provincial and regional offices of relevant institutions affiliated to the Ministry of Agriculture and Forestry, Special Provincial Administrations, local governments, and governorates. Village meetings were held in chosen regions to ask mukhtars and villagers for their opinion. Besides, women-only focus group meetings were held to assess local needs in an equal way. At the same time, the working group got support from specialists in various areas such as forestry, irrigation, and rural development as well as from the staff of relevant institutions. The main problems identified in the basin by means of the above-mentioned works are listed below. Further information is provided in the following paragraphs.

- Floods and overflows occurring in the basin;
- Lack of sustainable use of natural resources, particularly forests;
- Decline in plant and animal production;
- Inability to use the nature's potential to the fullest;
- Lack of agricultural development;
- Rural migration.

With an average annual precipitation of 391 mm, according to the meteorological data recorded between 1927–2019, Çekerek basin receives less and irregular rainfall in comparison to most regions in Turkey. In Turkey's Central Anatolia Region, forests were destroyed and landslides occurred due to rainfall, carrying soil from pastures and agricultural lands to rivers and seas, for thousands of years. An important portion of the local population migrated out of the basin due to soil impoverishment. There is a decline in plant and animal production in the basin. There is not enough irrigated farming due to the lack of irrigation infrastructure, and thus not enough forage production, which is the most important need of stockbreeding. Natural resources are not conserved properly and managed sustainably.

Agricultural lands in the basin are cultivated without planning, and thus pastures and other areas, particularly forests, are under pressure. Landslides occur frequently due to vegetation degradation and irregular precipitation. This poses a threat to natural resources (forests, pastures) as well as the lifespan of dams. Employment opportunities are limited in the region. Agricultural and stockbreeding productivity is low.

Many public institutions and local administrations make major investments in the basin. However, these are not "coordinated, inclusive and ecosystem-focused", which reduces their effectiveness and life-span. This causes a serious resource loss.

Stakeholder analysis

To maximize the social and institutional benefits of any project and minimize their adverse effects, it is extremely important to thoroughly analyze and develop the perspectives of interest groups, individuals and organizations about a certain problem and a project idea, and incorporate them into the project design. Stakeholders and projects may have a positive or negative impact on one another. It is impossible for a project to achieve any objective in a sustainable manner unless it takes into account the views and needs of the stakeholders. Therefore, it is extremely important to establish the stakeholders, their interests, challenges and potential first and then incorporate them into the project design and management. Therefore, a stakeholder analysis was performed as a part of the project. The group and list of stakeholders are shown in Table 2.

Table 2 List of Stakeholders

Direct Stakeholders		**Indirect Stakeholders**	**Other Stakeholders**
Internal Stakeholders	**External Stakeholders**		
• General Directorate of Forestry (GDF) • General Directorate of State Hydraulic Works (DSI) • Special Provincial Administrations • General Directorate of Agricultural Reform (TRGM) • Tokat Provincial Directorate of Agriculture and Forestry • Çorum Provincial Directorate of	• Presidency of Strategy and Budget (PSB) • Ministry of Treasury and Finance • Ministry of Environment and Urbanization (MoEU) • Ministry of Agriculture and Forestry General Directorate of CDM • General Directorate of Nature Conservation and National Parks • Beekeeping Research • Muhtars of directly-affected settlements • Animal farmers • Beekeepers • Forest village	• General Directorate of Mineral Research and Exploration (MTA) • Disaster and Emergency Management Presidency (AFAD) • Small and Medium Enterprises Development Organization (KOSGEB) • Turkish Employment Agency (ISKUR) • Provincial Police Departments • Provincial Directorates of National Education • Provincial Directorates of Industry and Commerce • Provincial Directorate of Health	Private sector • Investors • Farmers • Manufacturers, sub-contractors • Companies and stores • Banks • Staff Non-governmental organizations • City councils • Rural unions • Rural cooperatives • Local non-governmental organizations • Professional chambers Academic institutions • Yozgat Bozok University

Direct Stakeholders		Indirect Stakeholders	Other Stakeholders
Internal Stakeholders	**External Stakeholders**		
Agriculture and Forestry • Sivas Provincial Directorate of Agriculture and Forestry • Yozgat Provincial Directorate of Agriculture and Forestry • Kayseri Regional Directorate of Forestry • Amasya Directorate of Forestry • FAO (Food and Agriculture Organization of the United Nations) • World Bank	communities • People residing in disaster-stricken sites • Vulnerable groups	• People migrating from the basin to metropolitan cities • Indirectly relevant national, regional and district-level public organizations • Muhtars of indirectly-affected settlements	• Sivas Cumhuriyet University • Çorum Hitit University • Tokat Gaziosmanpaşa University Press and Media • News agencies • Local newspapers

Target group and setting the demands of the beneficiaries

Human activities play a major role in destruction of natural resources. Therefore, local communities tend to suffer from the destruction. However, they will become beneficiaries once conditions are improved. The role of the local communities is important to safeguard the value of natural resources. It is, therefore, extremely important for local communities to understand the correlation between their socio-economic status and natural resources and know that they have a huge role to play in improvement of natural resources. It is pertinent to adopt a participatory approach when such a situation is itemized, and that is the only way sustainability can be achieved.

The target group of the project is the people of villages (forest and non-forest), towns and districts situated within the project basin. They mainly live on small-scale agriculture, bovine and ovine breeding.

The importance of their needs was verified as a part of the field surveys. Those who had been to the site visits and meetings and the mukhtars are highly open to cooperation and have an affirmative opinion about the execution of the project.

The project includes activities to meet these needs and the project components are related to the needs of the target group. The thematic groups that cover projects ascertained to resolve

problems and meet the needs in the basin as a part of components and sub-components established as a result of an analysis over the project proposals of the partners are presented in the following table.

Table 3 Components, Sub-Components and Thematic Titles of the Project

Component	Sub-Component	Thematic Title
Component 1: Green and Sustainable Rural Development	Sub-Component 1.1: Upper basin landscape and rural livelihoods	Erosion, landslide and flood control works
		Climate-smart pasture management
		Forest rehabilitation, protection and sustainable management
		Income generation and livelihood diversification for forest villages
	Sub-Component 1.2: Climate-smart agriculture and sustainable value chains	Sustainable and climate-smart agricultural practices
		Income generation and livelihood diversification for rural areas
		Sustainable agricultural value chains
		Branding and marketing of sustainable agricultural products
Component 2: Climate-Resilient Gray Infrastructure	Sub-component 2.1: Resilient infrastructure	Reservoirs
		Climate-smart rural road construction and rehabilitation
	Sub-Component 2.2: Climate-resilient rural road system	Irrigation works
		Multi-purpose reservoirs
		Resilient infrastructure for flood and sedimentation control
Component 3: Institutional Coordination, Project Management and Sustainability	Sub-Component 3.1: Technical assistance and institutional capacity building for integrated landscape management	-
	Sub-Component 3.2: Project management, environmental and social management and monitoring and evaluation	-

1.7. Project Alternatives

1.7.1. Situation without Project

The analysis of no-project case is presented in the following paragraphs on the basis of project themes.

Erosion, landslide and flood control works

The themes include projects focused on the construction of flood and landslide prevention structures. Erosion, landslides and floods and their damage to the environment and people will not be able to be prevented unless the sub-projects are executed.

Climate-smart pasture management

Unless the projects focused on pasture rehabilitation and ecosystem reservoirs under this theme are executed, forest and forest-connected animal breeding activities will not be promoted and the local community will continue to suffer from poor livelihoods.

Forest rehabilitation, protection and sustainable management

The sustainable use of natural resources will not be possible and vulnerable ecosystems will not be protected unless the projects such as forest maintenance, seedling production plants, infrastructure systems for nurseries and the establishment of systems to indirectly protect forests with less use of woods and infrastructure systems are executed under this theme.

Income generation and livelihood diversification for forest villages

Livelihoods will not be diverse and the local people will continue to fail to make ends meet unless the projects on construction of recreational sites, and promotion of agricultural productivity and animal breeding activities are executed under this theme.

Sustainable and climate-smart agricultural practices

Land use practices will not be supported and consequently rural livelihoods will not be promoted unless the agricultural projects are executed under this theme.

Income generation and livelihood diversification for rural areas

Rural livelihoods will not be promoted unless the recreational sites are built and animal breeding projects are executed under this theme.

Sustainable agricultural value chains

Unless the projects focused on rural bakeries and processing plants are executed under this theme, agricultural and animal-based products will go to waste and fail to become qualified for marketing. This will lead to no contribution to employment and improvement of livelihoods.

Reservoirs

In the case that the projects under this thematic title cannot be implemented, agricultural irrigation cannot be supported.

Irrigation works

In the case that the irrigation reservoir and irrigation facility projects under this thematic title cannot be implemented, agricultural production will not be supported. Therefore, the livelihood challenges of the locals will remain.

Multi-purpose reservoirs

Unless multi-purpose reservoirs are built and operated as a part of the project, the natural resources of the basin will be inadequate for sustainable use and suffer from drought, floods and torrents.

Resilient infrastructure for flood and sedimentation control

The basin will continue to suffer from floods and torrents unless levees, flood and sedimentation control structures are built in the rivers under this theme.

From the perspective of all project groups, the basin will continue to suffer - unless the project is executed - from landslides, severe pollution in rivers, poor domestic and solid waste management, decline in vegetative and animal-based production, failure to make full use of environmental potential, challenges in planning and implementation of nature and conventional tourism, poor sustainable use of natural resources including forests in particular, drought, floods and torrents. In addition, the forest communities will continue to use the natural resources in an unsustainable way.

Unless the sub-projects are executed under the project, the project outputs will not be generated, and a result the outcomes of the outputs will not be achieved, and the following objectives of the main components will not be achieved, and Çekerek Basin will continue to suffer from natural disasters and effects of the climate change, with the local communities having welfare and livelihood problems lingering.

Objectives of the Component 1

The purpose of this component is to conserve and recover the well-being, function and efficiency of critical ecosystems, boost the sustainability of natural resource basis, promote sustainable land use in the basin to safeguard the livelihoods of the local communities, and build resilience against climatic risks.

Objectives of the Component 2

The purpose of this component is to offer protection from climatic disasters such as landslides and floods and improve the access of the local communities to climate-resilient infrastructure systems for the purpose of drinking water supply, sanitation and mobility.

1.7.2. Maintenance, Repair or Expansion Investment

The following sub-projects proposed under the project include maintenance, repair or expansion investments. The projects other than those itemized below are new projects. Therefore, they are not indicated under this title.

- Pasture rehabilitation project (General Directorate of Forestry) (Cost: 1.920.000 TRY),
- Pasture rehabilitation project (General Directorate of Forestry) (Cost: 726.000 TRY),
- Pasture rehabilitation project (General Directorate of Forestry) (Cost: 500.000 TRY),
- Rehabilitation project (General Directorate of Forestry) (Cost: 8.500.000 TRY),
- Rehabilitation project (General Directorate of Forestry) (Cost: 1.900.000 TRY),
- Stable Conditions Improvement Project (General Directorate of Agricultural Reform) (Cost: 7.500.000 TRY),
- Stable Conditions Improvement Project (General Directorate of Agricultural Reform) (Cost: 1.000.000 TRY),

- Pasture rehabilitation project (General Directorate of Agricultural Reform) (Cost: 5.500.000),
- Pasture rehabilitation project (General Directorate of Agricultural Reform) (Cost: 5.000.000),
- Pasture rehabilitation project (General Directorate of Agricultural Reform) (Cost: 4.200.000),
- Artova Reservoir Irrigation and Renovation (General Directorate of State Hydraulic Works) (Cost: 32.000.000 TRY).

The aforementioned maintenance, repair and expansion investments will help prolong the lifespan of the projects, improve their capacity and strengthen their infrastructure with less cost. This will help avoid situations that would be more costly in the future. The cost-benefit and financial analyses concerning the projects are set out in the relevant sections of this feasibility report.

1.7.3. Second Best Alternative

No second-best alternative has been entertained for site selection as Çekerek Basin is evidently less developed than other regions and affected by climate-induced natural disasters and their effects more than other regions, and natural assets of the basin need to be protected.

The sub-projects of the project were designated by a needs analysis along with a desktop review and site surveys performed by the project partners (public organizations and rural administrations). To this end, the second-best alternative analysis was performed as a part of the needs analysis. The sites and types of projects limited by topography and other factors such as reservoir construction, flood prevention projects and road rehabilitation were selected based on the views of the experts.

1.7.4. Best Alternative

The sub-projects of Çekerek Basin Rehabilitation Project have been reviewed in line with the following parameters, and the projects on the list have been designated as the best options and incorporated into the project.

- **Relevance:** The sub-projects have been designated based on the expertise of the project partners. Therefore, the project themes fit the purposes of the project partners.
- **Costs:** When the sub-projects were selected, the costs were kept low in a way to achieve the objectives.
- **Technical feasibility:** The selection of the sub-projects is based on adequate reviews of the project partners and due diligence paid to the technical feasibility of the projects. This is because it is impossible to achieve an objective unless the proposition made for the solution of a problem is feasible.
- **Views of different partners:** The views of different partners were taken into account for the selection of the sub-projects and each partner contributed to the project proposals in line with its remit, power, obligations or relevance.

- **Political feasibility:** Local authorities offer great support to the sub-projects proposed under the project. This will help embrace the project, make effective use of existing resources and make the project sustainable.
- **Efficiency and effectiveness:** As the project alternatives were considered, due diligence was paid to the adoption of the optimal method for the activities to be carried out in line with the local condititons and minimum cost.
- **Social acceptability:** The project partners and the target group in particular expressed their support for the project, agreed on and embraced it in all the meetings held as a part of the project.
- **Conformity to Programme Priorities:** The project's relationship to the following was investigated and found compatible: The Eleventh Development Plan (2019-2023), Medium-Term Plan (2020-2022), Ministry of Agriculture and Forestry Strategic Plan (2019-2023), General Directorate of State Hydraulic Works Strategic Plan (2019-2023), Çorum Special Provincial Administration Strategic Plan (2020-2024), Tokat Special Provincial Administration Strategic Plan (2020-2024), Yozgat Special Provincial Administration Strategic Plan (2020-2024), TR72 Regional Plan – Kayseri, Sivas, Yozgat (2014-2023), TR83 Regional Development Plan (Amasya, Çorum, Samsun, Tokat), Republic of Turkey Climate Change Action Plan (2011-2023), National Strategy and Action Plan to Combat Desertification (2015-2023), National Basin Management Strategy (2014-2023), National Rural Development Strategy (2014-2020), National Strategy for Regional Development (2014-2023), Turkish National Forestry Programme (2004-2023), World Bank's Turkey Forest Policy Note-2017, and Turkish National Water Plan (2019-2023).
- **Contribution to the elimination of inequalities (between men and women):** The selection of sub-projects is based on the inclusion of projects to contribute to the reduction of gender inequality.
- **Urgency:** For the selection of the sub-projects, priority was attached to the matters that the partners deemed extremely important and must be resolved.

While the following factors were taken into consideration for the site selection of the projects, an alternative was not entertained as flood, landslide and torrent control structures, maintenance-repair and expansion investments and drinking water reservoirs are going to be made in problematic sites:

- No conservation site in the project sites (national parks, natural parks, wetlands, natural monuments, cultural assets, heritage and conservation sites),
- No endemic and protected species to be affected by construction and operational phases of the projects in the project sites,
- Site selection based on the needs of the communities (e.g. water supply for a settlement with water scarcity or rehabilitation/reconstruction of roads damaged by floods or landslides),
- Project sites to be affected in a minimum way by environmental effects to arise in the construction and operational phases of the project such as noise and vibration,

- Project sites to be affected in a minimum way by the transformation of visual characteristics/landscape as a result of activities to be carried out in the construction and operational phases of the project,
- Few cultural heritage assets or none in the basin to be adversely affected by the activities to be carried out in the construction and operational phases of the project,
- Minimizing the expropriation activities that may be needed in the construction phase of the project,
- Minimizing the legal barriers that may arise from environmental concerns in the planning and construction phases of the projects,
- Minimizing the impact of construction works and operations of the project on the soil (soil quality, erosion and geomorphological issues to be analyzed),
- Minimizing the impact of construction works and operations of the project on water bodies (quality of rivers, coastal areas, ground water and sea water to be analyzed),
- Minimizing the impact of construction works and operations of the project on air (air quality, odor and noise pollution to be analyzed),
- Minimizing the impact of construction works and operations of the project on the ecosystem (ecosystem quality, ecosystem protection and extent of ecosystem degradation to be analyzed).

1.8. Technology and Design

Çekerek Basin Rehabilitation Project is an integrated basin rehabilitation project composed of 111 sub-projects. The project's technology and design has been designated by the relevant public organizations for some of the sub-projects. For some others, the project's technology and design will be designated in the final project preparation phase at the outset of the investment phase. Some of the projects proposed under the project are focused on agricultural and animal breeding outreach projects for the target group, and they are not based on technology and design. As the public project partners have the high-level expertise about designating the best technology and design for the projects, this section does not cover an alternative analysis on technology and design.

2. LOCATION SELECTION AND COST OF LAND

2.1. Physical and Geographical Characteristics

2.1.1. Geographic Location

Çekerek river basin has a total area of approximately 876.551 hectares, with the 85% being located in Yeşilırmak river basin and 15% in Kızılırmak river basin. The basin covers Akdağmadeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Merkez, Saraykent and Sorgun districts of Yozgat province; Artova, Sulusaray and Yeşilyurt districts of Tokat province; Alaca and Ortaköy districts of Çorum province; and Yıldızeli district of Sivas province. Yozgat province constitutes approximately 60.52%, Çorum province constitutes 18.72%, Tokat province constitutes 11.10%, and Sivas province constitutes 9.56% of the project area. The area of the Çekerek River Basin Rehabilitation Project is given in Figure 4.

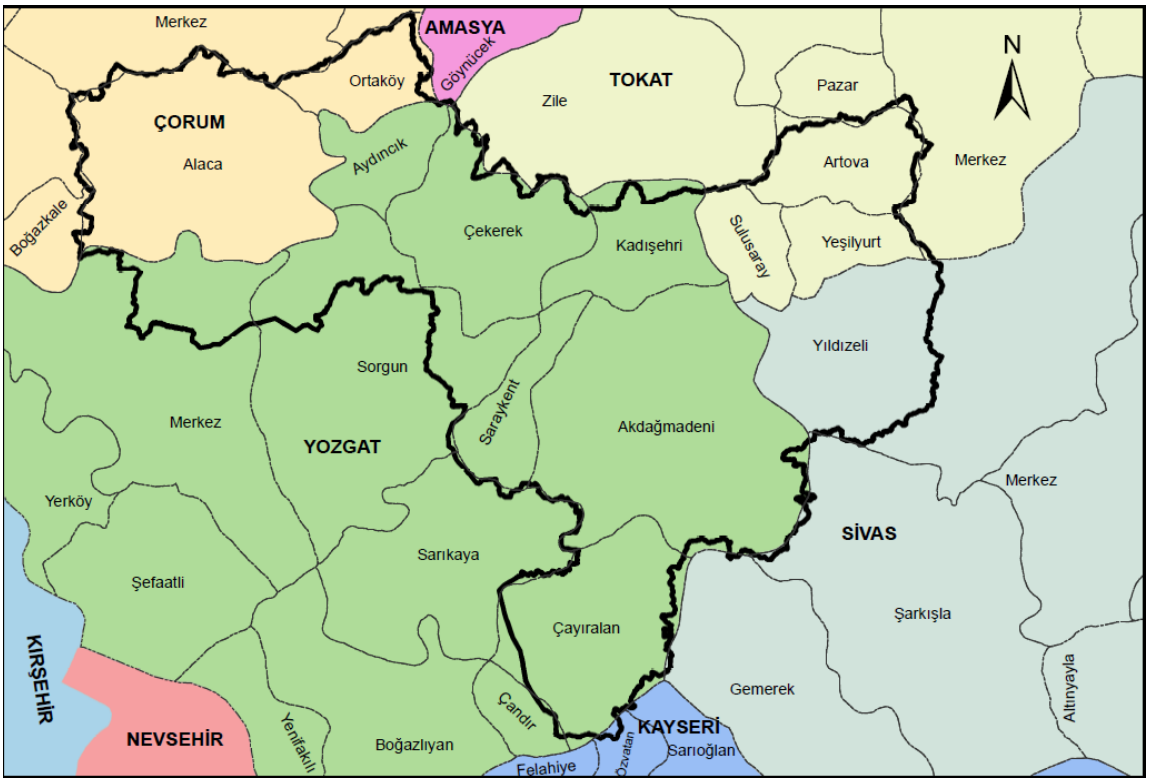

Figure 4. Area of Çekerek River Basin Rehabilitation Project >> (OGM, 2020)

2.1.2. Climate

Çekerek river basin has the climate of the Central Anatolia Region, which is semi-arid continental climate. Because the region is landlocked, it typically experiences hot and dry summers and cold and wet winters. Besides, there are great temperature differences between summer and winter and between day and night. Also, climate conditions vary within the region. The generally prevailing harsh weather conditions of the region turn relatively mild in the

Çekerek valley, located in Yeşilırmak basin, which is slightly affected by the Black Sea climate. >> (T.C. Yozgat Valiliği, 2020).

According to the Meteorological Parameters Bulletin (1929-2019) of **Yozgat** province, which was obtained from the General Directorate of Meteorology of the Ministry of Agriculture and Forestry, the average yearly temperature is 9.2 ºC. The hottest month is August, while the coldest one is February. The highest recorded temperature in the province is 38.8 ºC, recorded in July 2000, while the lowest is -24.4 ºC, recorded in February 1985. The average monthly relative humidity is 66.3%. The annual average number of uncloudy (clear) days is 131, cloudy days 202, and overcast days 34. The annual average number of rainy days is 93. The annual average number of snowy days is 31. The maximum recorded snow height is 92 cm, recorded in February 1950. The average monthly wind speed is 2.3 m/s. The highest recorded monthly wind speed is 33.1 m/s in the southwestward direction, recorded in 1986.

According to the Meteorological Parameters Bulletin (1929-2019) of **Tokat** province, which was obtained from the General Directorate of Meteorology of the Ministry of Agriculture and Forestry, the average yearly temperature is 12.5 ºC. The hottest month is August, while the coldest one is January. The highest recorded temperature in the province is 45.0 ºC, recorded in July 2000, while the lowest is -23.4 ºC, recorded in January 1972. The average monthly relative humidity is 63.2%. The annual average number of uncloudy (clear) days is 98, cloudy days 235, and overcast days 44. The annual average number of rainy days is 111. The annual average number of snowy days is 19. The maximum recorded snow height is 95 cm, recorded in December 2015. The average monthly wind speed is 2.1 m/s. The highest recorded monthly wind speed is 48.9 m/s in the southwestward direction, recorded in 1978.

According to the Meteorological Parameters Bulletin (1929-2019) of **Çorum** province, which was obtained from the General Directorate of Meteorology of the Ministry of Agriculture and Forestry, the average yearly temperature is 10.8 ºC. The hottest month is August, while the coldest one is January. The highest recorded temperature in the province is 42.6 ºC, recorded in July 2000, while the lowest is -27.2 ºC, recorded in February 1985. The average monthly relative humidity is 67.2%. The annual average number of uncloudy (clear) days is 105, cloudy days 232, and overcast days 40. The annual average number of rainy days is 111. The annual average number of snowy days is 21. The maximum recorded snow height is 80 cm, recorded in February 1948. The average monthly wind speed is 1.9 m/s. The highest recorded monthly wind speed is 32.5 m/s in the southward direction, recorded in 1981.

According to the Meteorological Parameters Bulletin (1930-2019) of **Sivas** province, which was obtained from the General Directorate of Meteorology of the Ministry of Agriculture and Forestry, the average yearly temperature is 9.0 ºC. The hottest month is August, while the coldest one is January. The highest recorded temperature in the province is 40.0 ºC, recorded in July 2000, while the lowest is -34.4 ºC, recorded in February 1950. The average monthly relative humidity is 64.8%. The annual average number of uncloudy (clear) days is 124, cloudy days 214, and overcast days 36. The annual average number of rainy days is 94. The annual average number of snowy days is 30. The maximum recorded snow height is 110 cm, recorded

in February 1950. The average monthly wind speed is 1.4 m/s. The highest recorded monthly wind speed is 41.2 m/s in the northward direction, recorded in 2008.

2.1.3. Soil and Land Structure

2.1.3.1. Soil Characteristics

There are quite different types of soil in the region due to different parent materials, topography, and climate characteristics of its semi-arid areas. The soil in the semi-arid areas are typically argillaceous and calcareous. The soils in the investigated areas are usually slightly alkaline with a pH range between 7–8 due to the lime content as well as the lack of rainfall to wash the lime off. Saline, alkaline, or gypsum-bearing soils may have higher pH values. Especially in the areas with an average annual rainfall of less than 600 mm, the soil has carbonate (particularly calcium carbonate) accumulation (calcification) in its lower layer. The carbonate accumulation in the lower layer increases gradually due to low rainfall. Indeed, carbonate concentration is higher in hollow lands with an average annual rainfall of less than 400 to 500 mm. In the areas with an average annual rainfall of less than 400 m, there are sierozem soils involving carbonate deposits below the shallow Horizon A. Brown steppe soils involving carbonate deposits in Horizon B were formed under steppe vegetation in the areas with an average annual rainfall of less than 400 m. There are chestnut-brown soils in the areas with an average annual rainfall of 400 to 500 mm (Atalay, 2015).

2.1.3.2. Geologic Structure

Table 4 lists the geological units in the basin in order from youngest to oldest.

Table 4. Geological Units of Project Field

Age	Formation	Member
Quaternary	Alluvium (Qal)	
	Slopewash (Qym)	
	Travertine (Qtr)	
	Old alluvium (Qe)	
Plio-Quaternary	Plio-Quaternary units (plQ)	
Miocene–Pliocene	Miocene–Pliocene deposits (Tmpli)	
Middle−Upper Eocene	Ortaköy volcanite (Teo)	
	Tokuş (Tet)	Asar member (Teta)
		Susuzdağ member (Tets)
Upper Paleocene−Middle Eocene	Boğazköy Formation (Tpeb)	Konacı member (Tpebko)
		Kireçtaşı member (Tpebk)
		Kiremitliktepe volcanite member (Tpebki)
		Sarayözü volcanite member (Tpebs)
		Pazarcık volcanite member (Tpebp)
		Dolak member (Tpebd)
		Yaycılar gabbro (Tey)
Upper Cretaceous	Artova Ophiolitic Complex (Ka)	
	Darmik Formation (Kd)	

Age	Formation	Member
	Central Anatolian Granitoids (Kog)	
Upper Palaeozoic–Mesozoic	Akdağmadeni massive (PzMza)	

1. Akdağmadeni Massive (PzMza)

This unit consists of late Palaeozoic–Mesozoic calcschist, quartzite, quartz schist, amphibolite schist, gneiss marble, and dolomitic marble. The unit went through metamorphosis in greenschist and amphibolite facies in general. It is indicated that its lower layers went through higher-level metamorphosis (AKÇAY & BEYAZPİRİNÇ, 2017). The rocks belonging to Akdağmadeni massive are frequently intersected by Central Anatolian granitoids.

2. Central Anatolian Granitoid (Kog), Darmik Formation (Kd) and Artova Ophiolitic Complex (Ka)

The Central Anatolian Granitoid is primarily made up of granite, granodiorite, syenite, microgranite, granite porphyry, monzonite, and tonalite. Artova Ophiolitic Complex consists of serpentinized peridotite, dunite, harzburgite, gabbro, diabase, pyroxenite dykes, whose primary structures were disrupted, pillow lavas, and deep-sea sediments, as well as metamorphites belonging to the Sakarya Continent and Trias–Cretaceous limestone blocks. (AKÇAY & BEYAZPİRİNÇ, 2017).

Artova Ophiolitic complex and Darnik Formation, which include tectonic contacts, have basaltic andesite lava and pyroclastics at the bottom, and pebble stone, sandstone, clay stone, mudstone, argillaceous limestone, micritic limestone, and calciturbidites on top layers >> (AKÇAY & BEYAZPİRİNÇ, 2017).

3. Boğazköy Formation

Boğazköy Formation, which consists of late Paleocene–middle Eocene volcano-sedimentaries, is not compatible with the units mentioned above. The gabbroic rocks, which are placed on the bottom layers of Boğazköy Formation in the form of sill and laccolith, are called the Yaycılar gabbro >> (AKÇAY & BEYAZPİRİNÇ, 2017). The middle-late Eocene Tokuş Formation overlays on Boğazköy Formation and basement rocks in an incompatible way (Yılmaz, 1982).

4. Tokuş Formation (Tet) and Ortaköy volcanite (Teo)

Tokuş Formation consists of two parts: one is made up of basement pebble stone and called Susuzdağ member, and the other is made up of sandstone, clay stone, and fossiliferous limestone and called Asar member >> (AKÇAY & BEYAZPİRİNÇ, 2017). The Susuzdağ member is represented with alluvial fan, fan delta, and river sediments consisting of reddish brown, grey and poorly sorted pebble stone, sandstone, and mudstone. The Asar member comprises grey, caen and yellow, massive-very thick bedded and porous limestone; with bottom layers being pebbled, arenaceous, and argillaceous and with top layers being highly fossiliferous. In this study, acidic lava and pyroclastic rocks that are located in Ortaköy district and that have intricate relationships with the basement pebble stones (Susuzdağ member) of

Tokuş Formation are called Ortaköy volcanite. The unit is represented with yellowish, light grey rhyolite and rhyodacite lava and pyroclastics >> (AKÇAY & BEYAZPİRİNÇ, 2017).

Figure 5 shows the geologic map of the project area and Figure 6 shows a generalized stratigraphic section.

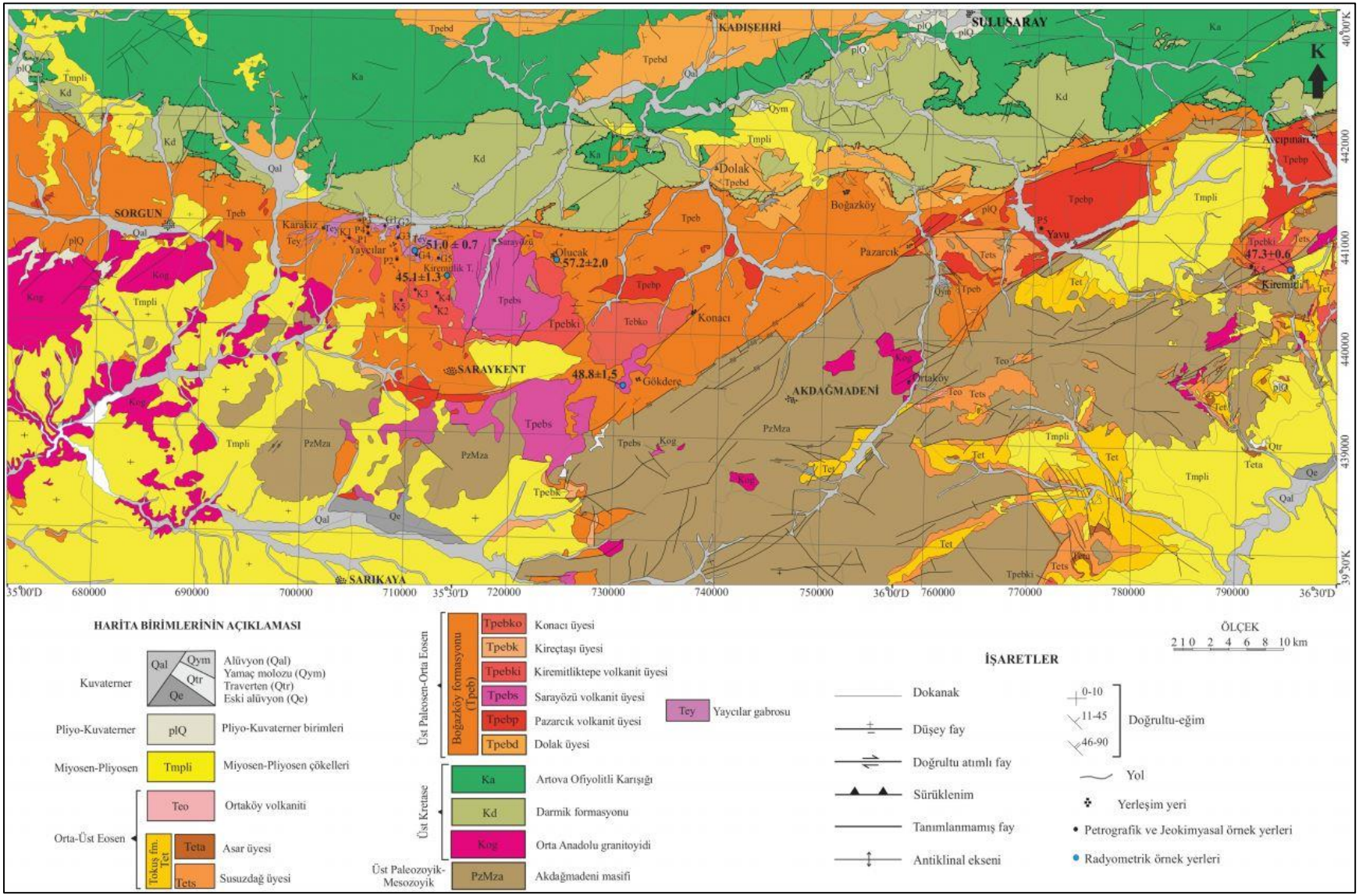

Figure 5 Geological Map Covering Project Area (AKÇAY & BEYAZPİRİNÇ, 2017)

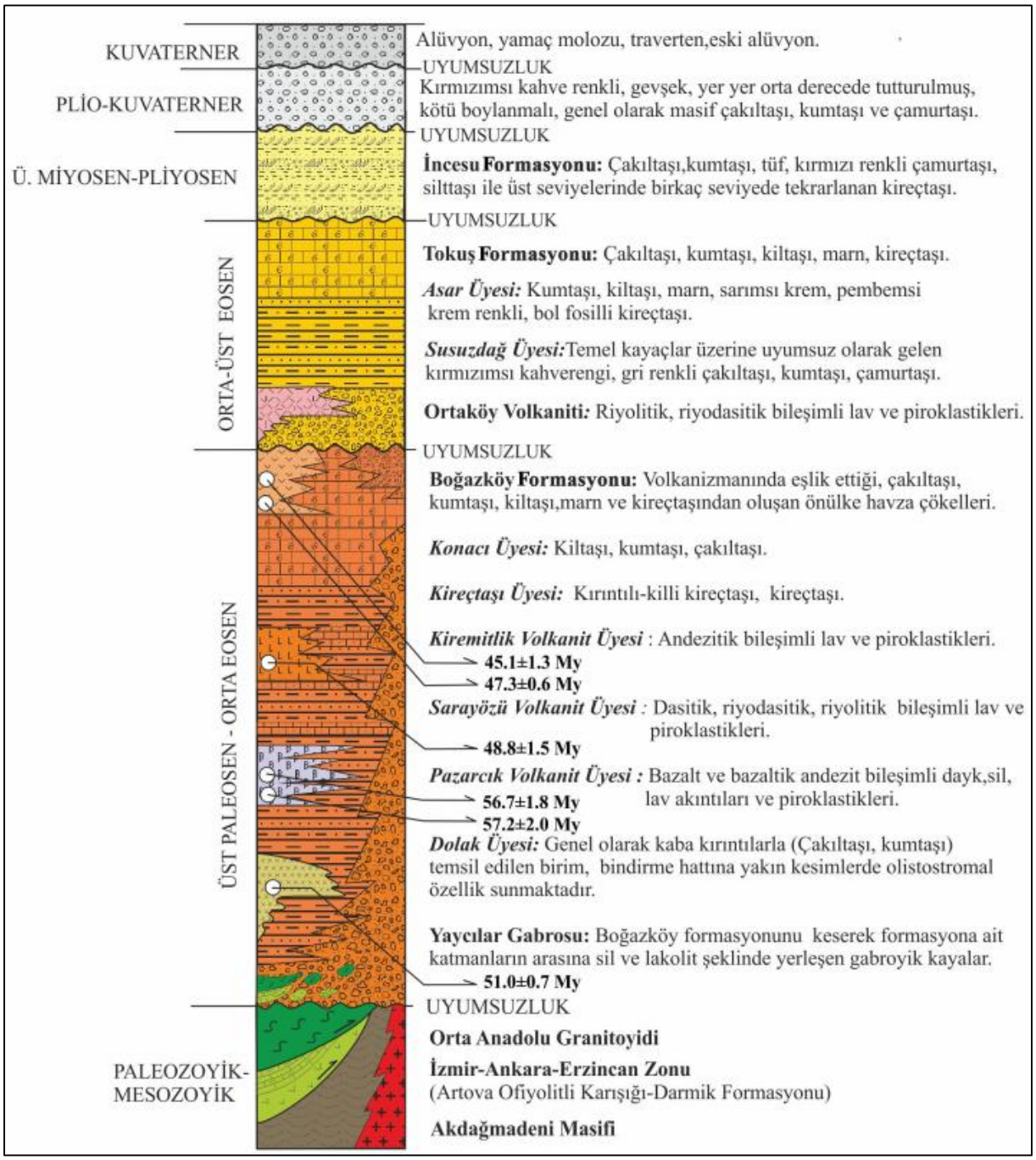

Figure 6 Generalized Stratigraphic Section of Project Area (AKÇAY & BEYAZPİRİNÇ, 2017)

2.1.3.3. Seismicity

The location of the project area is close to a branch of the North Anatolian Fault, which runs across Çorum province. Alaca district of Çorum, which is part of the project area, is very close to the fault. Besides, the location of Artova district of Tokat province, which is part of the project area, is also close to the North Anatolian Fault. Figure 7 shows the project area roughly on Turkey Earthquake Risk Map.

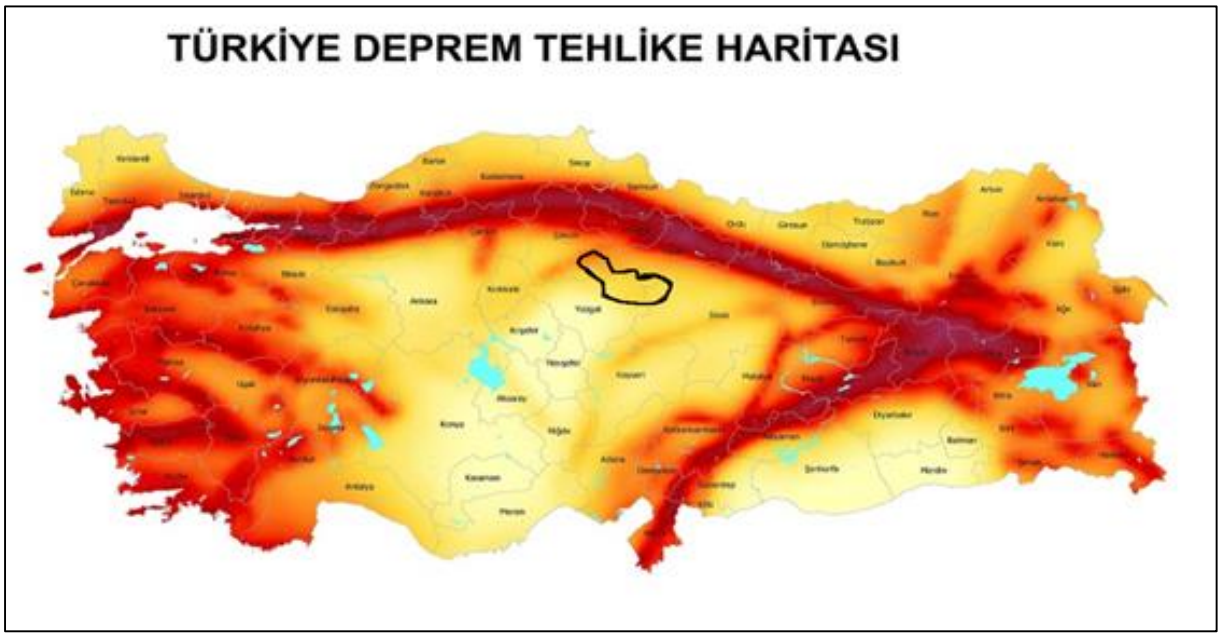

Figure 7 Turkey Earthquake Risk Map (AFAD, 2020)

According to the Turkey Earthquake Regions Map, Aydıncık and Yerköy districts of **Yozgat** province are located in the 2nd degree earthquake zone, while other districts are located in the 3rd degree earthquake zone. The project area is located in the 3rd degree earthquake zone according to the Yozgat Earthquake Map. The Yozgat Earthquake Map is shown in Figure 8.

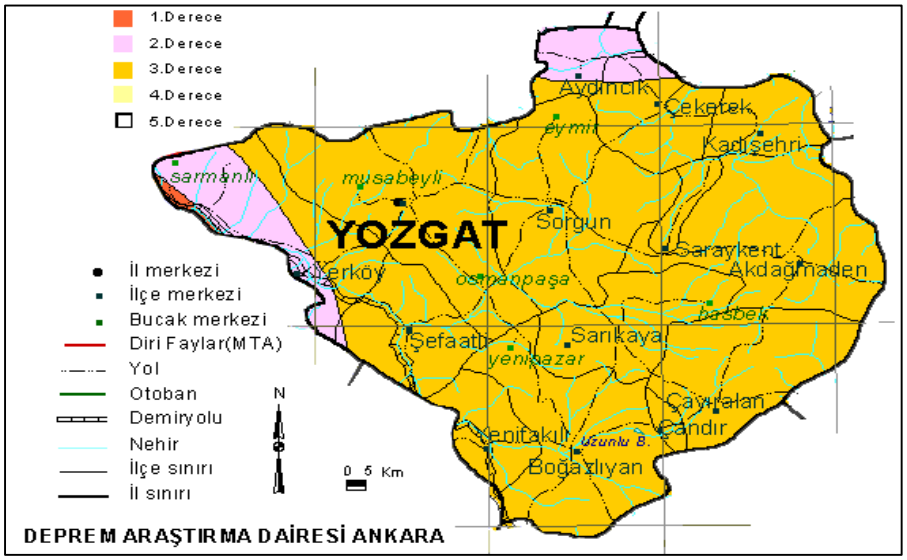

Figure 8 Yozgat Earthquake Map (AFAD, 2020)

The project area located in **Tokat** province covers Artova, Sulusaray and Yeşilyurt districts of Tokat. While Sulusaray and Yeşilyurt districts are completely located in the 2nd degree earthquake zone, one part of Artova disrict is located in the 2nd and the other part is located in the 3rd degree earthquake zone. One of the most important earthquakes that happened in Tokat province is the Erbaa-Niksar earthquake, which occurred on 20 December 1942. However, Erbaa and Niksar districts, which were severely affected by the earthquake, are not within the basin area. The Tokat Earthquake Map is shown in Figure 9.

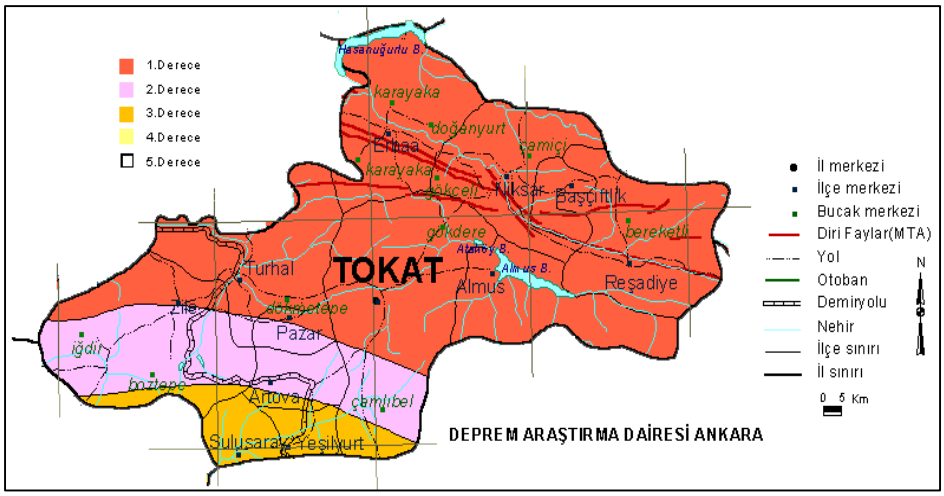

Figure 9 Tokat Earthquake Map (AFAD, 2020)

The project area located in **Çorum** province covers Alaca and Ortaköy districts of Çorum. Alaca district is located in the 3rd degree earthquake zone, while Ortaköy district is located in the 2nd degree earthquake zone. These districts are located in between the Kazankaya fault and Çekerek fault. The Çorum Earthquake Map is shown in Figure 10.

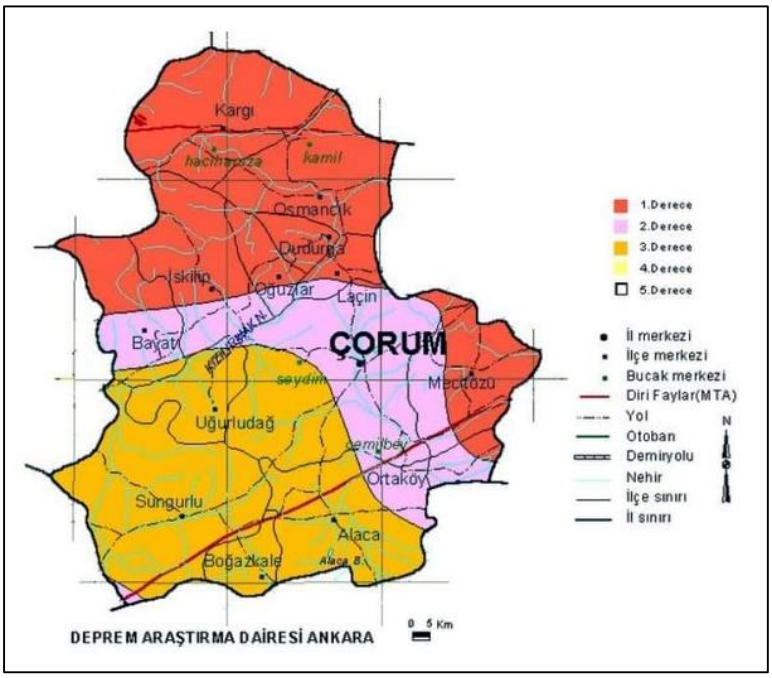

Figure 10 Çorum Earthquake Map (AFAD, 2020)

The project area located in **Sivas** province only covers Yıldızeli district of Sivas, which is located in the 3rd degree earthquake zone. The district is located near the Deliler fault and Akdağmadeni fault, which run across Sivas. The Sivas Earthquake Map is shown in Figure 11.

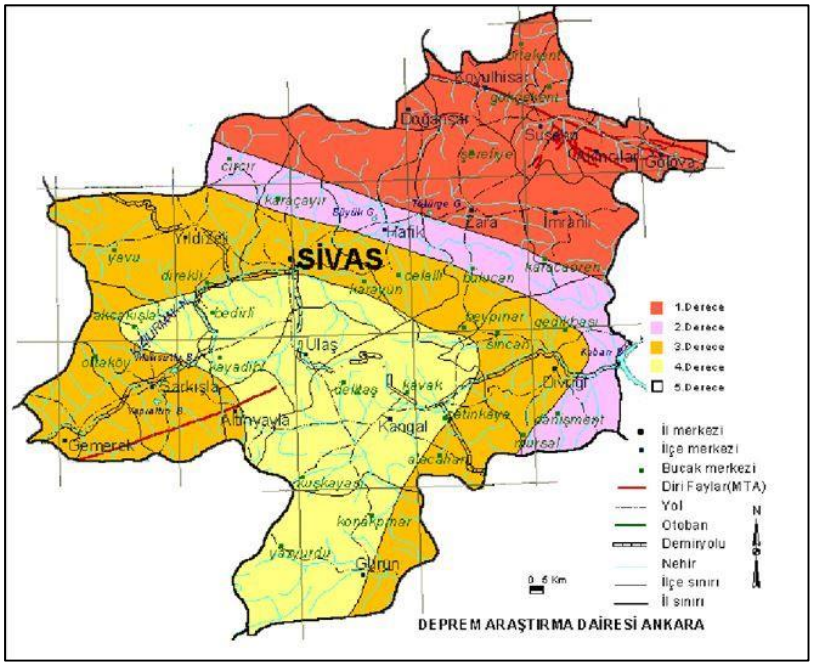

Figure 11 Sivas Earthquake Map (AFAD, 2020)

2.1.4. Vegetation

The land area of **Yozgat** province consists of meadows and pastures (15%), forests (28%), and cultivated areas (56%). Because of the prevailing continental climate, the province is mostly covered with steppe vegetation. In addition, there is a land area of 962 hectares, which consists of forests and heaths >> (Yozgat Çevre ve Şehircilik İl Müdürlüğü, 2020)

The land area of **Tokat** province consists of meadows and pastures (12%), cultivated areas (38%), and forests and heaths (39%). The 1.9% is made up of nonarable lands. The province is one of the most important forest regions of Turkey. Nearly all of the mountains located in its northern and southern parts are covered with forests.

Besides, there is a large diversity of plants and trees. Wild tea grows in Kozlu, Meydandüzü and Osmanköy villages of Erbaa district; Lebanon cedar grows in the Çatalan forest in Kale village as well as in the forests located near Kazalapa village of Reşadiye district; wild olive tree grows in the areas located between Doğanyurt village of Erbaa district, Kümbetli village of Niksar district, and city centre; and pomegranate and fig grow in the same area, naturally. Forest density increases around Almus, Reşadiye and Niksar districts. Among the most common species are black pine, Scots pine, firs, hornbeams, and cedars. Species such as hazelnut, Cornus mas, wild plum, apple, wild pear, and hawthorn are also found occasionally. Willows and poplars are usually seen in plains and valley bottoms. The prevailing vegetation in the regions with low density of trees is steppe. The vegetation is green during spring and early summer, while it turns yellow and takes the form of steppe in the late summer (T.C. Tokat Valiliği, 2020).

The vegetation in **Çorum** is usually steppe. Some examples of the species include common daisy, common poppy, milk thistle, creeping thistle, yellow star thistle, common mullein, and tree wormwood. Willow and poplar species are found along rivers. Oak, juniper and black pine trees grow in highlands. Crocus species, common grape hyacinth, and wild tulip are also seen in spring, seasonally. Oak forests and coniferous forests are encountered in the northern districts. Oak tree, cornelian cherry, wild plum, apple, hawthorn, and wild rose are commonly seen in lands with an elevation of 1000–1200 m above sea level. Lime trees are also encountered in the region rarely. Scots pine, black pine, calabrian pine, and fir tree are found in Kargı, İskilip, Osmancık and Bayat districts. Forestlands and heathlands constitute around 28% percent of total land area of the province << (T.C. Kültür ve Turizm Bakanlığı, 2020).

Forestlands do not cover a large area in **Sivas** province due to the destruction of forests around the province. Two significant forestlands of the province are located in Koyulhisar district and Şerefiye village. Besides, the White Mountains (Akdağlar) constitute the most important forestland of the Central Anatolia Region. Apart from these forestlands, the prevailing vegetation in Sivas is steppe. Common species include crocuses, winter aconite, poppies, and service tree, as well as those with resilient deep roots such as milkvetch, mulleins, bindweeds, spurges, mountain clover, thyme, and tree wormwood. However, the growth rate of these plants rapidly decreases because they are used as fuel in some areas (T.C. Tarım Bakanlığı, 2020).

2.1.5. Water Resources

2.1.5.1. Surface Waters

Rivers

The rivers located within the territory of **Yozgat** province include the Delice river with a total length of 576 km and an annual flow of 450 hm^3 and the Çekerek river with a total length of 350 km and an annual flow of 430 hm^3 >> (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

The entire land area of **Tokat** province is located in the Yeşilırmak basin. The Yeşilırmak River is nearly 519 km long and meets the spring waters coming from the mountains located between Koyulhisar and Zara districts of Sivas. The river flows past Kazova and Turhal districts of Tokat and meets the Çekerek river, then flows through Amasya and Canik Mountains and reaches the Black Sea at Cape Civa. There are alluvial barrier lakes in its delta such as Dumanlı, Semenlik, Akarcık and Kocagöl lakes. Yeşilırmak has 3 important tributaries. These are Tersakan, Kelkit and Çekerek streams. Other branches include Geyraz, Miçöz, Büyük, Hazan, Çilkoru, Sarsı, Alpu, Dereköy, Öz, Sapoğlu, Özdere, Bani, Kara, Zinav, Delice, Çanakçı, Kelkik, Karakuş, İmbat, Tanoba, Bahçe başı, Çivril, Dazya, Hotan streams. These are sub-tributaries of the 3 major tributaries mentioned above >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

The rivers located within the territory of **Çorum** province include the Kızılırmak River and Delice, Devrez, Çorum and İncesu (Çekerek) streams. The Kızılırmak River is used for irrigation and power generation, while the other 4 are used only for irrigation >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

The rivers located within the territory of **Sivas** province include: the Kızılırmak, Yıldız, Kalın, Mısmıl, Fadlım, Tecer, Acı and Acısu rivers as well as Kelkit, Tozanlı, Çaltı, Yılanlı, Balıklıtohma, Tohma and Hurman streams. The annual flow rates of these rivers are as follows: Kızılırmak 39,42 m^3, Yıldız river 11,30 m^3, Kalın river 1,77 m^3, Tecer river 2,90 m^3, Kelkit stream 50,34 m^3, Tohma stream 7,38 m^3, Mısmıl stream 1,21 m^3, and Fadlım stream 3,0 m^3. These rivers are used for irrigation and power generation >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Lakes

There are no natural lakes in **Yozgat** province. The province has 3 dams in-service. The total reservoir area is 3.047 hectares. In addition, there are 4 irrigation reservoirs in-service. There is also a small lake called “Cavlak Lake” by the locals (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

The important lakes in **Tokat** province include Zinav, Göllüköy and Kaz lakes. The Zinav Lake is a freDSIater lake. It is fed by the Kelkit River. The lake is under protection as an In-forest Recreation Area affiliated to the Ministry of Agriculture and Forestry. The Göllüköy Lake is fed by nearby creeks. The Kaz Lake is located in Üzümören town near the Pazar-Zile Highway. Other waters in the province include Dutluca, Artova, Bedirkale, Kızık, Akbelen and Büyükaköz reservoirs as well as Belpınar, Boztepe, Almus and Uluöz dams >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

There are no important lakes within the territory of **Çorum** province. The water levels of the Eymir (Gölünyazı) Lake, located in a central district, drops dramatically in summer. Therefore, it looks like a reed bed or a swamp. There is the Uyuz Lake and a group of ponds called Kırkgöz, both of which emerge in spring and dry out in summer. In addition, there are the Alaca-Alacahöyük, Alaa-Bozdoğan, Alaca-Geven, Alaca-Kızkaracca, Alaca-Sincan, Boğazkale-Evci, Kargı-Aksu, Kargı-Gökçedoğan, Seydim 1, Seydim 2 and Mecitözü-Hıdırlık reservoirs in the province >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

There are many important lakes within the territory of **Sivas** province**.** These include the Lota-1, Lota-2, Hafik, Tödürge, Çetme, Kemis, Mağara, Kuru, Kaz, Karayün, Ulaş and Balıkkaya lakes. There are also 10 dams in the province, which are used for irrigation, power generation, and drinking water. These are Yapıaltın dam in Maksutlu village of Şarkışla district, Kılıçkaya and Çamlıgöze dams in Suşehri district, 4 Eylül and Gazibey dams at the centre, Mursal dam in Divriği district, Pusat-Özen dam in Hafik district, Gölova dam, İmranlı dam, Karacalar dam in Ulaş district, Güneykaya dam in Yıldızeli district, Nevruz dam, and Kocakurt dam in Kangal district. There are reservoirs used for surface water irrigation in the province, which include the following: Üçtepe, Harmancık, Çeltek, Tutmaç (Centre), (Ulaş) Kızılıcakışla Karacaören (Şarkışla) Deliilyas, Kurucagöl, Güzeloğlan (Altınyayla), Karagöl-Sahli Çatköy, Kömeviran (Gemerek), Delice (İmranlı), Avcıpınar, Topulyurdu Küçükhöyük, Sarıçal, Kıldır, Halkaçayır, Kaman, Kapıköy, Cizözü Gündoğan (Yıldızeli), Boğazdere, Tutmaç, Karasar, Şenyurt Örenlice (Ulaş), Kemeriz (Zara), Bozarmut (Kangal) ve Şerefiye (Zara), Hayranlı, Eskihamal, Ayvalı, and İncesu (Gürün). The following reservoirs are currently under construction: Armutlu (Centre), Demiryazı, Karacalar, Gülbahçe, Baharözü, Küpeli (Ulaş), Esmebaşı Kaleköy, Gündoğan (Yıldızeli), Kuşcu (Zara), Davulbaz, Mancınık (Kangal), Güresin, and Kevendüzü (Divriği). In addition, the following regulators are used for irrigation: Hamal (Kangal), Kalın Yıldız (Yıldızeli), Habeşçayı (Zara), Sarıca (Gürün), Ağcainiş (Merkez), Göksu (Gemerek), and Yılanlıçay (Divriği) >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Seas

The provinces located in the basin are landlocked.

2.1.5.2. Groundwater

The amount and quality of groundwater in **Yozgat** vary due to the geological characteristics of the province. Because of extensive irrigation, the average water level is around 90.00 meters in the dry season and 60.00 meters in the wet season in Boğazlıyan Sub-basin. Apart from this area, the groundwater level varies between 10 and 120 meters locally. A net land area of 490 hectares is irrigated by means of 3 Soil and Water Cooperatives, which were opened thanks to 3.68 hm^3 of water reserved for irrigation. 30,51 hm^3 of the water, which can be used safely, is allocated, while 64,49 hm^3 of groundwater could not be allocated. In addition, there are many thermal springs in the area. These include Sarıkaya, Boğazlıyan, Bahariye, Sorgun, Yerköy, Saraykent, Akdağmadeni and Karadikmen thermal springs. Hot waters are used for heating and spa >> (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

The important aquifers in **Tokat** province include alluvial aquifers, which were formed by

Yeşilırmak, Kelkit and Çekerek rivers as well as their creeks, and karstic limestone aquifers. Alluvial aquifers constitute the most efficient groundwater basins in the province. Karstic aquifers are smaller than alluvial aquifers in terms of reserve and use. Flysch sequences and volcanic sequences also carry groundwater. These constitute the third most important aquifer group in the province >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Aquifers that are rich in terms of groundwater in **Çorum** province are alluviums and lime stones lying across plains and rivers. The amount of groundwater used in 2018 is 636.000 tons/year. The groundwater resources in the area include Alaca, Derinçay (Upper and Lower), Çorum Stream-Efendik, Ortaköy Göynücek, Merzifon-Gümüşhacıköy, Delice (İnegazili-Kavşut), Çavuşçayı, Budaközü (Sungurlu, Demirşeyh, Boğazkale), Kızılırmak (Uğurludağ), İskilik-Bayat, Bayat-Kızılırmak, Kızılırmak-Ovacıksuyu, Hamamözü, East Osmancık, and Kargı. Besides there are 3 geothermal power plants in service >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

In **Sivas** province, 1980 Groundwater Utility Certificates were granted to public institutions, persons and organizations, and the amount of permitted water use is 50.20 hm^3/year. 19 hm^3/year of groundwater is used to provide villages with drinking and utility water. The total amount of groundwater abstracted in the area is 50.20 hm^3/year. 23.5 hm^3/year is used as drinking and utility water, 8.6 hm^3/year for irrigation, and 18.1 hm^3/year for industrial use. 880 hectares of agricultural land is irrigated with groundwater in the area >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

2.1.6. Degradation of natural resources

Although the climate and geographical formations of most areas in the region are suitable for forest growth, forestlands have decreased dramatically and been replaced by steppes due to the destruction of forests and green areas ongoing for centuries.

2.2. Economic and Physical Infrastructure

2.2.1. Underground Resources and Energy

Yozgat province is rich in terms of mineral diversity due to its geological structure. As a result of the works conducted by the General Directorate of MTA (Mineral Research and Exploration), a wide variety of deposits and prospects of metallic minerals and industrial raw materials were discovered. These include raw materials of lead-zinc, iron, manganese, feldspar, rock salt, limestone, quartzite, brick-tile, fluoride, graphite, and cement. Deposits and prospects of iron, which is one of the metallic minerals, are mostly found in Akdağmadeni, Sorgun and Sarıkaya districts. Akdağmağdeni and Sorgun are two districts of Yozgat that are included in the Çekerek Basin Rehabilitation Project. There is a proven+probable reserve of 8.5 million tons at a Fe2O3 grade of 40% in the Akdağmadeni-Karapınar ore deposit. In the ore deposits located near Sorgun-Sarıkaya area, mineral deposits with 17–39% iron content were found. Akdağmadeni-Pazarcık and Kartalköy mineral prospects have manganese ores at grades of 21.23% and 29.13%, respectively. Pazarcık prospect has a reserve of 500 tons. Besides, the most important copper-lead-zinc reserve in the region is located in Akdağmadeni district. The

reserve having 500.000 tons of deposit at a Zn grade of 8% and Pb grade of 4% was found and processed in the past years. >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

Yozgat province is also important in terms of industrial raw materials for feldspar, rock salt, limestone, quartzite, brick-tile, fluoride, and cement. 139 million tons of proven feldspar reserve with a total alkaline value of 7.7–8.7% was found in Sarıhacılı village, which is included in the Çekerek Basin Rehabilitation Project. Besides, 114.580.000 tons of proven feldspar reserve with a total alkaline value of 8% was found in Çağlayan and Gözbaba villages of Sorgun district, which is also included in the project. There is limestone in Kayakışla village of Sorgun district. 3 million tons of probable reserve at a CaCO3 grade of 96–98% was found there. Also, a quartzite reserve with 95.51% SiO2 content, which is suitable for aerated concrete production, was found near Sorgun >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

As a result of the works conducted by the General Directorate of MTA, geothermal resources were found in Boğazlıyan, Akdağmadeni, Sorgun, Sarıkaya, Yerköy and Saraykent districts of the province. A geothermal fluid with a temperature of 38.8–75ºC and a flow rate of 14.15 lt/s was obtained from geothermal resources in Sorgun. These hot springs are used for spa. As a result of the works conducted between 1958 and 1985 searching for radioactive raw material, 3.852 tons of proven uranium reserve at a grade of %0.1 was found in Temrezli village of Sorgun district. Also, 13.206.000 tons of proven coal reserve with a calorific value of 4926 Kcal/kg was found near Sorgun as a result of the works conducted to search for coal >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

Tokat province is located on two tectono-stratigraphical units consisting of rocks that have completely different characteristics and that are located in the northern and southern sides of a tectonic line laying between Devecidağ and Köroğlu mountains. As a result of the works conducted there, important deposits and prospects of metallic minerals and industrial raw materials were found, notably antimony and bentonite, which are of great importance in terms of national production. Copper, chromium, iron, and manganese are also found within the territory of the province. There are many chromium mine, open cut and mostra in Yeşilyurt, Sulusaray and Artova districts, which are located in Çekerek basin. The most important chromite mineralization in the province is found in Artova district. A mineralization potential of around 500.000 tons at a Cr2O3 grade of 10–48% is considered possible there. Another metallic mineral found in the province is the Karadut iron ore prospect at a Fe grade of 50% >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

As a result of a geothermal well testing conducted by the General Directorate of MTA for the Special Provincial Administration in Sulusaray district, a geothermal fluid with a temperature of 48ºC and a flow rate of 42 lt/s was obtained at 294 m depth. It was found out as a result of the test that the well has a thermal power of 2.29 MW >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

Sivas is an important area in the Central Anatolia Region for its developed industry and an important province in the country for its underground resources. There is a zeolite reserve of 1 million tons with an annual production capacity of around 5.000 tons in Yıldızeli district, which is included in the Çekerek Basin Rehabilitation Project. There are fields of basalt and andesite,

which are suitable for paving stone production, in Kangal, Altınyayla and Yıldızeli districts. Fluoride, zeolite, and limestone are also found in Yıldızeli >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

As a result of works conducted in and around **Çorum** province, a wide variety of deposits and prospects of metallic and industrial raw materials were found, such as antimony, copper, iron, manganese, bentonite, graphite, clay, limestone, and brick-tile. However, according to the 2010 Çorum Province Minerals and Energy Resources report of MTA, there are no deposits and prospects of raw materials or energy resources in Alaca and Ortaköy districts, which are located in Çekerek basin and included in the Rehabilitation Project >> (Maden Tetkik ve Arama Genel Müdürlüğü, 2010).

2.2.2. Agriculture and Stockbreeding

In **Yozgat** province, whose economy is largely based on agriculture and stockbreeding, the 56.52% of the population works in agriculture, while the 43.8% works in other sectors. Cereals are the most commonly produced crops in dry conditions in the province. Wheat, barley, lentil, chickpea and bean fields constitute a large portion of arable lands. Yozgat province occupies the 1st place in lentil production and the 2nd place in sugar beet production >> (T.C. Yozgat Valiliği, 2017). Most agricultural businesses also carry out stockbreeding activities. The most common culture breeds include the Brown Swiss cattle and its cross-breeds. Dairy and livestock farming are common in Merkez, Akdağmadeni, Çekerek, Kadışehri and Sorgun districts located in Çekerek basin. Akkaraman sheep breed is the most common local breed. There has been a decline in sheep production in the recent years due to the inefficient use of pasture areas, high input costs, and challenge of finding shepherds. Therefore, there has been an increase in grants given and projects implemented to support sheep/goat production. It is planned to overcome these challenges and increase productivity by making investments as part of the project >> (Yozgat'ta Tarım ve Hayvancılık, 2017).

In Artova, Sulusaray and Yeşilyurt districts of **Tokat** province, which are included in the project region, there are a total dry farming area of 750.000 decares and a total wet farming area of 83.000 decares. These farming areas include fields, vegetable and fruit farms, greenhouse cultivation areas, ornamental plant cultivation areas, arable lands, forestlands, and pasture areas >> (Tokat İli 2019 Yılı Tarım İstatistikleri, 2019). The following factors indicate the social and economic benefits of agricultural activities in the province: around 40% of total land area of the province being arable and fertile; the presence of major water resources for irrigation; large pasture areas that support stockbreeding; the presence of geothermal resources to use in agricultural sector (greenhouse cultivation); and the 42% of the population being employed in agricultural sector. Stockbreeding is one of the important economic activities coming after plant production in Tokat province. Tokat comes second with 25% share after Samsun among the provinces in TR83 region (Samsun, Çorum, Tokat, Amasya) in terms of livestock breeding (Barış, 2019).

As for the sectoral distribution of workforce in **Sivas** province, agriculture and stockbreeding are two major economic activities in the province. The 66.5% of the economically active

population works in agriculture, with 54.7% of them being women and 45.3% being men. It is notable that the 91.6% of the population working in agriculture live in rural areas. Sivas province has a total land area of 2.720.279 hectares. The 41% of this is arable land, 27% is pasture area, 13% is forest and heathland, and 19% is non-agricultural land. The province is an important plant production center thanks to having the 2nd largest agricultural area and an agricultural basin with a microclimate. It occupies the first place in sainfoin, seed potato and oat production and the third place in wheat production in the country. Apple, pear, sour cherry, and apricot are the most commonly produced fruits. Fruit growing is rather considered an activity to do for side income and family needs beside cereal and animal production. In terms of beekeeping, Sivas province occupies the 2nd position in Turkey >> (Sivas Yatırım Rehberi, 2017).

Agriculture sector is the primary livelihood source in **Çorum** province. The most commonly produced crops include wheat, rice paddy, chickpea, onion, walnut, and green lentil. Agricultural products constitute 14% of total exports of the province. Besides, stockbreeding activities are carried out for side income >> (Çorum İli Tarımsal Verileri, 2016).

2.2.3. International Trade and Logistics

Top three sectors in terms of export in **Yozgat** province are: agriculture sector (cereals, legumes, and oilseeds and oilseed products), ready-made garment sector, and automotive sector. According to the 2019 December temporary international trade data, which was obtained by partnership of Turkish Statistical Institute and Ministry of Customs and Trade, Yozgat had an export value of 1 million 469 thousand dollars and an import value of 1 million 423 thousand dollars >> (KARA, 2019).

Tokat province had an export value of 18.1 million dollars and an import value of 14.9 million dollars according to 2019 data. The export value is the lowest figure among TR83 region provinces, which include Çorum province as well and are part of the Rehabilitation Project. According to the 2019 December data, manufacturing industry had 93% share, agriculture and stockbreeding sector had 4.4% share, mining and quarrying sector had 1.8% share, and fisheries sector had 0.5% share in exports.

As for the exported products of **Sivas** province, a wide variety of sectors lead the province's economy, such as mining, machine and equipment production, furniture manufacturing, mineral products, and metal goods. The province exports to the four corners of the world, from the Far East to Central Asia and from the United States to Europe. In terms of export figures, China occupies the first place, followed by the US, Iraq, Germany, Syria, and India (Sivas Yatırım Rehberi, 2017). According to the temporary international trade data, which was obtained by partnership of the Turkish Statistical Institute and the Ministry of Trade, the export value was 7 million 325 thousand dollars and the import value was 3 million 535 thousand dollars in Sivas province in December 2019.

Çorum province has nearly 450 industrial sectors that manufacture the following: tile and brick, flour, iron and steel casting, alloys of copper, zinc, and magnesium, automotive sub-industry, vitrified and ceramic tiles, textile products, surgical and medical supplies, paper,

wrapping paper, livestock and egg, pasta, sugar, milk and dairy products, timber and furniture, tempered (shaped) glass, cosmetics, and more. With its sectors trading these products nationally and internationally, Çorum province occupies the second place after Samsun in TR83 region in terms of international trade >> (TR 83 Bölgesi İçerisinde Temel Göstergeler İtibariyle Çorum İlinin Yeri, 2017). According to the temporary international trade data, which was obtained by partnership of the Turkish Statistical Institute and the Ministry of Trade, the export value was 11 billion 82 million dollars and the import value was 14 billion 259 million dollars in province in June 2019.

2.2.4. Investment

A total investment of 1 billion 170 million TRY has been made in Yozgat in the last 14 years. It was aimed at conserving and growing forests, supporting forest villagers, managing preserved areas effectively and making these public spaces, using water resources efficiently to meet drinking water, irrigation and other needs and to generate power, and making weather forecasts more accurately. In addition to these, investments and improvements were made in education, transportation and industrial sectors >> (Yozgat İli Kamu Yatırımları, 2019). The road transport is somewhat adequate in the area but additional regulations and investments are necessary. The completion of the High-Speed Rail project and the Airport project, which are in progress, will accelerate the economic growth of the province >> (Yozgat Belediyesi 2020-2024 Dönemi Stratejik Planı, 2019).

Public investments have been ongoing in Sivas province with a total amount exceeding 7 million TRY. This amount, reached in 2017, keeps increasing with the projects planned in 2019 or have already been started. These include investments for a social and disable-accessible city, environment and livability projects, cultural heritage and tourism investments, as well as investments for developing and improving education, transportation, and industry >> (Sivas Belediyesi, 2019).

2.2.5. Tourism

Located in one of the oldest human settlement areas in Anatolia, **Yozgat** is an important province in terms of tourism with its historical and cultural attractions as well as hot spring spas. Yozgat has a rich potential in terms of thermal springs, and it was declared a primary tourist destination by the Ministry of Culture and Tourism. Sorgun, Saraykent and Akdağmadeni districts of Yozgat province, which are included in the Çekerek Rehabilitation Project, have important geothermal resources. The province has a total capacity of 1500 beds in the facilities, which produce the supply of thermal tourism. Yozgat has 1.5% share in Turkey's thermal tourism capacity, which is one of the goals in the Tenth Development Plan >> (KELEŞ & AKBAŞ, 2016).

Tokat province is rich in terms of historical and cultural heritage because of hosting many ancient states and seigniories such as the Hittite Empire and Phrygia. Tokat Tourism mainly comprises historical tourism and tableland tourism. It is planned to attain regional achievements

by carrying out marketing projects for Çamiçi, Topçam, Dumanlı, Batmantaş and Akbelen tablelands >> (Gürses, Dinç, & Çakar, 2017).

There are various types of tourism in **Sivas** province such as health and thermal tourism, mountain and winter tourism, air sports tourism, nature tourism, and culture tourism. Sivas province hosted many civilizations. The Great Mosque of Divriği is the first building in Turkey to be inscribed on the UNESCO World Heritage List. Besides, the province has the Kangal Thermal Fish Spa, which is one of a kind. In addition, Sivas has a rich cultural heritage thanks to the legacy of all the civilizations settled in the area. Projects, which will make a positive difference with these values for the common interests of both tourists and locals, will be implemented so that the area attracts more tourists (Balıkçı & Öz, 2018).

Çorum province has important values in terms of historical and cultural tourism. There are 28 archeological sites in Çorum. In addition to these, there are 5 tumuli and 2 rock tombs. The most famous one among the archeological sites is Hattusa, the capital of the Hittite Empire, which is the first organized state in history. Hattuşaş is inscribed on the UNESCO World Heritage List. Nearly 7% of the tourists visiting Çorum are foreign tourists. The province will be made an alluring tourist destination by means of improvements, such as increasing the bed capacity, and advertising with the support of the Ministry of Culture and Tourism >> (Günay, 2007)

2.2.6. Industry

Manufacturing industry is of great importance in **Yozgat** province. Within the manufacturing industry, the major part of export takes place in the sectors producing metal goods, mineral products, base metals, garment, and furniture. Having experienced workforce in metal goods, textile, garment, food and mineral products sectors and being part of the 5th region in the incentive system show that Yozgat province has a development potential in manufacturing industry in addition to agriculture >> (Yozgat İli İmalat Sanayi Raporu, 2019).

Agro-industries were developed in **Tokat** with the facilities established by public and private sectors. Major advances were made in the province's industry and employment opportunities were created on a large scale due to the growth of manufacturing companies and businesses in organized industrial zones in the recent years. This development was also observed in textile industry; many ready-made garment shops and garment factories were established in the province. Goods produced by the manufacturing companies, which operate in the following sectors, are placed in national and international markets: food and drink, textile and ready-made garment, rock and soil-based products, wood products and furniture, plastics, metal goods, machines >> (Tokat İl Yatırım Destek ve Tanıtım Stratejisi, 2017).

Food industry, Rock and Soil-Based Industry, and Machine-Metal industry are dominant in the economy of **Çorum** province. Çorum's economy consists of the following industries in general: food and drink industry with 25% share, metal goods and machine industry with 25% share, rock and soil-based Industry with 21% share, forest products and tree-based industry with 6% share, chemical and plastics industry with 7% share, textile industry with 6% share, paper industry with 2% share, and other industries with 8% share. Çorum has become one of the most

developed industrial provinces in the region with its internal dynamics, and its development is accelerating exponentially. The Çorum Organized Industrial Zone is a complex one, hosting facilities that manufacture the following: machines, agricultural equipment, food, plastics and electro plastics, medical products, forest products, chemicals, ceramics, marble, heat insulating materials, prefabricated building elements, casting products, automotive sub-industry products, trailers and bodyworks, textile products, furniture, and metals >> (Çorum İli 2017 Yılı Çevre Durum Raporu, 2018).

Because it is one of the leading provinces in Turkey in terms of stockbreeding, **Sivas** province has an important place in food industry. Sivas also has a large mining industry due to its underground treasures. It has a significant potential for the discovery of new reserves and turning of the resources into products with high added value. The Sivas Organized Industrial Zone was established with a decree issued by the Cabinet of Turkey, dated 15.07.1976 and numbered 7/12207. The leading sectors of the province include food production, mining and quarrying, mineral product manufacturing, furniture manufacturing, iron ore mining, and garment manufacturing (Sivas Yatırım Rehberi, 2017).

2.2.7. Land Use

Grasslands and pasture areas cover 260.153 hectares in **Yozgat,** which is located in Kızılırmak ve Yeşilırmak basins and uses the Çekerek river as an important water resource. Grasslands and pasture areas constitute 18% of the total agricultural area. The grasslands and pasture areas located within villages are used for agriculture, while there are also large grasslands and pasture areas used for stockbreeding >> (T.C. Çevre ve Şehircilik Bakanlığı, 2020)

The land structure of **Tokat** province is mostly steep and sloped. Forestlands cover the 44% of the province's land area, while agricultural lands cover nearly 36%. These lands are usually used by family businesses for agricultural activities such as farming, fallowing, fruit and vegetable growing, poplar and willow growing. Grasslands and pasture areas cover 12% of the province's total area, which are used for stockbreeding >> (Tokat İli 2019 Yılı Tarım İstatistikleri, 2019).

The land used for agriculture and stockbreeding constitutes 48% (615.328 hectares) of the total land area of **Çorum**, with 42% being used for agriculture only. While a major part of these lands is used as farms, some part is used as vineyards and fruit and vegetable growing areas >> (2017 Yılı Brifing Raporu, 2017).

The land area of **Sivas** province consists of agricultural areas with 41% share, grasslands and pasture areas with 28% share, forestlands with 12% share, and places such as settlements, roads, etc. with 19% share. The 1st grade lands cover 158.906 hectares, 2nd grade lands cover 187.303 hectares, and 3rd grade lands cover 337.498 hectares in the province >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

2.2.8. Transportation and Communication Systems

The General Directorate of Highways has a total road network of 1.183 km in **Yozgat** province, with 440 km being state roads and 743 km being provincial roads. 244 km of this road network

is covered with Hot Bituminous Mixture, 872 km with chipseal, and 67 km with other surface treatments. 377 km (32%) of the 1.183 km road network comprises divided highways. Connections with neighboring provinces, which include Kayseri, Sivas, Kırıkkale, Çorum, and others, are made up of divided highways. It is planned to complete the construction of the 101 km long divided highway network to connect Sorgun, Akdağmadeni and Yıldızeli districts, which are part of the Çekerek Basin Rehabilitation Project, by 2021. As for the communication system, the province has a total fiber cable network of 2.578 km, and the number of broadband subscribers reached 341.113 as of 2019. Besides, it is planned to build infrastructures in 44 settlement areas that do not have GSM infrastructure >> (Ulaştırma ve İletişimde Yozgat, 2019).

The General Directorate of Highways has a total road network of 704 km in **Tokat** province, with 379 km being state roads and 325 km being provincial roads. 272 km (39%) of the 704 km road network comprises divided highways. Tokat's connection with Amasya and Sivas provinces is made up of divided highways. A 115 km long divided highway connection was built between Tokat and Yozgat, which are two neighbor provinces included in the project. As for the communication system, the province has a total fiber cable network of 2.753 km, and the number of broadband subscribers reached 451.560 as of 2019. Besides, it is planned to build infrastructures in 19 settlement areas that do not have GSM infrastructure >> (Ulaştırma ve İletişimde Tokat, 2019).

The General Directorate of Highways has a total road network of 1.055 km in **Çorum** province, with 623 km being state roads and 432 km being provincial roads. 333 km (32%) of this road network comprises divided highways. Çorum's highway connection with Amasya, Kırıkkale and Yozgat provinces is made up of divided highways. As for the communication system, the province has a total fiber cable network of 2.921 km, and the number of broadband subscribers reached 440.392 as of 2019. In addition, it is planned to build infrastructures in 5 settlement areas that do not have GSM infrastructure >> (Ulaştırma ve İletişimde Çorum, 2019).

The General Directorate of Highways has a total road network of 2.444 km in **Sivas** province, with 1.040 km being state roads and 1.404 km being provincial roads. 792 km (32%) of the 2.444 km long network comprises divided highways. Sivas's highway connections with Erzincan, Kayseri, Tokat and Yozgat provinces are made up of divided highways. As for the communication system, the province has a total fiber cable network of 5.449 km, and the number of broadband subscribers reached 513.698 as of 2019. In addition, it is planned to build infrastructures in 81 settlement areas that do not have GSM infrastructure >> (Ulaştırma ve İletişimde Sivas, 2019).

2.2.9. Electricity, Water and Natural Gas Distribution Networks

Water

There are no lakes used as a water resource in **Yozgat** province. There are 5 dams but 2 of them are currently operating. The 90% of the water needed by the population is supplied from 10 wells located in Çatalkaya creek basin in Alaca district of Çorum and 14 wells located in Eğriöz creek basin in Sorgun district of Yozgat since 1999. The water collected from the wells is conveyed by 40 km long pipeline and chlorinated before being distributed to the network. Kirazlı drinking water reservoir is a surface water resource used for urban water supply in the province. There is a drinking water facility with a capacity of 3.000 m^3/days, which has been operated by Yozgat Municipality since 1985. All the water supplied from the facility is distributed to the network for domestic use. The 10% of the water needs of the population is supplied from this reservoir. The construction of Musabeyli dam is started to meet the drinking, utility and industrial water needs of Yozgat province, Yerköy district, and Yozgat OIZ (Organized Industrial Zone). With the 48,6 hm^3 water to be stored in the dam, 1.850 hectares of land will be irrigated. Besides, the drinking, utility and industrial water needs of abovementioned places will be met until 2050 >> (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

The most important lakes in **Tokat** province are Zinav, Göllüköy and Kaz lakes. There is also an irrigation reservoir with a volume of 3.562 m^3 in Artova district, which is part of the project. The most important aquifers (groundwater basins) include the alluvial aquifers made by Yeşilırmak, Kelkit and Çekerek rivers, which are the largest rivers in the region, and their tributaries in the valley bottoms they flow into. Other important aquifers are karst aquifers originated from limestone. The main resources for water supply include Spring Water and Groundwater Drawn From Wells. The total amount of supplied water is 15.707.520 m^3/year. Around 40% of this water is used as drinking and utility water, 10% as industrial water, and 10% as irrigation water. 40% of the obtained water is lost/leaked and consumed in mosques, temples, fountains, etc. There is a drinking water treatment facility at Tokat province centre (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

The aquifers in **Çorum** province that are common and rich in terms of groundwater are alluviums that lay throughout plains and rivers as well as Jurassic-Cretaceous lime stones. The amount of groundwater obtained in 2018 is 636.000 tons. According to data obtained from DSI's observation wells and private wells, there are groundwater resources in 18 groundwater basins, which are on different levels due to water use and hydrogeological, meteorological and topographical conditions in Çorum province. Dams, wells, and springs are used for urban water supply in the province. 8.910.990,0 m^3 water was supplied from dams (Yenihayat, Hatap and Çomar dams), while 9.470.059,00 m^3 su water was supplied from springs (Elmalı, Kavacık, Pınarbaşı and Sağmaca springs). There are two drinking water treatment facilities operated by Çorum Municipality. Bahabey drinking water treatment facility operates with a capacity of 400,00 lt/s, while OIZ drinking water treatment facility operates with a capacity of 721,00 lt/s >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Drinking and utility water needs of **Sivas** province are supplied from groundwater resources (47%) and surface water resources (53%). The daily water need varies between 900–1.100 lt/s depending on the season. The surface water resource of the province is the Mısmılırmak river with the 4 Eylül Dam built across to supply drinking water. The planned drinking and utility water capacity of 4 Eylül Dam is 33 hm^3 /year. It is aimed at supplying the province with drinking and utility water, which conforms to the relevant standards, by means of the drinking water treatment facility that was built in addition to the storage facility. The water reserved in the dam is treated in the drinking water treatment facility and then distributed to the province. The 90% of the distributed water is used for domestic purposes, while 10% is used for industrial purposes >> (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Electricity

According to the 2019 Electricity Market Development Report published by the Energy Market Regulatory Authority, the provincial licensed electricity generation data is as follows: 104.810,16 MWh electricity was generated in Yozgat, which constitutes 0.04% of national generation; 2.442.341,28 MWh electricity was generated in Tokat, which constitutes 0.83% national generation; 661.169,00 MWh electricity was generated in Çorum, which constitutes 0.22% of national generation; and 4.207.986,71 MWh electricity was generated in Sivas, which constitutes 1.43% of national generation. Unlicensed electricity generation figures in these provinces were 63,65 MWe, 21,85 MWe, 104,86 MWe, and 76,89 MWe, respectively. The total amount of billed electricity consumption in these provinces were 3.553.238,82 MWh, with the smallest amount consumed in Yozgat province and the largest amount consumed in Sivas province. This amount constitutes the 1.54% of Turkey's electricity consumption >> (Elektrik Piyasası 2019 Yılı Piyasa Gelişim Raporu , 2020).

Natural Gas

According to the 2019 Natural Gas Market Report published by the Energy Market Regulatory Authority, the numbers of natural gas subscribers in the provinces were as follows: 52.172 in Yozgat province, 93.064 in Tokat province, 106.489 in Çorum province, and 128.593 in Sivas province. Total amounts of provincial natural gas consumption, including energy sector, transportation sector, service sector, housing sector, and other sectors were as follows: 126,729 million Sm3/year in Yozgat province, 138,010 million Sm3/year in Tokat province, 178,301 million Sm3/year in Çorum province, and 259,370 million Sm3/year in Sivas province (Doğal Gaz Piyasası 2019 Yılı Sektör Raporu , 2020).

2.3. Social Infrastructure and Social Impact

2.3.1. Population and Migration

It is observed that there is a continuous and rapid decline in the population living the basin. As shown in detail below, the main reason of this is the migration from the basin provinces to other provinces. The spatial distribution of population has changed in years; rural population has declined due to the outward migration, while the population living in the province and district centers remained unchanged. It is understood that rural people migrate to the province centers first, but they cannot find what they are looking for there, thus migrating again to other

provinces. For instance, Yozgat's population in 2010s is less then its population in 1965. While the annual population growth was 10.51 per thousand in Turkey in 2018, it was (minus) -30.12 in Yozgat and (minus) -5.05 in Sivas. If the population decline in Yozgat continues in this way, the rate will be (minus) -42.47 in 2023. All provinces in the basin show a similar trend. However, there is an emphasis on Yozgat here because the 60.52% of the project area is within the territory of the province.

According to TURKSTAT (2019) data, the population density (number of people per square kilometer) in the provinces located in Çekerek basin is much below the country average, which is 108. Sivas has the lowest (22) population density, followed by Yozgat (30), Çorum (41), and Tokat (61). (See Table 5)

Table 5 Population and Population Density of Provinces in Çekerek Basin (2019)

Province	Population	Population density (person/km^2)
Yozgat	421.200	30
Tokat	612.747	61
Çorum	530.864	41
Sivas	638.956	22

According to TURKSTAT (2019) data, it is understood from civil registry records that most people living in the province were born in the same province and 10% or more were born out of the province. (See Table 6).

Table 6 Rate of Population Born in the Province to Total Provincial Population in Çekerek Basin (2019)

Province	Total Population	Population Born in Province	Rate of population born in Province to total population (%)
Yozgat	421.200	368.591	87,51
Tokat	612.747	529.877	86,57
Çorum	530.864	477.252	89,90
Sivas	638.956	576.453	90,22

Investigating the population changes in Çekerek basin specifically through the districts, which fall within the project's impact area, will provide a better projection. According to TURKSTAT (2007-2019) data, Yozgat's all districts that are part of the project saw a regular decline in population between 2007–2019. Although some increase occurred in 2018, it did not last. The population at the center increases regularly as opposed to the districts (See Table 7).

Table 7 Population Changes in the Districts within the Project's Impact Area (Yozgat)

Year	Akdağmağdeni	Aydıncık	Çayıralan	Çekerek	Kadışehri	Merkez	Saraykent	Sorgun
2019	42.621	10.079	12.563	19.467	11.227	106.280	12.486	79.533
2018	42.919	10.407	13.512	19.786	11.716	105.167	14.198	79.314
2017	43.070	9.811	12.390	19.583	11.739	103.965	12.722	78.369

Year	Akdağmağdeni	Aydıncık	Çayıralan	Çekerek	Kadışehri	Merkez	Saraykent	Sorgun
2016	43.826	9.870	12.735	20.680	12.021	101.426	13.172	78.133
2015	44.326	10.089	13.073	20.857	12.768	98.248	12.909	78.178
2014	47.309	10.936	14.201	22.729	13.397	96.831	14.192	79.580
2013	48.249	12.585	14.985	23.699	14.578	97.443	15.134	81.231
2012	49.442	11.065	16.092	25.441	15.154	97.094	15.620	82.944
2011	50.591	11.347	18.040	26.810	15.530	96.350	18.046	84.591
2010	53.065	11.560	18.637	27.690	15.971	95.667	17.392	87.518
2009	52.624	11.813	20.757	28.352	16.452	95.853	18.511	89.209
2008	53.789	12.558	20.318	28.799	16.914	94.972	18.705	85.831
2007	54.530	12.618	22.053	30.463	17.976	95.275	19.607	83.931

According to the TURKSTAT (2007-2019) data, Artova and Yeşilyurt districts of Tokat, which fall within the project's impact area, saw a regular population decline between 2007–2019. Although some increase occurred in 2018, it did not last. As for Sulusaray district, which is also within the project's impact area, the population grew in 2015 and 2016 and then started to decline again. However, a little increase was observed again in 2019 (See Table 8).

Table 8 Population Changes in the Districts within the Project's Impact Area (Tokat)

Year	Artova	Sulusaray	Yeşilyurt
2019	8.374	7.598	8.969
2018	8.744	7.401	9.154
2017	8.503	7.576	9.133
2016	9.275	8.610	9.402
2015	8.752	8.442	9.565
2014	9.106	7.835	10.291
2013	9.384	8.455	11.458
2012	9.450	8.838	11.785
2011	9.805	8.914	11.359
2010	10.022	9.071	11.556
2009	10.220	9.297	11.610
2008	10.770	9.863	11.817
2007	11.073	9.595	11.921

According to the TURKSTAT (2007-2019) data, population changes in two districts of Çorum, which fall within the project's impact area, are as follows: Alaca district saw a steady population decline between 2007–2019, while Ortaköy district saw some fluctuations in population numbers in the same period.

Table 9, Ortaköy district of Çorum saw a population increase (1000 people) in 2008, but the next year the population declined even below the numbers of 2007, and kept declining after. A small increase was observed in 2013, and a relatively large increase was observed in 2018.

Table 9 Population Changes in the Districts within the Project's Impact Area (Çorum)

Year	Alaca	Ortaköy
2019	31.121	7.069
2018	31.460	8.696
2017	31.594	6.848
2016	32.017	7.573
2015	32.669	8.371
2014	33.468	8.155
2013	34.677	8.430
2012	35.324	8.090
2011	36.840	8.124
2010	37.985	8.646
2009	38.628	9.491
2008	39.738	10.725
2007	40.770	9.711

According to the TURKSTAT (2007-2019) data, a rapid and steady population decline took place between 2007–2019 in Yıldızeli district of Sivas, which falls within the project's impact area. Besides, the district had the same pattern seen in the other districts: a small population growth in 2018, followed by a declining trend (See Table 10).

Table 10 Population Changes in the Districts within the Project's Impact Area (Sivas)

Year	Yıldızeli
2019	32.787
2018	33.986
2017	33.486
2016	34.860
2015	35.980
2014	38.735
2013	40.540
2012	42.723
2011	43.639
2010	45.041
2009	47.228
2008	51.031
2007	52.710

According to the TURKSTAT (2007-2019) data, the information about the migration trends in the provinces, which fall within the impact area of the Çekerek Basin Rehabilitation Project, shows that their populations tend to decline in general. As in the districts, the provinces also

saw a population increase in 2018 but their populations started decline again as of 2019 (See Table 11).

Table 11 Net Migration Rates of the Provinces (2008-2019)

Year	Çorum	Sivas	Tokat	Yozgat
2019	-13,88	-19,92	-0,06	-17,05
2018	7,77	30,76	8,3	7,64
2017	-6,91	-10,49	-6,64	-10,51
2016	-7,05	-5,46	5,31	-9,66
2015	-12,02	-13,14	-10,42	-27,91
2014	-16,51	-8,2	-4,75	-26,29
2013	-8,21	-6,22	-32,99	-22,01
2012	-13,72	-9,5	4,76	-21,56
2011	-13,5	-11,49	-11,06	-24,75
2010	-15,56	-12,22	-24.88	-27,83
2009	-16,56	-8,44	-2,49	-15,96
2008	-15,00	-18,15	-10,15	-30,04

According to TURKSTAT (2007-2019) data regarding what provinces received migration from the provinces in Çekerek basin in 2019, people from Çorum, Tokat and Yozgat provinces mostly migrated to Ankara province. More than 10 thousand people migrated from Çorum and Yozgat provinces to Ankara, which is a nearby metropolitan province, in 2019. The number of people migrated from Sivas and Tokat to Ankara is nearly 3000. People from Sivas mostly migrated to Kayseri province. There were also a high number of people migrating from Yozgat to Kayseri (2750 people) and from Sivas to İzmir (2112 people) in 2019. The number of people who migrated from Sivas, Çorum, Tokat, and Yozgat to other provinces is given in Table 12.

Table 12 Number of People Migrating from Çekerek Basin Provinces to Other Provinces (2019)

Receiving province	Sending province			
	Çorum	Sivas	Tokat	Yozgat
Ankara	11698	2842	2855	10524
Kayseri	111	2923	360	2750
İzmir	823	2112	1243	1052
Bursa	528	805	1011	1443
Antalya	668	1213	672	783
Kocaeli	391	724	1293	450
Tekirdağ	181	301	1272	265
Samsun	486	411	921	198

According to TURKSTAT (2007-2019) data, the number of people who live in metropolitan provinces despite having their civil registry in the provinces, which are within the impact area of the Çekerek Basin Rehabilitation Project. 141.667 people registered in Yozgat live in

İstanbul, while 178.552 live in Ankara. According to the Address Based Census records, the number of people who are registered in Sivas province despite living in İstanbul is 827.753, while those living in Ankara is 418.174. It is understood that 499.026 people who are registered in Tokat live in İstanbul, and 371.150 who are registered in Çorum live in Ankara.

Table 13 Status of Population Enrolled in the Register of Çekerek Basin Provinces in İstanbul and Ankara (2019)[1]

Province	Yozgat	Tokat	Çorum	Sivas
İstanbul	141.667	499.026	-	827.753
Ankara	178.552	-	371.150	418.174

When the migrants are examined quantatively in accordance with TURKSTAT (2019) data, it is observed that mostly the educated population leaves the provinces in Çekerek Basin. This shows that migration causes both quantitative and qualitative loss and human resources remain weaker in terms of quality. It is seen that most of the migrant men are graduates of high Schools and Their Equivalent Vocational Schools and a similar trend is observed among women too. However, in Sivas province, it is observed that the number of migrant women who graduated from College or Faculty is higher than the number of women graduated from High Schools and Their Equivalent Vocational Schools. (See Table 14).

The data of the study “Internal Migration and Qualities of Internal Migrants in Turkey” (State Planning Organization, 2008), show that one of the main reasons of migration for men is job seeking/finding and for women it is mostly marriage. This indicates a migration depending on one of the household members. This trend is also observed in the basin.

Table 14 Educational Status of Migrating Population (Men and Women aged 15 and above) (2019)

MEN				
Educational status	**Çorum**	**Sivas**	**Tokat**	**Yozgat**
Illiterate	57	141	61	41
Literate but not finished any school	106	230	183	102
Elementary school	821	2464	1838	3695
Primary education	714	993	1620	713
Secondary schools or Their Equivalent Secondary Vocational Schools	1457	2077	2973	1682
High Schools and Their Equivalent Vocational Schools	3607	4807	5629	3695
College or Faculty	2086	3404	3371	2616

[1] Registration status is calculated based on the address-based system and is cumulative by years.

Post graduate education (including 5 or 6-year-faculty)	173	360	282	241
Doctorate	29	49	44	30
Unknown	103	137	58	114
WOMEN				
Illiterate	336	994	429	303
Literate but not finished any school	303	758	581	308
Elementary school	1320	2632	2831	1570
Primary education	616	721	1335	639
Secondary schools or Their Equivalent Secondary Vocational Schools	1371	1800	1270	1533
High Schools and Their Equivalent Vocational Schools	3789	4550	4982	3477
College or Faculty	2471	4855	3949	2703
Post graduate education (including 5 or 6-year-faculty)	154	333	327	2703
Doctorate	12	33	32	19
Unknown	130	151	76	145

The main reason of the decline in the basin population is the rapid migration of rural population. Following issues can be listed as the reasons of the migration from the rural areas: Decline in the earnings from the economic activities in rural and insufficient employment are among the most important reasons of migration from the rural areas. Reasons like the loss of yield in agricultural production, production which is based on natural events and fragmentation of arable lands by inheritance, accelerated the escape from agriculture. In order to find a solution to these agricultural problems, state decided to provide subsidies. However, as these subsidies were mostly given to land owners rather than real farmers who made production, these subsidies did not totally fulfill their purpose. Production in the basin's rural parts is mostly made on lands leased for a certain period of time. Considering the effect of national and international policies and the shift from agriculture towards industry and services sectors in Turkey, it is observed that long term decline in agricultural employment is still ongoing. Despite some support for agricultural and rural development, it is also understood that the basin takes its share from this vicious cycle, too. Under these conditions, with the shift from agriculture towards services and industry sectors in the upcoming 10 years, we should expect to see an increase in the disintegration of agricultural sector, which triggers migration phenomenon. For the women and other disadvantaged groups, additional measures should be taken in the Region and especially in the Basin which has a structure dependent on agriculture on socio-economic terms. Throughout the country, some factors cause the progression of disintegration in agriculture which has been experienced since 2001 in an uncontrolled way and decline in employment. They also play a role in the failure to bring poverty and unemployment to the desired levels. Some of these factors are conducting agricultural activities traditionally in the form of small family enterprises, widespread unwaged family labor, relatively lower level of education in agricultural worker population and their unqualifiedness, working of some women in

agricultural sector and as a result the fact that agricultural sector contains the elements of informal and concealed unemployment and recent decline in the rural population as a result of migration.

Age dependency ratio shows the amount of inactive population dependent on per 100 people who are considered at the working age in a region. In other words, it is the ratio of the total number of people aged 0-14 and above 65 to the total number of people aged 15-64. As a result of migration, elderly population in the basin is increased. Low fertility rate in the basin is also effective on the increased elderly population rate. For example, Yozgat's median age (30.48) which was quite close to Turkey's median age (30.07) in 2012, is expected to rise to 41.33 in 2023. Turkey's median age estimation for the same year is 31. As supported by the data in the table below, in all districts of the basin the ratio of population aged 65 and above is above Turkey's average which is 9.1%. Moreover, in some districts the ratio of this population doubles the Turkey average. (Such as Ortaköy 22.88%; Çayıralan 21.86%; Alaca 18.53%, Aydıncık 18.23%; Artova 17.86%).

It is observed that the districts in the basin have an older population. This is the reason for including activities aiming to attract young people to the region and rural areas under the framework of Çekerek Basin Rehabilitation Project.

Table 15; total population, population over the age of 65 and ratio of the population over the age 65 to the total population of the districts are provided. According to this data, population over the age of 65 constitutes more than 10% of the total population in all districts. This ratio is approximately 15% in Çekerek district of Yozgat and Yıldızeli district of Sivas. The ratio is above 17% in Aydıncık district of Yozgat and in Artova district of Tokat. In two districts of Çorum, ratio of the population over the age of 65 to the district population is way higher. In Ortaköy the ratio is calculated as 22,88 and in Alaca as 18,53 (See Table 15)

Table 15 The Ratio of the Population Aged 65 and Above to the District Population in the Districts of Basin (2019)

District	Province	Population	Population aged 65 and above	The Ratio of the Population Aged 65 and Above to the District Population
Akdağmadeni	YOZGAT	42.621	5.568	13.06
Aydıncık	YOZGAT	10.079	1.838	18.23
Çayıralan	YOZGAT	12.563	2.747	21.86
Çekerek	YOZGAT	19.467	3.190	16.38
Kadışehri	YOZGAT	11.277	1.496	13.26
Merkez	YOZGAT	106.280	10.631	10.00
Saraykent	YOZGAT	12.486	1.529	12.24
Sorgun	YOZGAT	79.533	9.306	11.70
Artova	TOKAT	8.374	1.496	17.86
Sulusaray	TOKAT	7.592	972	12.79
Yeşilyurt	TOKAT	8.969	1.123	12.52
Alaca	CORUM	31.121	5.769	18.53

Ortaköy	CORUM	7.069	1.618	22.88
Yıldızeli	SIVAS	32.791	4.741	14.45

Another type of migration which is not included in migration statistics but is repeated regularly every year is the movements of seasonal agricultural workers. People who mainly come from the East and Southeast to work in agriculture are present in the basin during summer. Housing, health and education are among the leading problems for seasonal workers. (ORAN, Tokat, 2017)

2.3.2. Economic Life and Employment

According to TURKSTAT data, a population over one million is not employed in the Basin. Approximately 72% of this unemployed population is composed of women. (ORAN 2017) As seen in the previous sections, general socio-economic level of the region is quite low. Because, economically inactive population (like people over the age of 65) is way above Turkey's average, educational statistics are below Turkey's average and subsistence agriculture is dominant in the agricultural sector which provides most of the employment in the region. (See Table **16**).

Table 16 Socio-Economic Status of the Provinces in the Basin (2019)[2]

Provinces	Group A Plus	Group A	Group B	Group C	Group D
Çorum	9.435 (%1.78)	24.369 (%4.59)	61.697 (%11.67)	155.418 (%29.28)	279.945 (%52.73)
Sivas	17.973 (%2.81)	35.664 (%5.58)	83.491 (%13.07)	188.601 (%29.52)	313.227 (%49.02)
Tokat	4.439 (%0.72)	19.565 (%3.19)	69.546 (%11.35)	157.838 (%25.76)	361.359 (%58.97)
Yozgat	4.459 (%1.06)	17.362 (%4.12)	47.490 (%11.27)	121.109 (%28.75)	230.780 (%45.79)

2017 Socio-Economic Development Ranking of Provinces and Regions Study carried out by the Ministry of Industry and Technology (SEGE 2017) ranks the provinces in accordance with some variables like demographics, employment, education, health, competitive and innovative capacity, finance, accessibility and life quality. This ranking gives the rank of the provinces among 81 provinces. Provinces are also given a grade between 1 (highest) and 6 (lowest) taking the average score of the province as a basis. As you can see from the Table below, the provinces in the basin rank amongst the lowest in the province ranking. Most of the provinces' grade is 4 and 5 and average score of all provinces are below zero. For example, İstanbul's average score

[2] Source: https://www.endeksa.com/tr/analiz

is 4,051 and it is at the first grade. Ankara is at the same grade with İstanbul and its score is 2,718. İzmir's score is 1,926. (SEGE 2017: 35) (See Table 17).

Table 17 Socio-Economic Development Ranking of the Provinces in the Basin (2017)

Provinces	Ranking by 81 provinces	Grade	Score
Çorum	50	4	-0,262
Sivas	45	4	-0.137
Tokat	56	5	-0.381
Yozgat	63	5	-0.589

Another source which assesses socio-economic status of Turkey's settlement areas is "Endeksa" Socio-Economic Status assessment. In this study, a Socio-Economic Status Index (SES) is prepared by ranking these areas based on various variables like population, income, pastime activities, ownership of several assets etc. These statuses are ranked from the highest status A+ to the lowest status D. Categories are A+, A, B, C and D. D accounts for the lowest SES group. Population ratios of the basin districts which are in the Group D (group with the lowest socio-economic status) are shared in the table below. (See Table 18)

Table 18 Population Ratios with the Lowest Socio-Economic Status in the Districts of the Basin (2019)[3]

DISTRICT	Province	Number of populations in D SES group (N)	Population ratio in D SES group (%)
Akdağmadeni	YOZGAT	26.889	63.09
Aydıncık	YOZGAT	6.747	66.94
Çayıralan	YOZGAT	8.512	67.75
Çekerek	YOZGAT	13.179	67.70
Kadışehri	YOZGAT	7.210	63.94
Merkez	YOZGAT	44.317	41.70
Saraykent	YOZGAT	8.228	65.90
Sorgun	YOZGAT	41.195	51.79
Artova	TOKAT	6.355	79.89
Sulusaray	TOKAT	5.272	69.39
Yeşilyurt	TOKAT	6.509	72.57
Alaca	CORUM	20.077	64.51
Ortaköy	CORUM	4.652	65.81
Yıldızeli	SIVAS	27.817	84.82

[3] https://www.endeksa.com/tr/analiz/

2.3.3. Education and Health Status

Health:

Despite the fact that public investment in health is still ongoing, some improvements are required in physical, technical and technological infrastructure and health care personnel. The number people per physician in Yozgat is 23,56% higher than Turkey's average. Some measures should be taken for the employment of health care personnel, especially Specialized personnel in Yozgat. This problem is mostly the case for the personnel who are not from Yozgat and are appointed from out of the province.

In Yozgat, the health care personnel especially those from out of the province, does not want to stay in Yozgat on the grounds of social infrastructure gap, despite the fact that there is no significant security threat. (Yozgat does not have a city identity. Education and shopping opportunities, social infrastructure, cultural activities, transportation possibilities etc. are not sufficient.) Once they complete their obligatory service, the health care personnel who come from other provinces leaves Yozgat. This situation leads to an ongoing need of health care personnel.

In terms of low maternal-infant mortality rate, Yozgat performs in a relatively better way. However, infant mortality rate exceeded Turkey's average in the last year. Undoubtedly, awareness raising activities carried out in provinces and districts as well as childbirths in the hospital environments are effective in these results.

Life expectancy at birth in Yozgat is below Turkey's average and Yozgat ranks amongst the lowest in provinces.

People from Yozgat prefer to go to provinces like Kayseri and Ankara for the diseases which require specialization and long-term treatment. The fact that people leaving in Yozgat generally prefer Kayseri even for the diseases which can be treated in Yozgat is another interesting issue. Insufficient health care infrastructure, low quality of the provided health care services, insufficient specialized personnel and semi-active university hospital are effective in all these results.

It is specifically important to prevent rabies and rabies related biting incidents and to improve preventive medicine physicians' practices for Hepatitis B, Tuberculosis and Brucella in Yozgat. In Yozgat which is among the risky provinces in terms of Crimean Congo Hemorrhagic Fever, it is important to continue taking measures in cooperation with the rural organization of Ministry of Food, Agriculture and Livestock.

Like the country in general, it is observed that especially the number of specialist physicians in Tokat province is insufficient. In 2014, the number physicians per 10.000 people was 12, while the number specialist physicians were 7. In addition to this, there are significant differences among districts. In 2014, the number of family physicians in the province was 173 and the number of family physicians per 10.000 people was 2,9. In 5 districts of the province, there are

Integrated District Hospitals (Artova-Başçiftlik-Pazar-Sulusaray-Yeşilyurt). In those Hospitals, there is no Specialist Physicians. People living in those districts go to Central District for medical examination. Inadequacy of Specialist Physicians is felt mostly in branches like Pediatric Surgery, Gastroenterology and Cardiovascular Surgery.

In Çorum, the insufficient number of specialist physicians and absence of some diagnosis and treatment tools in the districts increase the number of referrals to the city centers. In 2014, the number of family physicians in the province was 167 and the number of people per family physician is 3.157. Most important problems about heath care in the province are the insufficient number of health care personnel and the significant differences among districts in health care service provision. By checking the statistics, it can be understood that health care institutions with beds are still insufficient in terms of equipment and personnel.

In Sivas, the number of people per bed (in 2002: 315,5, in 2014: 250,1) is significantly lower compared to 2002. However, the number of people per hospital doubled from 2002 to 2010 (2002:346297, 2010: 627056). In between 2010-2015, it continued with almost the same intensity. In Sivas, 59,69% of the number of people per hospital is in the Central district, 6,25% is in Yıldızeli district and 6,24% is in Şarkışla district. The number of people per bed is lowest in the Central district and above Turkey's average except in Divriği, Doğanşar and Gölova districts. In this regard, Altınyayla, Akıncılar, Gemerek, Hafik, Ulaş, İmranlı, Gürüm, Yıldızeli districts have a higher intensity compared to other districts. In Sivas, especially after 2010, there has been a decline particularly in the total number of physicians and other personnel. The districts with the lowest number of physicians are Doğanşar, Gölova, Akıncılar, Altınyayla, İmranlı, Ulaş, Hafik and Koyulhisar. In İmranlı district, there is no dentists and the number of dentists in the other districts is quite low. In Akıncılar, Altınyayla, Doğanşar, Gölova, Hafik, Koyulhisar, Ulaş districts there is 1 dentist. The districts with the lowest employment number of nurses are Doğanşar (1 district) Akıncılar, Altınyayla, Hafik, Ulaş districts. (ORAN, Sivas 2017: 47).

Education:

Limited social infrastructure possibilities in rural areas is one of the important reasons of migration. Migration from the rural areas is accelerated. Because, there are problems in having an access to the needs like education and health. Sometimes challenges are experienced in having an access to the basic needs. People want to have better opportunities as a result of increased prosperity and usage of modern communication methods in the rural areas. Some social balances are disrupted in rural areas and people began to consider agriculture and husbandry as a social status issue.

When we check educational level distribution of Çorum province, it is understood that a large portion of the population is still graduated from elementary or primary school. This ratio in Çorum is higher than Turkey's average. On the other hand, it is observed that the number of college or faculty graduates is slowly increasing. When we check completed educational levels in districts, it can be seen that the ratio of high school and university graduates is low except for the Central district. Districts with the lowest ratios are Bayat, Boğazkale and Laçin districts. In Çorum, schooling ratios in pre-school, primary, secondary and high school education are

above Turkey's average. However, there are problems related to physical infrastructure of the schools. When we look into the number of students per school, section, classroom and teacher; we can see that status of the province is fine. However, there are some shortcomings regarding the quality and accessibility of education, guidance for children and young people (OKA, 2017, Çorum 25-6). In Çorum, the most basic problems of education are insufficient number of preschool education institutions in rural areas, shortcomings in the quality of education, frequently changed working places of teachers which undermines continuity, low academic success levels of the students.

See Table 19 for Çorum province educational level distribution.

Table 19 Çorum – Educational Status of the Population (2019)

Educational Status	N	%
Illiterate	10602	3,02
Literate but not finished any school	33605	9,58
Elementary school	88473	25,24
Primary education	46280	12,06
Secondary schools or Their Equivalent Secondary Vocational Schools	46233	13,18
High Schools and Their Equivalent Vocational Schools	72285	20,62
College or Faculty	45628	13,02
Post graduate education (including 5 or 6-year-faculty)	4271	1,22
Doctorate	596	0,20
Unknown	2566	0,73
Total	350539	100

Literacy ratios in Sivas are lower than both region's and Turkey's averages. According to 2013 data, highest literacy ratio in the center and districts of Sivas is 95,71% in the central district. Doğanşar district has the lowest literacy ratio with 81,21%. According to 2015 data, preschool education is examined for the ages of 3-5, 4-5 and 5 in the National Education Statistics published by the Ministry of National Education. Schooling ratios for these ages are below Turkey's average in Sivas province. According to the same statistics, the number of students per school, section, teacher and classroom in primary education institutions are below the region's and Turkey averages. (ORAN 2017, Sivas: 33-4) In accordance with the educational status average data for the years 2009-2013 prepared by TURKSTAT by taking the address-based population registry system into account, the ratio of graduates of tertiary education for the population over the age of 18 to the total population is 8,84%. Sivas is below Turkey's average with an average of 7,5%. When we consider the 5-year tertiary education graduates ratio averages in the districts of Sivas between 2009-2013, we can see that central district has the highest ratio (10,32%) and Yıldızeli District has the lowest ratio (2,13%). According to Ministry of National Education Statistics, in Sivas, the number students per classroom is 25, the number students per teacher is 14, per school is 385 and per section is 20. With these

figures, Sivas is below both the region's and Turkey's averages. (ORAN, Sivas 2017: 38). See Table 20 for Sivas province educational level distribution.

Table 20 Sivas – Educational Status of the Population (2019)

Educational Status	N	%
Illiterate	13331	2,87
Literate but not finished any school	38981	8,93
Elementary school	91659	21,00
Primary education	59349	13,60
Secondary schools or Their Equivalent Secondary Vocational Schools	48909	11,20
High Schools and Their Equivalent Vocational Schools	111333	25,52
College or Faculty	61837	14,17
Post graduate education (including 5 or 6-year-faculty)	6664	1,53
Doctorate	1206	0,27
Unknown	3065	0,70
Total	436334	100

When we check education level distribution of Tokat province, it is understood that a large portion of the population is still graduated from elementary or primary school. This ratio in Tokat is higher than Turkey's average. On the other hand, it is observed that the number of college or faculty graduates is slowly increasing. When we check the completed educational levels in districts, it can be seen that the ratio of high school and university graduates is quite low except for the Central district. (ORAN, Tokat, 2017). Schooling ratio in secondary education is not a healthy indicator, as there are students studying at schools outside of the district they live. However, highest ratios show that there is a concentration in Zile and Central district. Başçiftlik and Almus districts are less preferred. There are problems about the physical infrastructures of the schools. When we check the number of students per school, section, classroom and teacher, it is observed that status of the province is fine. However, there are some shortcomings regarding the quality and accessibility of education, guidance for children and young people (ORAN, Tokat, 2017: 28).

See Table Table **21** for Tokat province educational level distribution.

Table 21 Tokat – Educational Status of the Population (2019)

Educational Status	N	%
Illiterate	6917	1,66
Literate but not finished any school	47354	11,41
Elementary school	102105	24,60
Primary education	56212	13,54

Educational Status	N	%
Secondary schools or Their Equivalent Secondary Vocational Schools	53505	12,89
High Schools and Their Equivalent Vocational Schools	86518	20,84
College or Faculty	55227	13,30
Post graduate education (including 5 or 6-year-faculty)	5284	1,27
Doctorate	821	0,20
Unknown	1033	0.25
Total	414976	100

Literacy ratios in Yozgat are lower than both Region's and Turkey's averages. In terms of YGS (Transition to Higher Education Exam) and LYS (Undergraduate Placement Exam) results, Yozgat ranks amongst the lowest provinces in success ranking for LYS Turkish-Social Sciences and Turkish-Mathematics. According to educational status average data between 2009-2013, the ratio of graduates of tertiary education for the population over the age of 18 to the population is 8,84%. With its 5,06% average ratio, Yozgat is way below Turkey's average. (ORAN, Yozgat, 2017). Although higher education level is low in Yozgat and the Region in general, ratios of university graduates is increasing with a certain momentum since 2009. Pay scales in the centers of provinces especially like İstanbul, Ankara, Kocaeli, Bursa cannot be reached in the Region and particularly in Yozgat. This causes the migration of the qualified labour force.

See Table 22 for Yozgat province educational level distribution.

Table 22 Yozgat – Educational Status of the Population (2019)

Educational Status	N	%
Illiterate	7609	2,78
Literate but not finished any school	28803	10,52
Elementary school	70303	25,68
Primary education	35947	13,13
Secondary schools or Their Equivalent Secondary Vocational Schools	31369	11,46
High Schools and Their Equivalent Vocational Schools	60803	22,21
College or Faculty	31476	11,50
Post graduate education (including 5 or 6-year-faculty)	2928	1,07
Doctorate	382	0,14
Unknown	4070	1,74
Total	273690	100

2.3.4. Social Impacts of the Investments on the Region

Investments are expected to be effective primarily on agricultural productivity. Increased agricultural productivity will have positive impacts on socio-economic levels of the local people. These impacts will also cause an increase in the employment figures by diversifying income-generating activities. As agricultural food value chain projects include industry branch, they have a potential to generate employment. Projects for branding and marketing of sustainable agricultural products aim to contribute the development of agricultural activities commercially. Commercial part of the project will be effective primarily on employment potential, as in the industry part of the project.

As forests have positive effects on the environment, protection of forests may positively affect the public health, too. Projects on income generation and livelihood diversification for forest villages can only be sustainable with the participation of the young people. It is believed that human potential to make use of these investments is limited, due to the older population in the demographics of the region. Projects which particularly aim to attract young people to the rural areas will be helpful in eliminating this limitation.

Projects planned under Çekerek Basin Rehabilitation Project are expected to have direct effects on the infrastructure and socio-economic indicators of the region and indirect effects on education level and human health indicators. The increase in these indicators increases the tendency of local people to stay in the region and even some returns may be expected. For this reason, in the long run, changes are expected to be observed on population indictors.

When the barriers especially before women's participation into these kinds of activities are removed, the integration of women into economic life will be ensured. Other indirect positive impacts of increased agricultural productivity can be observed on seasonal agricultural workers whose work potential will rise. It is a must to take facilitating measures to make sure the members of vulnerable groups have an access to these supports during the implementation phase.

During construction phase, access roads for the local people can be blocked. If security measures are not taken, this phase can cause some risks for human and animal health. These impacts can be minimized by taking public health and security measures considering vulnerable groups, too.

When the lands owned by local people or public lands are procured in small pieces for construction works or for various reasons, in total a large land acquisition happens. This situation causes a reduction in private lands on which local people conduct agricultural activities and in public lands they utilize, in time. For this reason, land acquisition should be planned considering cumulative impacts.

2.4. Environmental Impacts

While the following factors were taken into consideration for the site selection of the projects, an alternative was not entertained as flood, landslide and torrent control structures,

maintenance-repair and expansion investments and drinking water reservoirs are going to be made in problematic sites:

- No conservation site in the project sites (national parks, natural parks, wetlands, natural monuments, cultural assets, heritage and conservation sites),
- No endemic and protected species to be affected by construction and operational phases of the projects in the project sites,
- Areas to be picked in line with the needs of local communities
- Project sites to be affected in a minimum way by environmental effects to arise in the construction and operational phases of the project such as noise and vibration,
- Project sites to be affected in a minimum way by the transformation of visual characteristics/landscape as a result of activities to be carried out in the construction and operational phases of the project,
- Few cultural heritage assets or none in the basin to be adversely affected by the activities to be carried out in the construction and operational phases of the project,
- Minimizing the expropriation activities that may be needed in the construction phase of the project,
- Minimizing the legal barriers that may arise from environmental concerns in the planning and construction phases of the projects,
- Minimizing the impact of construction works and operations of the project on the soil (soil quality, erosion and geomorphologic issues to be analyzed),
- Minimizing the impact of construction works and operations of the project on water bodies (quality of rivers, coastal areas, ground water and sea water to be analyzed),
- Minimizing the impact of construction works and operations of the project on air (air quality, odor and noise pollution to be analyzed),
- Minimizing the impact of construction works and operations of the project on the ecosystem (ecosystem quality, ecosystem protection and extent of ecosystem degradation to be analyzed).

2.4.1. Biodiversity

Vulnerable Locations

When the project area is taken under review, it is seen that there is no area which is designated and announced as “Special Environmental Protection Areas” by the Council of Ministers pursuant to article 9 of the Environmental Law. When “National Parks”, “Natural Parks”, “Natural Monuments” and “Natural Conservation Areas” defined in article 2 of National Parks Law and designated pursuant to article 3 of this Law are examined, it is understood that within and around the project boundaries, there are Oluközü Natural Park and Kadıpınarı Natural Park

in Akmağdeni district of Yozgat province and Davulbaztepe Natural Park in the Central district. Additionally, within the boundaries of project areas, there is Boğazköy-Alacahöyük National Park in Boğazkale district of Çorum province. There is no area designated within the scope of "Regulation on the Protection of Wetlands" effectuated by being promulgated on the Official Gazette at 17/05/2005 with the number of 25818.

Additionally, if any species under protection is detected within and around the boundaries of project location, necessary measures will be taken in accordance with the national legislation and provisions of international conventions to which our country is a party. These species will be protected. In the event of finding species which are under protection within and around the boundaries of project location, actions will be taken in accordance with articles 6 and 7 of Convention on the Conservation of European Wildlife and Natural Habitats (Bern) and the Decisions of Central Hunting Committee. Moreover, pursuant to Bern Convention, all members of Amphibians and Reptiles are under protection in Turkey. Related articles of the convention will be applied accordingly and necessary precautions will be taken.

Flora

Turkey is within the Holarctic flora region and it is divided into three phytogeographical regions as Europe-Siberia, Iran-Turan and Mediterranean. Project area is within Iran-Turan and Europe-Siberia flora regions. (Terzioğlu, Serdar, Uzun, Uzun, & Karaköse). General information on the flora of Yozgat, Tokat, Çorum and Sivas provinces have been examined and shared below.

399 species have been detected in the flora examination for Yozgat province and 70 of these species are endemic. These 399 species belong to 57 different families. Percentages of families in accordance with the number of species they have are listed below: Compositae 14% (55 species), Leguminosae 13% (52 species), Graminea 9% (36 species), Labiatae 7% (27 species), Caryophyllaceae 5% (21 species), Rosaceae %5 (20 species), Boraginaceae 5% (19 species), Scrophulariaceae 4% (17 species), other families 38% (152) (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

Tokat province is quite rich in terms of flora. In addition to naturally growing forage crops, there are many plant species like blackberry, cornelian cherry, rosehip thyme, caper plant, mahaleb, hawthorn and tear-thumb. A medicinal aromatic plant sage and some of its other species can be widely found in the flora. Additionally, there are also almost extinct fruit species known as health fruits like Rowanberry (Sorbus domestica L.), Medlar (Mespilus germenica L.). In addition to them, Jujube and caper (Cappari spinoza) can be found in the region and they should be protected. Endemic species, habitats which are rich in species that should be monitored and proposed conservation areas designated in flora studies carried out for Tokat province are listed below: Erbaa Çatalan Lake ve Tifi Creek, Erbaa-Gökbel location, Erbaa Fındıcak location Cedruslibani relict plant community, orchid areas in Erbaa İkizce location, location between Niksar Çamiçi Highland-Perşembe Highland, inner part of Niksar Fortress , Niksar Keltepe-Çanakçı Valley, Niksar Şahnalan location, Niksar Örenler location Tulipa armena species, Erbaa Şehitler location, Niksar Muhtardüzü location wild quince species, Niksar Akıncı location, Cedrus libani relict plant community, Niksar Çanakçı stream, Almus dam lake location, Reşadiye Sazak Passage, orchid species in Zile Uğurluören location, orchid

species in Turhal Yağlıalan location, Pazar Kaz Lake, Pazar Ballıca Cave location, Almus Mescit Highland, Almus Hubyar Highland, Çamlıbel peak Niksar-Sulugöl location, Niksar maquis area (T.C. Çevre ve Şehircilik Bakanlığı, 2019). While 57 species are designated as endemic in literature studies, 114 species are designated as endemic in field studies. (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

63 plant species are designated in the studies carried out in Çorum. (T.C. Çevre ve Şehircilik Bakanlığı, 2019). Forests within the limits of Çorum province are composed of tree species like black pine, scotch pine, beech and oak. Cedar, fir and juniper trees can also be found. (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

In Sivas, there are endemic species designated in accordance with the categories of IUCN Red Data Book (2000) shared in "Plants of Turkey Red Book" (T.C. Çevre ve Şehircilik Bakanlığı, 2020). Ak Mountains located within the limits of Şarkışla-Yıldızeli are the most important forest areas of Central Anatolian Region. Except for this forest, main vegetation of the region is steppe. (T.C. Orman ve Su İşleri Bakanlığı, 2015).

Forests

Pursuant to Article 1 of Forestry Law numbered 6831, forest is defined as "Naturally grown or raised tree and small tree communities are considered a forest with their location." Forest areas in Turkey cover 27% of the country (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

The climate of the forest ecosystem in Yozgat province is arid during summer and harsh during winter. There are calcareous and saline soil in the southern parts and brown forest soil in the northern parts. Forest areas in the province constitutes 15% of the province. 50% of this area is fertile and 50% is rough. While 64% of the forests is composed of leaved species, 36% is composed of coniferous species. (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

Forest areas in Tokat province cover 47,9% of the province. While 60% of this area is fertile, 40% is rough. There are tree species like redwood, juniper, scotch tree, Calabrian pine, oak, hornbeam, beech and linden in the province. All of the forest areas in Tokat province are in the possession of the state. (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Within the provincial limits of Çorum, forest areas are generally formed by oak, breech, black pine and scotch pine. In addition to this; fir, juniper and cedar trees are observed locally. (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

In Sivas, forest areas cover 20,64% of the province, which amounts to 588.000 hectares. Natural tree species in those forest areas is oak. Juniper species can be found at the highest altitudes. Forests are mainly in the northern parts of Sivas. They are scarcer in western and eastern parts. (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Fauna

Turkey is rich in terms of fauna as a result of its geographical location. In addition to this, Turkey is on the world's two largest migration routes of birds. This increases Turkey's importance in terms of bird diversity (T.C. Çevre ve Şehircilik Bakanlığı, 2016).

As a result of fauna studies carried out in Yozgat province, 9 bird species, 4 mammal species and 3 reptile species are detected. Some of the detected species are fox, field mouse, squirrel, wild boar, red-legged crow, starling, hobby, sparrow hawk, rabbit and golden eagle. (T.C. Çevre ve Şehircilik Bakanlığı, 2020).

Tokat is rich in terms of fauna. Since it has different habitats, Tokat contains many different species. As a result of the studies, 76 bird species, 18 mammal species and 7 reptile species are found. There are wild animals like fox, rabbit, marten, roe-deer, pheasant, bear, wolf, wild boar and jackal. (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

37 bird species and 19 mammal species are detected in the studies carried out for Çorum province. 10 of these detected bird species are in the Appendix-II (Strictly Protected Fauna Species) in accordance with the Convention on the Conservation of European Wildlife and Natural Habitats (Bern) and 4 of these mammal species are in the Appendix-III (Protected Fauna Species) in accordance with the Convention on the Conservation of European Wildlife and Natural Habitats (Bern) (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

Sivas province is also rich in terms of fauna. Within the limits of the province, there are mammals like wolf, bear, fox, squirrel; species in the families of eagle, hawk, sparrow hawk, stork and duck, species of piscivorous bird species and reptile species like snake, lizard and turtle. (T.C. Çevre ve Şehircilik Bakanlığı, 2020)

2.4.2. Climate Change

The most important effects that can arise in Turkey as a result of climate change are the increase in the frequency and strength of drought and overflow incidents (Ülke & Özkoca, 2018). According to the Fourth Assessment Report by the IPCC (Intergovernmental Panel on Climate Change), the increase in the annual temperature of Turkey in the coming years is expected to be 2,5 - 4 ˚C. It is thought that Turkey will be considerably affected economically and socially as a result of this climate change, especially because of the negative effects caused by reduction of water sources, forest fires, drought and desertification and ecological disruptions that are related to these (Ministry of Environment and Urbanization of the Republic of Turkey, 2012).

Provinces within the project location are planning to conduct short, medium and long-term studies in their provinces, in accordance with Climate Change Action Plan. In Yozgat, Municipalities, Provincial Special Administration, Non-governmental Organizations and Public Institutions are in cooperation, in accordance with Climate Change Action Plan. Accordingly, some measures are planned like: protection and development of green areas, collection of solid waste, conducting regular storage in accordance with regulations, minding ecological balance during improvement studies to be conducted by the municipalities, utilizing wastes which have energy value, decreasing wastes, activating pedestrian and bicycle roads with some elements which promote public transportation, adjusting certain time periods for load vehicles to make it out to the traffic, taking urban road, highway, sea route and railroad investments into operation, choosing vehicles with low carbon emission etc. (T.C. Çevre ve Şehircilik Bakanlığı, 2020). Additionally, facilities within the scope of “Regulation on the Monitoring of the Greenhouse Gas Emissions” published on the Official Gazette No. 28274 on

25 April 2012 should prepare greenhouse gas monitoring plans and send them to the Ministry. After the approval of the plans, they should conduct monitoring every year and should report to the Ministry for the validation of previous year's greenhouse gas emission monitoring reports. (T.C. Çevre ve Şehircilik Bakanlığı, 2019).

2.5. Alternatives, Site Selection and Land Cost

Criteria for the selection of alternative sites in the context of the project are provided in Section 2.4.

The expropriation process is carried out in accordance with the Expropriation Law no. 2942. In the procedures carried out in accordance with this law, the expropriation cost is determined by the procedures and principles laid out in the law in the judicial process. Hence, no expropriation cost is determined at this stage. Furthermore, almost all the investment projects that require site allocation are areas like forest, pasture, treasury owned parcels and state-owned lands that can be allocated to public institutions who are project partners at no cost.

3. DEMAND FORECASTING AND CAPACITY SELECTION

3.1. Assumptions

- Çekerek Basin is not in the desired position in terms of economy and commerce due to the unsuitable geographical and climatic conditions. GDP per capita in the region is 35% lower than Turkey's average. For this reason, supporting the local people with income-generating activities is one of the important needs.
- As the transportation means are limited as a result of the geographical location, the products made in the region are hard to transport out of the region. With road construction and improvement projects, it is expected that the transportation of locally made products to out of the region will become easier.
- Economy of the region is mainly based on agriculture and husbandry. Production capacity of the region will be increased by supporting income-generating activities within this context. Product export to the other regions is expected to surge with the increased production capacity and improved or newly built roads.
- With the construction of recreation areas, it is envisaged that Çekerek Basin will be potentially utilized in terms of the tourism sector.
- By means of increasing the number of irrigated farming areas through the improvement of irrigation infrastructures, agricultural products with high added value are expected to be produced.
- It is aimed to decrease the pressure on the forests through the rehabilitation of forests and savings in the consumption of wood fuel.
- Migration to outside of the region is expected to decrease with the increasing economic activities in the region,
- Increase is not expected in the costs determined by the related administrations except for supply shocks and force majeure,
- With the scale and scope of the investments made, an appreciation similar to the gross domestic product trend is expected,
- Public contributions are calculated as a percentage of total project cost as shown in the Annex-8 on the basis of thematic chapter in different sub-projects like production, supervision, construction, rehabilitation, infrastructure, application with costs of public vehicles and civil servants taken into account.

3.2. Demand Forecasting Method

Direct beneficiaries of the project are the target people living in the villages where the rehabilitation works are carried out for the natural resources. Generally, their main means of livelihood are husbandry, agriculture retirement pension and daily wages. Interviews conducted have put forward the troubles and needs of the local population and focused on the natural resource rehabilitation and management and life/livelihood improvement topics. The feasibility report was prepared by taking into consideration the features of the sites related to the project and application area, the boundaries of the overflow plain and areas not suitable for settlements.

Priorities of the region were identified by the beneficiary institutions. Also, the needs and requests were observed on site through face-to-face interviews in the field visit to the region.

Trees and plants suitable for the region's geography and climate were selected according to the analysis made by the beneficiary administrations.

3.3. Demand Analysis

Through the interviews conducted, priorities of the region and results of the study, a needs assessment was conducted, and as a result of the assessment of income-generating activities by the related institutions, this feasibility report was prepared. In this respect, the feasibility report analysis has a holistic approach as it includes the detected problems and the needs towards overcoming them. Demand analysis was carried out within the framework of the region's climate, its geographic conditions and the needs of the public. Selection of the species in agricultural products and husbandry were made by taking into consideration the conditions of the region and extent of income generation.

While the demand analysis was carried out, activities were selected amongst activities with a high potential of income generation for the region's local communities and from products suitable for the properties of the region. Afterwards, income generation cases were clarified by having discussions on the marketing strategies of the selected products. Thereafter, requests and views were gathered from the households and enterprises via discussions during the field visit in the areas where the projects would be realized. In these discussions, it was also tried to observe the household production capacities which are aimed to be increased. Development potential was forecasted in the cases with and without the project in product and activity determination analysis which was reinforced by the field visits. Subsequently, arrangements were done to the products and activities that are planned to be supported. Final project selections with high added-value, which correspond with the local community's demands and which will increase the production capacity of the region when applied were completed.

3.4. Demand Forecasting Results

Demand forecasting results were created by reinforcing the desk researches, which were based on the relevant institutions' experiences and knowledge about the region, with field research. Demand forecasting results were determined by the region's climate and geographic conditions as well as households/enterprises' demands and qualifications in the selection of products and activities. In this context, both the productivity situation in terms of agriculture were considered and demand and capacity aspects in terms of economy were paid attention. The results of the analysis can be summarized as follows:

- Natural characteristics and richness in the variety of flora and fauna in the project area will be protected during rehabilitation projects;
- Transportation means to different directions will be made possible with the built and improved roads;
- It is expected that the construction of rehabilitation projects and recreational sites will contribute to tourism. Furthermore, development opportunities in terms of economic development and recovery will be created by income generation projects;

- Economic limitations, which is one of the most important reasons for the local community to move out of the region, will be decreased by the economic recovery;
- Households and enterprises that are going to benefit from the supports will be identified with a scoring system based on criteria to be created;
- Especially in the selection of commercial projects, the climate and geographical features of the region will be taken into consideration. Furthermore, the opinions of the relevant administration in the region will be determinative;
- Support will be given to the households in the context of project activity whose annual income is estimated to be on average. 10.000-50.000 TRY was envisaged annually per household. Moreover, this figure increases incrementally in products like mushrooms which have a high added-value;
- With the support of solar powered water heating panels and sheathing projects, energy saving will increase and forest destruction will decrease;
- With the irrigation projects, it will be possible to irrigate 10 decares land per household. As a result, there will be 38% increase in the land yields on average;
- Enterprises that are going to benefit from the supports will be again identified with a scoring system within the framework of criteria to be created. For enterprises, employment created by them will also be taken into consideration;
- Income generating properties will be assessed in the list of agricultural products and animal species to be created.
- With the supports of production facility for jam, marmalade, vinegar and paste, production facility for natural pickle, processing facility for dairy products, facility for trout, production facility for goat cheese, machines for noodle production and grape juice extracting machines; agricultural product processing and sustainability of the supports will be provided. Employment and income in the project area will also increase.
- Because the region is rough and because of its geographical features, in the plans to be implemented in the future, considering small scale producers is of utmost importance for the sustainability of the agricultural production. Because of this, this matter should be taken into consideration in the determined criteria;
- After scoring, households and enterprises will be given technical training ranging from purchase processes to technicalities.

3.5. Capacity Selection

Increases in the green space ratio and number of planted trees in Çekerek Basin will be provided with the rehabilitation projects to be implemented. Moreover, agricultural irrigation operations needed by the local community will be carried out and the agricultural production capacity will increase with the reservoir projects to be implemented. With the improvement of the transportation needs of the region and with investments aimed at increasing agricultural revenues, there will be capacity increases economically in every sense.

As a result of the analysis carried out by the related administrations in the region and with field researches in the basin, in line with the community's economic needs and demands, income generating activities are analyzed in the feasibility report. In this context, it is envisaged that households that are engaged in agriculture and enterprises within the scope of the project will be supported. Supports determined by the projects will be given out to households in the context of activities that are expected to generate incomes around 10.000-50.000 TL annually. Annual income generated as a result of this support was not only considered in terms of financially but also with the aspect of sustainability, it was envisaged that it will have positive effects on the community of the basin with its social effects. In the selection of households and enterprises that will benefit from the support, the relevant administration's analysis and assessments can be carried out with a scoring system via a form that has the criteria previously determined. Thus, appropriate use of the supports given will be ensured. Assessment will also be carried out in a similar way with a scoring system according to the previously determined criteria. Besides the support given, real enthusiasts will be determined by giving information on the difficulties (execution proceedings according to the provisions of the law on collection procedure of public receivables etc.) in cases like sale, transfer, withdrawal etc.

Selection of the capacity was conducted in line with the region's priorities and in accordance with the state's agricultural policies and development objectives.

4. INVESTMENT COST

4.1. Fixed Capital Investment Cost

Fixed investment is the value of tangible and intangible elements in currency that are gained during the investment, and whose benefits will be utilized for a lifetime. Fixed investment is generally compromised of the items below:

- Survey Costs;
- Engineering and Project Costs;
- License-Patent-Know How etc. Technology Payments;
- Land Cost, Land Arrangement, Preparation Structures;
- Cost of Construction Works, Expenditures relating to the Transportation Operations;
- Machinery and Equipment Costs of Main Operation, Machinery and Equipment Costs of Auxiliary Operation;
- Transportation and Insurance Costs, Import and Customs Clearance Costs;
- Cost of Assembly, Vehicles;
- General Costs;
- Commissioning Costs, Unexpected Costs and Investment Period Interests.

In Table 23, the total fixed capital investment cost can be seen in Turkish Lira and US Dollars. Beneficiary contribution and public contribution are not included in this table showing fixed investment.

Table 23 Fixed Capital Investment Cost

No	Fixed Investment	Sum (USD $)	Sum (TRY)
1	Survey Costs		
2	Engineering and Project Costs	6.686.898	871.609
3	License-Patent-Know How etc. Technology Payments		
4	Land Cost		
5	Land Arrangement	30.352.148	3.956.275
6	Preparation Structures		
7	Cost of Construction Works	198.400.000	25.860.608
8	Expenditures relating to the Transportation Operations		
9	Machinery and Equipment Costs of Main Operation		
10	Machinery and Equipment Costs of Auxiliary Operation		
11	Transportation and Insurance Costs		
12	Import and Customs Clearance Costs		
13	Cost of Assembly		
14	Vehicles		
15	General Costs	106.846.000	13.926.928

No	Fixed Investment	Sum (USD $)	Sum (TRY)
16	Commissioning Costs	154.570.500	20.147.616
17	Unexpected Costs		
18	Investment Period Interests		
	Fixed Capital Investment Cost	**496.855.546**	**64.763.037**

Operation capital sub-projects are shown under 'Commissioning Costs' item. Details of Table 23 are given in Annex-6 on the basis of sub-projects.

Percentage weights of the investment items are seen in Figure 12.

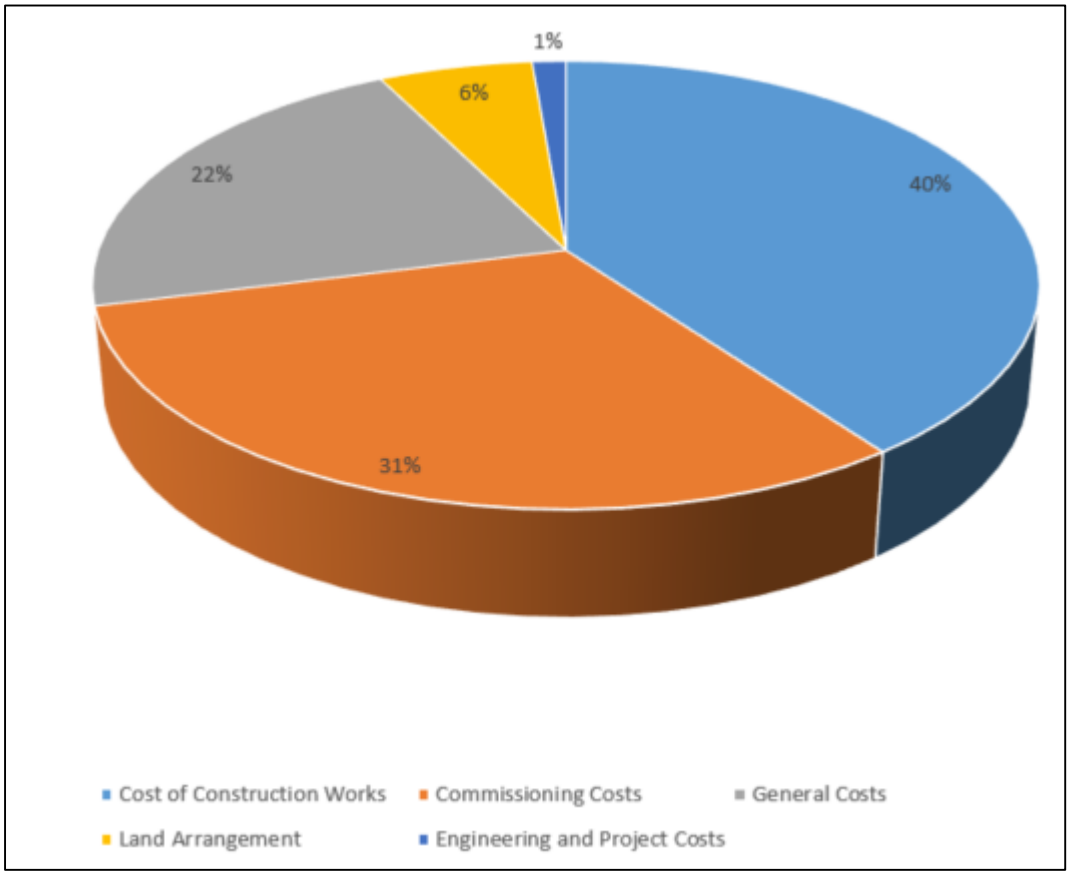

Figure 12 Fixed Capital Investment Cost (%)

'Cost of Construction Works' constitutes the biggest share with 40% in fixed capital investments. In the second place, there are the commercial investments with a total of 65 sub-projects that aim at increasing the standards of life of the local community by economic development (like dairy cattle farming, dissemination of good agricultural practices in hazelnut groves, establishing milk collection and processing centers).

4.2. Land Cost/Expropriation Cost

Most common administrative intervention that ends the right of property, which is a constitutional right, is expropriation. Juristically validation and legitimacy of expropriation

become possible by ensuring the condition of public welfare and by paying the real compensation for the expropriation subject in question in cash (Özel, 2015). Expropriation costs and land improvement costs after expropriation are stated as land cost. Partial expropriations will be done in compulsory cases in the project which will be generally conducted in existing facilities and public lands. In addition to this, as the costs of expropriation are clearly defined with judicial processes, approximate costs will be used in the partial expropriations. As a large part of the project area is comprised of public lands, no large expropriations will be done and no expropriation and land costs will be paid.

4.3. Working Capital

Working cost is identified as gross or net. While the gross working cost is identified as the total returned value, net working capital identifies the difference between returned value and short-term foreign assets.

In the working capital, expenditures of raw material, auxiliary product, electricity, fuel, water, labor force resources required by the investment to produce products or services and expenditures needed for the product or service created to reach to the market are calculated. However, as the present project is not a private sector project that is to say an entrepreneur project or investment, no calculations will be done in this section. Since the expenditures of required personnel and other costs of the investment to produce products and services will be provided by the relevant institutions' own resources. As the investment will be done in the context of an international project and with public funding, it will be provided by and sustained with the relevant public institutions' own resources and in the service network of them. The project for which the feasibility report was prepared is a project serving for the development of Çekerek Basin composed of 113 sub (separate) projects (Yavuz, 2017, p. 43-44). As the sub-projects are numerous and vary greatly, no income-generating activities or enterprises will be presented in this section of the report.

4.4. Total Investment Cost and Breakdown by Years

This is the section where total investment cost is presented by adding up fixed investment costs and working capital needs during operation period. Breakdown of total investment costs by years will be presented via the *Breakdown of Total Investment Cost by Years* below. This section will allow for the monitoring of the breakdown of total investments by years in terms of external and internal sources in the context of this project. While the internal money means the goods and services that will be provided domestically, external money means products to be supplied from abroad (Dalbudak, 1996, p. 426). In the feasibility report of the project, as domestic resources and workforce are envisioned to be used in the project, investments are placed in the internal money column in Table 19. In the table where the public and beneficiary contributions are not included, in accordance with the relevant institutions' work plans, 2021 was mostly considered in the framework of surveys and other preparation activities and the following table was created.

Table 24 Total Investment Cost by Years (₺)

Year	**2021**		**2022**		**2023**		**2024**		**2025**		**2026**		**2027**		**Total**
Expenditure Items	**Internal Money**	**External Money**	**Internal Money**	**External Money**	**Internal Money**	**External Money**	**Internal Money**	**External Money**	**Internal Money**	**External Money**	**Internal Money**	**External Money**	**Internal Money**	**External Money**	
A. Land Cost															
B. Permanent Facility Investment															
1.Survey and Project															
2.Techincal Assistance and Licence		668.690		2.006.069		1.671.725		835.862		1.044.828		334.345		125.379	6.686.898
3.Construction Works		4.575.043		13.725.129		57.188.037		91.500.859		45.750.430		9.150.086		6.862.564	228.752.148
4.Machinery and Equipment															
5.Transportation and Insurance		0		0		0		0		0		0		0	0
6.Import and Customs Clearance															
7.Assembly Costs															
8.General Costs		10.684.600		26.711.500		26.711.500		26.711.500		10.684.600		2.671.150		2.671.150	106.846.000
9.Vehicles and Fittings		0		0		0		0		0		0		0	0
10.Commissioning Costs		15.457.050		38.642.625		38.642.625		38.642.625		15.457.050		3.864.263		3.864.263	154.570.500
11.Unexpected Costs															
Fixed Investment Cost (A+B)		**31.385.383**	**0**	**81.085.323**	**0**	**124.213.887**	**0**	**157.690.846**	**0**	**72.936.907**	**0**	**16.019.843**	**0**	**13.523.356**	**496.855.546**
C. Need of Operational Capital															00
Total Investment Cost (A+B+C)		31.385.383	0	81.085.323	0	124.213.887	0	157.690.846	0	72.936.907	0	16.019.843	0	13.523.356	**496.855.546**

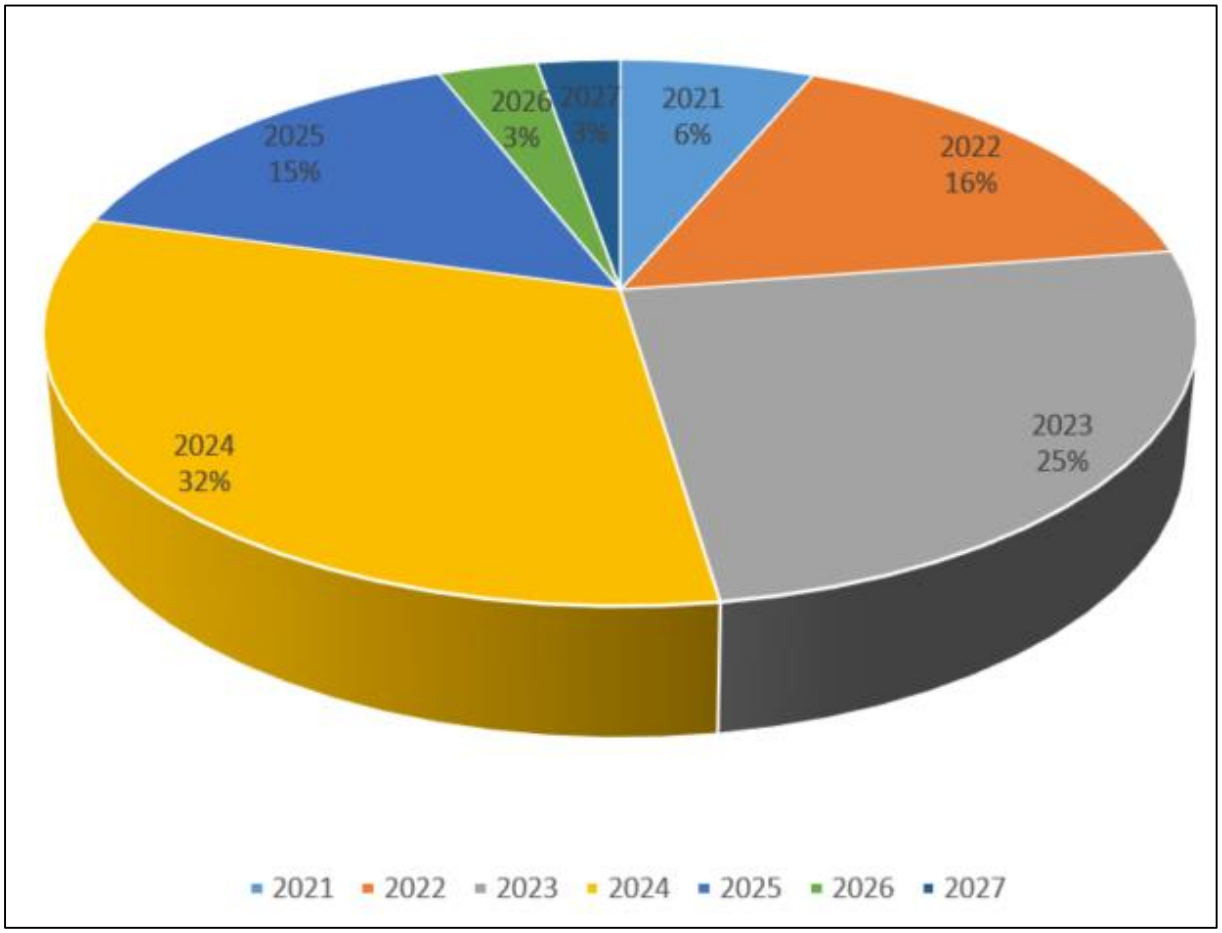

Figure 13 Proportional Distribution of the Investments by Years

Investment amounts specified were determined as institutions, activities, years and total investment costs in the context of the project. During these studies, all opinions and suggestions of the institutions were taken and during the calculation of unit costs market figures and unit costs of the institutions were taken into consideration.

Total cost by components was calculated as 64.763.037 USD excluding public and beneficiary contributions. Total budget was calculated to be 87.324.779 USD with a public contribution of 6.827.080 USD and beneficiary contribution of 15.734.661 USD. In conclusion, the total budget of the project is 669.946.974TRY, 52.376.678 TRY of this amount is government contribution and 120.714.750 TRY of this is beneficiary contribution, which amounts to 173.091.428 TRY of internal contribution while the remaining 496.855.546 TRY is external contribution.

Basic cost was distributed according to annual implementation objectives, and VAT rates, price increase, physical risks and administrative costs were determined with the relevant institutions through negotiations and were applied to the calculation. These results were used in determining the annual fund requirement.

Project will be implemented during the years of 2021-2027. In 2021, with the transfer of project resources, a low number of activities aimed at training and raising awareness and the

preparation of micro-basin plans are planned. Planning of main project implementation activities like the planning of micro-basins will be started in 2021. Below conditions were taken into account in the calculation of the project cost:

Project Duration: From 2021 to 2027, 7 years.

Exchange Rate: 1 USD was considered as 7.6719 TRY.

Furthermore, small scale contributions of the relevant institutions, VAT rates and hiring of some experts were placed in internal contribution. The details of the tables used in this feasibility study can be seen in the Annex-6, Annex-7 and Annex-8 of the report.

Table 25 Summarized Investment Cost by Components Based on Themes

	Cost (TRY)				Cost (USD)				External Contribution Percentage	Total Cost Percentage
Main Component\Thematic Title	**External Contribution**	**Beneficiary Contribution**	**Public Contribution**	**Total**	**External Contribution**	**Beneficiary Contribution**	**Public Contribution**	**Total**		
Component 1: Green and sustainable rural development	**293.766.500**	**120.714.750**	**350.000**	**414.831.250**	**38.291.231**	**15.734.661**	**45,621**	**54.071.514**	**44%**	**62%**
1.1.1. Erosion control, landslide and flood control works	75.050.000	0	0	75.050.000	9.782.452			9.782.452	11%	11%
1.1.4. Income generation and diversification of livelihoods for forest villages	71.309.250	44.333.250	0	115.642.500	9.294.861	5.778.653		15.073.515	11%	17%
1.2.1. Sustainable and climate friendly agricultural practices	4.695.800	3.472.200	0	8.168.000	612.077	452.586	0	1.064.664	1%	1%
1.2.2. Income generation and diversification of livelihoods of countryside	98.415.250	64.482.500	350.000	163.247.750	12.828.015	8.405.023	45.621	21.278.659	15%	24%
1.1.2. Climate-friendly pasture management	3.146.000	0	0	3.146.000	410.068	0	0	410.068	0%	0%
1.1.3. Rehabilitation, protection and sustainable management of forests	40.620.200	8.046.800	0	48.667.000	5.294.672	1.048.866	0	6.343.539	6%	7%
1.2.3. Sustainable agricultural value chains	530.000	380.000	0	910.000	69.083	49.531	0	118.614	0%	0%
Component 2: Climate resilient grey infrastructure	**183.000.000**	**0**	**28.800.000**	**211.800.000**	**23.853.282**		**3.753.959**	**27.607.242**	**27%**	**32%**
2.1.1. Reservoirs	0	0	10.000.000	10.000.000	0		1.303.458	1.303.458	0%	1%
2.2.1. Irrigation works	92.300.000	0	18.800.000	111.100.000	12.030.918		2.450.501	14.481.419	14%	17%
2.2.2. Multipurpose reservoirs	67.800.000	0	0	67.800.000	8.837.445		0	8.837.445	10%	10%

	Cost (TRY)				Cost (USD)				External Contribution Percentage	Total Cost Percentage
Main Component\Thematic Title	**External Contribution**	**Beneficiary Contribution**	**Public Contribution**	**Total**	**External Contribution**	**Beneficiary Contribution**	**Public Contribution**	**Total**		
2.2.3. Resilient infrastructure for flood and sedimentation control	22.900.000	0	0	22.900.000	2.984.918		0	2.984.918	3%	3%
Component 3: Institutional coordination, Project management and sustainability	20.089.046	0	23.226.678	43.315.724	2.618.522		3.027.500	5.646.023	3%	6%
Grand Total	496.855.546	120.714.750	52.376.678	669.946.974	64.763.037	15.734.694	6.827.080	87.324.779	74%	100%

Table 26 Thematic Titles by Organizations Based on Sub-Components: Total Estimated Cost (TRY)

Sub-Component\Thematic Title	TRGM	DSİ	GDF	Grand Total	Total Base Costs (%)
Sub-Component 1.1: Upper basin landscape and rural livelihoods			**190.125.450**	**190.125.450**	**38%**
1.1.1. Erosion control, landslide and flood control works			75.050.000	75.050.000	15%
1.1.2. Climate smart pasture management			3.146.000	3.146.000	1%
1.1.3. Rehabilitation, protection and sustainable management of forests			40.620.200	40.620.200	8%
1.1.4. Income generation and diversification of livelihoods for forest villages			71.309.250	71.309.250	14%
Sub-Component 1.2: Climate friendly agriculture and sustainable value chains	**103.641.050**			**103.641.050**	**21%**
1.2.1. Sustainable and climate friendly agricultural practices	4.695.800			4.695.800	1%
1.2.2. Income generation and diversification of livelihoods of countryside	98.415.250			98.415.250	**20%**
1.2.3. Sustainable agricultural value chains	530.000			530.000	0%
Sub-component 2.2: Resilient infrastructure for disaster risk and water security		**183.000.000**		**183.000.000**	**37%**
2.2.1. Irrigation works		92.300.000		92.300.000	**19%**
2.2.2. Multipurpose reservoirs		67.800.000		67.800.000	**14%**
2.2.3. Resilient infrastructure for flood and sedimentation control		22.900.000		22.900.000	**5%**

Sub-Component\Thematic Title	TRGM	DSİ	GDF	Grand Total	Total Base Costs (%)
Sub-component 3.1: Technical assistance and institutional capacity building for integrated landscape management			**6.686.898**	**6.686.898**	**1%**
Sub-component 3.2: Project management, environmental and social management and monitoring and evaluation			**13.402.148**	**13.402.148**	**3%**
Grand Total	**103.641.050**	**183.000.000**	**210.214.496**	**496.855.546**	**100%**
	21%	**37%**	**42%**	**100%**	

As can be seen in Table 26, majority of the costs foreseen (approximately 37%) are reserved for infrastructure investments. Other costs are for investments aimed at increasing local community's agricultural production and increasing their income. This ratio is arround 38% and one of the biggest investments. Investments in climate-friendly agriculture and sustainable value chains account for 21% of the total cost. While some of the investments of the General Directorate of State Hydraulic Works and the General Directorate of Forestry constitute the infrastructure investments, some of the investments of the General Directorate of Forestry and the total project costs of the General Directorate of Agricultural Reform include the upper basin landscape and rural livelihoods, climate-friendly agriculture and sustainable for economic and commercial projects such as value chains.

5. PROJECT FUNDS AND FINANCIAL ANALYSIS

In this section, a financial model of the investment, which was the topic of the feasibility survey, will be developed and a financial analysis will be conducted. When financial analyses are made, the majority of the income generated by the protection of natural resources and rehabilitation practices will not show up in the form of cash returns. Project funds and financial analysis section will show the detailed costs of the project and cash flow tables. Çekerek Basin Rehabilitation Project is an aggregated project that is comprised of mostly infrastructure projects. For this reason, the long-term return of the fund was evaluated in the context of Gross Domestic Product. Furthermore, no Financial Ratio Analysis will be carried out as the beneficiary institutions are institutions attached to the central budget and do not have their own balance sheets.

5.1. Financial Estimation

To be implemented by the General Directorate of Forestry (GDF), General Directorate of Agricultural Reform (TRGM), State Hydraulic Works (DSI), Special Provincial Administrations, a part that amounts to 496.855.546 TRY (64.702.315 USD) of the funding of the 'Çekerek Basin Rehabilitation Project' is funded by the credit of the World Bank, which constitutes the majority of the credit funds. Beneficiary contributions (120.714.750 TL - 15.734.662 USD) are also envisioned in specific sub-projects. As a result, internal and external funding will be used in conjunction with each other. In addition, personnel, vehicle expense etc. are predicted as 52.376.678 TRL - 6.827.080 USD. Grant ratios for projects are given in Annex-9. Therefore, external and internal financing will be used together.

5.2. Need for and Sources of Funds

This section will include the determination of the fund needs of the investment, the amount of this need and the sources that will be used to meet this need. Fixed Investment Total will be identified by adding necessary price increases in internal investments and currency differences and if existing funding costs to the fixed investment cost calculated in section 4 which is comprised of tangible and intangible elements. General Investment Total will be identified by adding the operational cost that is needed for the investment to start production. After determining the need for fund, this section will include which sources will be utilized to fund this need.

Need for funds and sources that will finance them and assessment results will be shown in Table 27 below.

Table 27 Needs for Funds and the Sources of Funds

Need for Funds	DSI			GDH			TRGM			SPA		
	External Contribution	Public Contribution	Beneficiary Contribution	External Contribution	Public Contribution	Beneficiary Contribution	External Contribution	Public Contribution	Beneficiary Contribution	External Contribution	Public Contribution	Beneficiary Contribution
Permanent Facility Investment	183.000.000			144.585.046	23.226.678		14.700.000					
Funding Costs												
Fixed Investment Total	183.000.000			144.585.046	23.226.678		14.700.000					
Operational Capital Investment				65.629.450	0	52.380.050	88.941.050		68.334.700			
Total Need for Funds	183.000.000			210.214.496	23.226.678	52.380.050	103.641.050		68.334.700			
Sources of Funds												
Own Resources					23.226.678	52.380.050			68.334.700			
External Resources	183.000.000			210.214.496			103.641.050					
Total Funding Resources	183.000.000			210.214.496	23.226.678	52.380.050	103.641.050		68.334.700			

5.3. Financial Terms and Capital Cost

It is expected that the majority of the project will be covered by the funding from the World Bank and the rest will be covered by the beneficiary contribution. The support by the World Bank will be in the form of a credit that has a reimbursement. As a result, capital cost will occur for the part of the project that will be funded by credit. The external funding total that will be taken from the World Bank with a maturity of 25 years, 6 of which without payment, on the rate of (Libor+1) was determined to be 64.763.037 USD (496.855.546 TRY). 25 years of expected income from the investments in the context of the project was calculated to be 103.021.860 USD in the present value. Details of the calculation is presented in Annex-7.

For the project to deserve investments, income from it should be higher than the cost of capital. Although the present-day net expected income from the project is lower than the fund/credit total, fixed investments are not included in this value. In this context, Çekerek Basin Rehabilitation Project was considered to be a totally feasible project. Also considering the social aspects of the project that cannot be monetized, effects of it on community development can be thought as inclusive and numerous.

5.4. Financial Statement and Analysis of Financial Rates

Table 28 was created for the summary of the financial model. Beneficiary institutions of the project are public institutions attached to the central budget. Financial Rates Analysis will not be conducted here as it can only be carried out when institutions have their own financial statements. Only Financial Statement will be presented.

Table 28 Financial Statement

Need for Fund	External Contribution (External Money)	Public Contribution (Internal Money)	Beneficiary Contribution (Internal Money)
Permanent Facility Investment	342.285.046	0	52.376.678
Funding Costs	0	0	0
Fixed Investment Total	342.285.046	0	52.376.678
Operational Capital Investment	154.570.500	120.714.750	0
Total Need for Funds	496.855.546	120.714.750	52.376.678
Sources of Funds	0	0	0
Own Resources	0	120.714.750	52.376.678
External Resources	496.855.546	0	0
Total Funding Resources	496.855.546	120.714.750	52.376.678
Grand Total	**669.946.974**		

6. ECONOMIC ANALYSIS

In this section, effects of projects on the whole of the economy and general public will be analyzed. All projects which have feasibility surveys conducted for them are considered as non-commercial public investments that have the characteristics of public welfare. In this section about economic analyses, basically by carrying out a more trustworthy social assessment on the total development plane, not only short-term economic/financial gains but also long-term social and environmental gains which have vital importance but are not monetary that will be realized with the project will be analyzed.

6.1. Main Assumptions about the Economic Analysis

The subject of the feasibility report foresees an inclusive economic development in the 'Aggregated Project' which has numerous public investments in it. While the project has infrastructure service projects that serves public interest, it also includes projects that will help with the economic development of the local community directly.

Hereby in this feasibility report, there are 4 Project Owners, 3 Main Components, 6 Sub-Components, 11 Thematic Titles and 113 Sub-Projects. In the economic analyses, inductive method was used by utilizing Public Institutions' Reports, Professional Associations' Reports and data from the academic articles. Economic Benefit Cost Analyses were carried out under 14 thematic titles and on the basis of sub-projects, specific to thematic titles with the average profitability ratio of significant majority applied to the rest of the thematic title.

6.2. Economic Benefits and Costs

6.2.1. Economic Benefits

Çekerek Rehabilitation Project not only means economic development but also aims at the development of the region as a whole. While the project directly contributes to economic and commercial life, it also provides sustainable ways of life for the basin community with infrastructure projects. Basic gains from the project's implementation can be sorted as follows:

(1) increase in the purchasing power of the basin community (with increasing incomes and decreasing costs);

(2) improvements in natural resource values;

(3) improvements in producer's and basin community's living conditions;

(4) increase in agricultural production capacity with the increase in irrigation opportunities,

(5) a more secure life with the control of natural disasters;

(6) positive contribution to environmental and social interaction;

(7) increase in institutional capacity;

Those among the sub-projects of the following thematic titles under the first component of the project 'green and sustainable rural development' shown in the following table were calculated below under different headings based on income, expense and profitability ratios of '2019 Medical Projects' run in the region by ORKÖY Department of General Directorate

of Forestry and values in the feasibility reports conducted by the public, direct added-value provided to the community of the basin through 'Çekerek Basin Rehabilitation Project'.

1.1.3. Rehabilitation, protection and sustainable management of forests;

1.1.4. Income generation and diversification of livelihoods for forest villages;

1.2.1. Sustainable and climate friendly agricultural practices;

1.2.2. Income generation and diversification of livelihoods of countryside;

Table 29 Some selected sub-projects with beneficiary contribution

Sub Project Name	Total Investment Cost (TRY)	External Contribution Estimated Cost (TRY)	Beneficiary Contribution(TRY)	Province	Location(district)
Water Heating System with Solar Energy	1.112.500	667.500	445.000	Yozgat	Akdağmadeni, Saraykent,Çayıralan,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun
Water Heating System with Solar Energy	75.000	45.000	30.000	Sivas	Yıldızeli
Water Heating System with Solar Energy	500.000	300.000	200.000	Çorum	Alaca
Water Heating System with Solar Energy	750.000	450.000	300.000	Tokat	Artova, Sulusaray, Yeşilyurt
Heat Insulated Sheathing	8.417.000	5.050.200	3.366.800	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
Heat Insulated Sheathing	350.000	210.000	140.000	Sivas	Yıldızeli
Solid Fuel Heating System	3.187.500	1.912.500	1.275.000	Yozgat	Akdağmadeni, Saraykent,Çayıralan,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
Solid Fuel Heating System	1.725.000	1.035.000	690.000	Sivas	Yıldızeli
Heat Insulated Sheathing	2.000.000	1.200.000	800.000	Tokat	Artova, Sulusaray, Yeşilyurt
Solid Fuel Heating System	2.000.000	1.200.000	800.000	Tokat	Artova, Sulusaray, Yeşilyurt
Mushroom Cultivation Project	841.000	420.500	420.500	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
Truffles Cultivation Project	1.000.000	500.000	500.000	Tokat	Artova,Yeşilyurt
Mushroom Cultivation Development Project	1.350.000	675.000	675.000	Tokat	Yeşilyurt
Dairy Sheep Breeding	18.000.000	9.000.000	9.000.000	Yozgat	Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Akdağmadeni, Saraykent,Çayıralan

Sub Project Name	Total Investment Cost (TRY)	External Contribution Estimated Cost (TRY)	Beneficiary Contribution(TRY)	Province	Location(district)
Dairy Cattle Breeding	40.000.000	20.000.000	20.000.000	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun, Çayıralan
Dairy Cattle Breeding	3.500.000	1.750.000	1.750.000	Sivas	Yıldızeli
Dairy Sheep Breeding	1.980.000	990.000	990.000	Sivas	Yıldızeli
Dairy Sheep Breeding Development Project	1.900.000	950.000	950.000	Çorum	Alaca,Ortaköy
Dairy Cattle Breeding Development Project	5.500.000	2.750.000	2.750.000	Çorum	Alaca,Ortaköy
Dairy Cattle Breeding Development Project	3.000.000	1.500.000	1.500.000	Tokat	Artova, Sulusaray, Yeşilyurt
Scientific Beekeeping	3.700.000	1.850.000	1.850.000	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
Scientific Beekeeping	55.500	27.750	27.750	Sivas	Yıldızeli
Scientific Beekeeping and Diversification of Bee Products	2.000.000	1.000.000	1.000.000	Çorum	Alaca,Ortaköy
Scientific Beekeeping and Diversification of Bee Products	2.300.000	1.150.000	1.150.000	Tokat	Artova, Sulusaray, Yeşilyurt
Greenhouse Cultivation	3.000.000	1.500.000	1.500.000	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
Greenhouse Cultivation	540.000	270.000	270.000	Sivas	Yıldızeli
I Have an Idea to Go Back to the Village Project (Strawberry Cultivation, Beekeeping, Roaming Chicken etc.)	5.050.000	2.525.000	2.525.000	Tokat	Artova, Yeşilyurt, Sulusaray
Installation of Irrigation Systems	2.368.000	1.420.800	947.200	Yozgat	Merkez, Aydıncık
Ovine Breeding Development Project	3.400.000	1.700.000	1.700.000	Sivas	Yıldızeli
Dairy Cattle Breeding	3.750.000	1.875.000	1.875.000	Sivas	Yıldızeli

Sub Project Name	Total Investment Cost (TRY)	External Contribution Estimated Cost (TRY)	Beneficiary Contribution(TRY)	Province	Location(district)
Development Project					
Ovine Breeding Development Project	25.000.000	12.500.000	12.500.000	Yozgat	Merkez, Akdağmadeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Saraykent, Sorgun
Cattle Breeding Development Project	50.000.000	25.000.000	25.000.000	Yozgat	Merkez, Akdağmadeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Saraykent, Sorgun
Ovine Breeding Development Project	6.000.000	3.000.000	3.000.000	Tokat	Artova, Yeşilyurt, Sulusaray
Cattle Breeding Development Project	7.500.000	3.750.000	3.750.000	Tokat	Artova, Yeşilyurt, Sulusaray
Improvement of Barn Conditions Project	7.500.000	3.750.000	3.750.000	Yozgat	Merkez,Akdağmadeni, Kadışehri, Sorgun
Improvement of Barn Conditions Project	1.000.000	500.000	500.000	Tokat	Artova, Yeşilyurt, Sulusaray
Poultry Breeding Development Project	660.000	330.000	330.000	Yozgat	Akdağmadeni, Çayıralan
Poultry Breeding Project	750.000	375.000	375.000	Tokat	Artova, Yeşilyurt, Sulusaray
Beekeeping Development	1.125.000	562.500	562.500	Sivas	Yıldızeli
Beekeeping	2.200.000	1.100.000	1.100.000	Yozgat	Merkez, Akdağmadeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Saraykent, Sorgun
Greenhouse Project	1.000.000	500.000	500.000	Sivas	Yıldızeli
Greenhouse Cultivation 100 m2 58 pcs. 500 m2 16 pcs. 1000 m2 50 pcs.	6.570.000	3.285.000	3.285.000	Yozgat	Merkez, Kadışehri, Aydıncık, Akdağmadeni, Çekerek
Greenhouse Project	1.700.000	850.000	850.000	Tokat	Artova, Yeşilyurt, Sulusaray
Fruit Garden Facility	252.000	126.000	126.000	Yozgat	Akdağmadeni
Vineyard Facility and Installation	4.750.000	2.375.000	2.375.000	Yozgat	Akdağmadeni, Çekerek, Kadışehri
Procurement of Fruit Saplings and Dissipation of Fruit Growing	900.000	450.000	450.000	Tokat	Artova, Yeşilyurt, Sulusaray
Agricultural Machinery Support for Good Agricultural Implementations	3.500.000	1.750.000	1.750.000	Yozgat	Merkez, Akdağmadeni, Aydıncık, Çayıralan, Çekerek, Kadışehri, Saraykent, Sorgun

Sub Project Name	**Total Investment Cost (TRY)**	**External Contribution Estimated Cost (TRY)**	**Beneficiary Contribution(TRY)**	**Province**	**Location(district)**
Mushroom Cultivation Development Project	1.000.000	500.000	500.000	Sivas	Yıldızeli
Mushroom Cultivation Facility 6 pcs.	408.000	204.000	204.000	Yozgat	Merkez, Akdağmadeni
Noodle-making machines	160.000	80.000	80.000	Yozgat	Saraykent
Grape Juicers	1.094.880		45.620	Yozgat	Sorgun
TOTAL ₺	**246.076.500 ₺**	**125.361.750 ₺**	**120.714.750 ₺**	TRY	
TOTAL $	**32.075.040 $**	**16.340.375 $**	**15.734.662 $**	USD	
TOTAL		**50,9%**	**49,1%**		

6.2.1.1. Dairy Cattle Breeding

Within the scope of the project details of "Dairy Cattle Breeding" is as follows:

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Regional Directorate of Forestry
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Cattle Breeding	40.000.000	20.000.000	20.000.000	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun, Çayıralan
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Cattle Breeding	3.500.000	1.750.000	1.750.000	Sivas	Yıldızeli
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Cattle Breeding Improvement Project	5.500.000	2.750.000	2.750.000	Çorum	Alaca,Ortaköy
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Cattle Breeding Improvement Project	3.000.000	1.500.000	1.500.000	Tokat	Artova, Sulusaray, Yeşilyurt
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Dairy Cattle Breeding Improvement Project	3.750.000	1.875.000	1.875.000	Sivas	Yıldızeli
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Dairy Cattle Breeding Improvement Project	7.500.000	3.750.000	3.750.000	Tokat	Artova, Yeşilyurt, Sulusaray
Total (TRY)			**63.250.000 ₺**	**31.625.000 ₺**	**31.625.000 ₺**		
Total (USD)			**8.244.372 $**	**4.122.186 $**	**4.122.186 $**		
Total (%)				**50,0%**	**50,0%**		

A total of 63.250.000 TL investment is estimated together with the public and beneficiary contribution. A value chain will be formed in the region with this consolidated project which also covers procurements of Simmental dairy cattle, milking unit needed by the enterprises and milk cooling tank.

Investment profitability rate[1] in dairy cattle breeding is 20,48%. (Kalkınma Kütüphanesi, 2020) Considering this rate, the investment to be made in dairy cattle breeding which amounts to 63.250.000 TL will bring 12.953.600 TL annual profit,

6.2.1.2. Dairy Sheep Breeding

Within the scope of the project details of "Dairy Sheep Breeding" is as follows:

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (District)
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Sheep Breeding	18.000.000	9.000.000	9.000.000	Yozgat	Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Akdağmadeni, Saraykent,Çayıralan
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Sheep Breeding	1.980.000	990.000	990.000	Sivas	Yıldızeli
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dairy Sheep Breeding Improvement Project	1.900.000	950.000	950.000	Çorum	Alaca,Ortaköy
Total (TRY)			**21.880.000 ₺**	**10.940.000 ₺**	**10.940.000 ₺**		
Total (USD)			**2.851.966$**	**1.425.983 $**	**1.425.983 $**		
Total (%)				**50,0%**	**50,0%**		

A total of 21.880.000 TL investment is estimated together with the public and beneficiary contribution. A value chain will be formed in the region with other supporting sub projects.

Investment profitability rate[2] in dairy sheep breeding is 8,8%. (General Directorate of Forestry, 2019) Considering this rate, the investment to be made in the region which amounts to 21.880.000 TL will bring 1.925.440 TL annual profit.

[1] Return of Investment = (Profit After Tax/Total Investment Cost) x 100
[2] Return of Investment = (Profit After Tax/Total Investment Cost) x 100

6.2.1.3. Scientific Beekeeping

Within the scope of the project details of beekeeping is as follows:

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (district)
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Scientific Beekeeping	750.000	750.000	0	Tokat	Artova, Sulusaray, Yeşilyurt
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Scientific Beekeeping	3.700.000	1.850.000	1.850.000	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Scientific Beekeeping and Diversification of Bee Products	55.500	27.750	27.750	Sivas	Yıldızeli
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Scientific Beekeeping and Diversification of Bee Products	2.000.000	1.000.000	1.000.000	Çorum	Alaca,Ortaköy
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Beekeeping 6350 hives	2.300.000	1.150.000	1.150.000	Tokat	Artova, Sulusaray, Yeşilyurt
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Beekeeping and Diversification of Bee Products Project	5.050.000	2.525.000	2.525.000	Tokat	Artova, Yeşilyurt, Sulusaray
Total (TRY)			**16.055.500 ₺**	**8.402.750 ₺**	**7.652.750 ₺**		
Total (USD)			**2.092.767 $**	**1.095.263 $**	**997.504 $**		
Total (%)				**52,3%**	**47,7%**		

A total of 16.055.500 TL investment is estimated together with the public and beneficiary contribution within the scope of the projects on Struggle with Bee Diseases and Pests, Diversification of Bee Products, Center for Production of Beekeeping Materials, Scientific Beekeeping, Scientific Beekeeping and Diversification of Bee Products.

Investment profitability rate in Scientific Beekeeping is 112%. (Orman Genel Müdürlüğü, 2014) Considering this rate, the investment to be made in the region which amounts to 16.055.500 TL will bring 17.982.160 TL annual profit.

6.2.1.4. Medicinal Aromatic Plant Production

Within the scope of the project, details of "Medicinal Aromatic Plant Production" is as follows:

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (district)
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Dissemination of Medicinal Aromatic Plant Production and Processing Facility Project	2.800.000	2.800.000	0	Tokat	Artova, Sulusaray, Yeşilyurt
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Lavender	126.000	126.000	0	Yozgat	Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun
Total (TRY)			**2.926.000 ₺**	**2.926.000 ₺**	**₺**		
Total (USD)			**381.392 $**	**381.392 $**	**0 $**		
Total (%)				**100,0%**	**0,0%**		

A total of 2.926.000 TL investment is estimated together with the public and beneficiary contribution within the scope of the project on "".

Investment profitability rate in Medicinal Aromatic Plant Production is 145% (Kalkınma Kütüphanesi, 2020). Considering this rate, the investment to be made in the region which amounts to 2.926.000 TL will bring 4.242.700 TL annual profit.

6.2.1.5. Mushroom Cultivation

Within the scope of the project, details on Mushroom Cultivation are as follows;

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (district)
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Cultivated Mushroom Farming	841.000	420.500	420.500	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Truffle Mushroom Production Project	1.000.000	500.000	500.000	Tokat	Artova,Yeşilyurt
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Improvement of Mushroom Production Project	1.350.000	675.000	675.000	Tokat	Yeşilyurt
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Truffle Mushroom Production Project	1.000.000	1.000.000	0	Çorum	Alaca,Ortaköy
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Improvement of Mushroom Production Project	1.000.000	500.000	500.000	Sivas	Yıldızeli
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	6 Mushroom Production Facilities	408.000	204.000	204.000	Yozgat	Merkez, Akdağmadeni
Total (TRY)			**5.599.000 ₺**	**3.299.500 ₺**	**2.299.500 ₺**		
Total (USD)			**729.806 $**	**430.076 $**	**299.730 $**		
Total (%)				**58,9%**	**41,1%**		

A total of 5.599.000 TL investment is estimated together with the public and beneficiary contribution in “Mushroom Cultivation” area.

Investment profitability rate of cultivated mushroom farming is 26,0%[1]. Considering this rate, the investment to be made in the region which amounts to 5.599.000 TL will bring 1.455.740 TL annual profit.

[1] OGM ORKÖY (Forest and Village Affairs) Department Year 2019 Type Projects

6.2.1.6. Heating System with Solar Energy

Within the scope of the project, details on Heating System with Solar Energy are as follows;

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (District)
OGM	1.1.3. Forest rehabilitation, protection and sustainable forest management	Water Heating System with Solar Energy	1.112.500	667.500	445.000	Yozgat	Akdağmadeni, Saraykent,Çayıralan, Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun
OGM	1.1.3. Forest rehabilitation, protection and sustainable forest management	Water Heating System with Solar Energy	75.000	45.000	30.000	Sivas	Yıldızeli
OGM	1.1.3. Forest rehabilitation, protection and sustainable forest management	Water Heating System with Solar Energy	500.000	300.000	200.000	Çorum	Alaca
OGM	1.1.3. Forest rehabilitation, protection and sustainable forest management	Water Heating System with Solar Energy	750.000	450.000	300.000	Tokat	Artova, Sulusaray, Yeşilyurt
Total (TRY)			**2.437.500 ₺**	**1.462.500 ₺**	**975.000 ₺**		
Total (USD)			**317.718 $**	**190.631 $**	**127.087 $**		
Total (%)				**60,0%**	**40,0%**		

A total of 2.437.500 TL investment is estimated together with the public and beneficiary contribution.

Annual profitability rate[1] of this investment is 43,98%. (General Directorate of Forestry 2019) Considering this rate, the investment to be made in the region which amounts to 2.437.500 TL will bring 1.072.012 TL annual profit.

[1] Return of Investment = (Profit After Tax/Total Investment Cost) x 100

6.2.1.7. Greenhouse Cultivation

Within the scope of the project, details on Greenhouse Cultivation are as follows;

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (Dictrict)
OGM	1.1.3. Forest rehabilitation, protection and sustainable forest management	Seedling Production Project (stream improvement, internal road stabilization, interlocking pavers, irrigation, greenhouse, boom irrigation system, open shed, garage, shading, tractor, trailer, UTV engine, dumper truck)	4.900.000	4.900.000	0	Yozgat	Akdağmadeni
OGM	1.1.4. Income generation and livelihood diversification for forest villages	Greenhouse Cultivation	3.000.000	1.500.000	1.500.000	Yozgat	Akdağmadeni, Saraykent,Aydıncık, Çekerek, Kadışehri, Merkez, Sorgun,Çayıralan
OGM		Greenhouse Cultivation	540.000	270.000	270.000	Sivas	Yıldızeli
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Greenhouse (Production under Protective Cover) Project	1.000.000	500.000	500.000	Sivas	Yıldızeli
TRGM		Greenhouse Cultivation 100m2 units, 500 m2 16 units, 1000 m2 50 units	6.570.000	3.285.000	3.285.000	Yozgat	Merkez, Kadışehri, Aydıncık, Akdağmadeni, Çekerek
TRGM		Greenhouse (Production under Protective Cover) Project	1.700.000	850.000	850.000	Tokat	Artova, Yeşilyurt, Sulusaray
Total (TRY)			**17.710.000 ₺**	**11.305.000 ₺**	**6.405.000 ₺**		

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (Dictrict)
Total (USD)			**2.308.424 $**	**1.473.559 $**	**834.865 $**		
Total (%)				**63,8%**	**36,2%**		

A total of 17.710.000 TL investment is estimated together with the public and beneficiary contribution within the scope of the project on "Greenhouse Cultivation".

Investment profitability rate in "Greenhouse Cultivation" is 15,39%.[1] Considering this rate, the investment to be made in the region which amounts to 17.710.000 TL will bring 2.725.569 annual profit.

[1] https://dspace.gazi.edu.tr/bitstream/20.500.12602/147215/1/68883a3155e2beac5e9d6048c6d43e3e.pdf

6.2.1.8. Fruit and Strawberry Farming

Within the scope of the project, details on fruit and strawberry farming are as follows;

Project Owner	Thematic Title	Sub Project Name	External Contribution Estimated Cost (TL)	Beneficiary Contribution	Public Contribution	Province	Location (district)
OGM	1.1.4. Income generation and livelihood diversification for forest villages	I Have an Idea to Go Back to the Village Project (Strawberry Cultivation, Beekeeping, Roaming Chicken etc.)	5.050.000	2.525.000	2.525.000	Tokat	Artova, Yeşilyurt, Sulusaray
TRGM	1.2.2. Income generation and livelihood diversification for rural areas	Fruit Garden Plant	252.000	126.000	126.000	Yozgat	Akdağmadeni
TRGM		Fruit Seedling Supply and Dissemination of Fruit Growing	900.000	450.000	450.000	Tokat	Artova, Yeşilyurt, Sulusaray
Total (TRY)			**6.202.000 ₺**	**3.101.000 ₺**	**3.101.000 ₺**		
Total (USD)			**808.404$**	**404.202 $**	**404.202 $**		
Total (%)				**50,0%**	**50,0%**		

A total of 6.202.000 TL investment is estimated together with the public and beneficiary contribution within the scope of the project on “fruit and strawberry farming”.

Investment profitability rate in Fruit and Strawberry Farming is %23.80 (Western Black Sea Development Agency, 2020). Considering this rate, the investment to be made in the region which amounts to 6.202.000 TL will bring 1.476.076 TL annual profit.

6.2.2. Economic Costs

In Table 30, external resources and beneficiary contributions are shown as public expenditures, while public contribution is shown as operational cost by calculating the staff to work and the use of public capabilities throughout the duration of the project. Even though the cash flow table was not prepared with the accrual basis of accounting, external resource will be repaid with 9 years of non-payment period and the next 19 years of paying period. For this reason, an accrual of interest was also done on the 6 years of non-payment period. Agricultural growth rate of Turkey in 2019 in its GDP, which was 3.3%, was taken as basis in the direct benefit account. While the indirect benefit was calculated as 25% of direct benefit and nonmonetizable important benefits were calculated as %30 of direct benefits. Moreover, 'negative expenses' were calculated as 0.5% of investment expenditures.
Totally, 669.946.974 TRY investment (external, public and beneficiary contribution will be made in Çekerek Basin. Most of this investments are related to agricultural sector and will be done in addition to the current agricultural activities/investments in the basin. When calculating the direct benefit/added value to be created by an additional investment of 669.946.974 TRY in total, the increase in agricultural sector (3.3 %) is taken as previous year's 2019 GDP chained volume index. In 2nd, 3rd, 4th, 5th, 6th and 7th years, it is predicted that this investment will again provide 3.3% more direct benefit / create added value by adding the direct benefit / added value created in the previous year (or years).

Table 30 Economic Cash Flow (TRY)

Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
A. Benefits of the Project							
Direct Benefits	22.108.250	22.837.822	23.591.471	24.369.989	25.174.199	26.004.947	26.863.111
Indirect Benefits	5.527.063	5.709.56	5.897.868	6.092.497	6.293.550	6.501.237	6.715.778
Nonmonetizable Important Benefits	6.632.475	6.851.347	7.077.441	7.310.997	7.552.260	7.801.484	8.058.933
B. Project Costs							
Investment Expenditures	39.010.695	100.785.606	154.392.574	196.003.010	90.657.471	19.911.983	16.808.956
Operational Costs	3.308.531	8.547.716	13.094.170	16.623.187	7.688.740	1.688.753	1.425.582
Funding Costs	12.128.244	12.128.244	12.128.244	12.128.244	12.128.244	12.128.244	12.128.244
Negative Expenses	195.053	503.928	771.963	980.015	453.287	99.560	84.045

Percentile breakdown of Thematic Titles are shown in Figure 14.

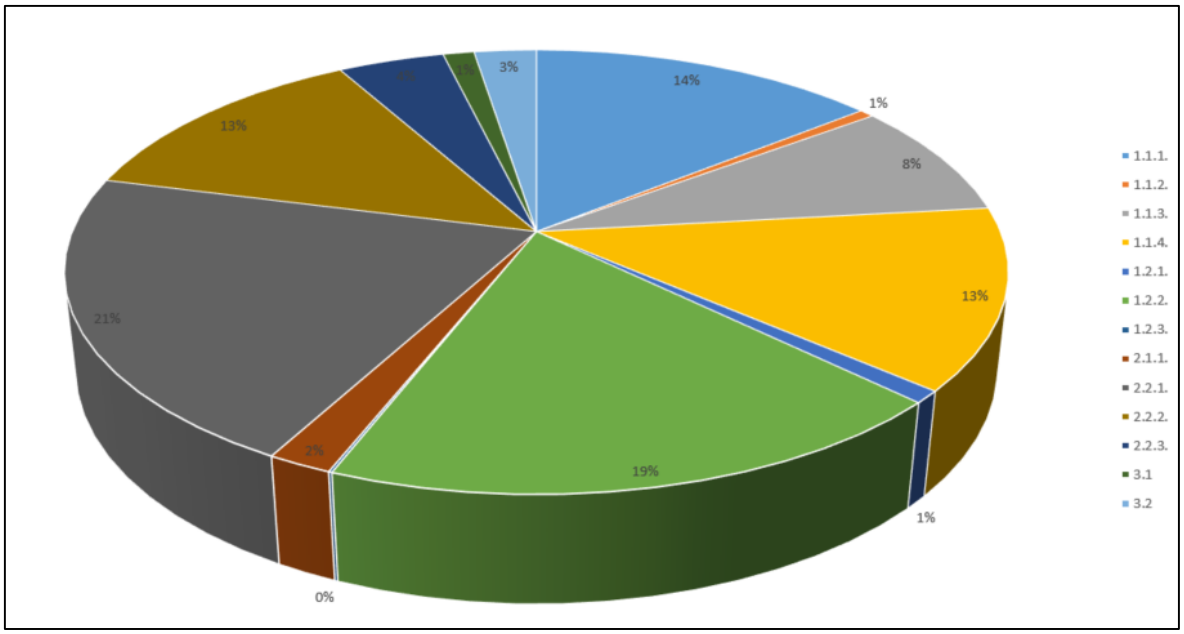

Figure 14 Percentile Breakdown of Thematic Titles

As can be seen here, more than half of the costs are comprised of multi-purpose reservoirs which have infrastructure investments, rehabilitation of climate resilient roads in the countryside, drinking water infrastructure systems, durable infrastructure for flood and sedimentation control and construction of climate resilient roads in the countryside. The remaining 20% mostly consists of investments aimed at increasing the agricultural production capacity of the local community.

6.2.2.1. (1.2.2.) Income generation and livelihood diversification for rural

(1.2.2.) Total foreseen cost of the thematic title income generation and livelihood diversification for rural is 163.247.750 TRY and the details are shown in Table 31.

Table 31 "(1.2.2.) Sub-Projects for the Thematic Title of Income Generation and Livelihood Diversification for Rural

1.2.2. Income generation and livelihood diversification for rural areas	Total External Contribution Estimated Cost(TL)	Total Beneficiary Contribution	Total Public Contribution
Project for the Improvement of Cattle Breeding	25.000.000	25.000.000	0
Pasture Rehabilitation Project	14.700.000	0	0
Ovine Breeding Development Project	12.500.000	12.500.000	0
Project for the Improvement of Dairy Cattle Breeding	5.625.000	5.625.000	0
Project on Increasing the Yield and Quality of Field Crops	5.000.000	0	0
Ovine Breeding Development Project	4.700.000	4.700.000	0

1.2.2. Income generation and livelihood diversification for rural areas	**Total External Contribution Estimated Cost(TL)**	**Total Beneficiary Contribution**	**Total Public Contribution**
Improvement of Barn Conditions Project	4.250.000	4.250.000	0
Increasing Area, Yield and Quality in Forage Crops Production Project	4.032.750	0	0
Project for Increasing Yield and Quality in Forage Crops Production	4.000.000	0	0
Greenhouse Cultivation 100m2 58 units, 500 m2 16 units, 1000 m2 50 units	3.285.000	3.285.000	0
Vineyard Facility and Installation	2.375.000	2.375.000	0
Increasing Yield and Quality in Wheat Farming Project	2.200.000	0	0
Agricultural Machinery Support for Good Agricultural Practices	1.750.000	1.750.000	0
Dissemination of Potato and Onion Production	1.500.000	0	0
Project for Increasing Yield and Quality in Barley Agriculture	1.500.000	0	0
Greenhouse (Production under Protective Cover) Project	1.350.000	1.350.000	0
Beekeeping	1.100.000	1.100.000	0
Increasing Yield and Quality in Chickpea Farming Project	1.000.000	0	0
Development of Beekeeping	562.500	562.500	0
Project for the Improvement of Mushroom Production	500.000	500.000	0
Fruit Seedling Supply and Dissemination of Fruit Growing	450.000	450.000	0
Poultry Farming Project	375.000	375.000	0
Poultry Farming Development Project	330.000	330.000	0
6 Mushroom Production Facilities	204.000	204.000	0
Fruit Garden Facility	126.000	126.000	0
Recreational Areas and Picnic Areas	0	0	350.000
TOTAL	**98.415.250**	**64.482.500**	**350.000**

(1.2.2.) There are 26 sub-projects in the thematic title of income generation and livelihood diversification for rural areas and percentile breakdown is shown in Figure 15.

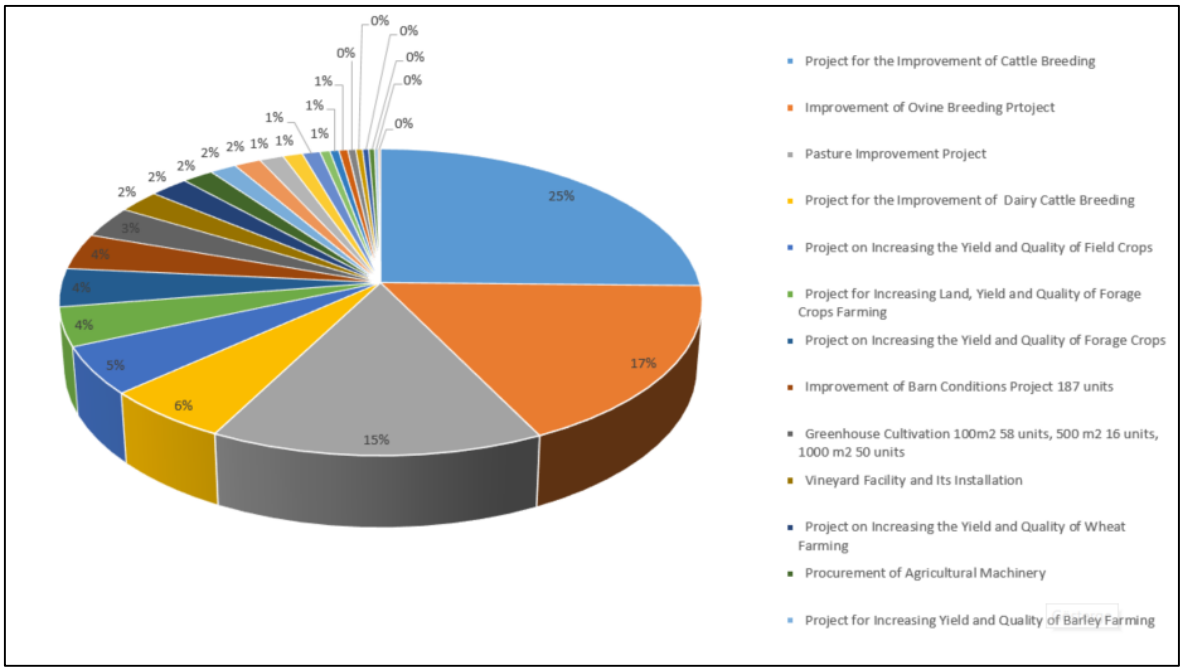

Figure 15 1.2.2 Sub-Projects for the Thematic Title of Income Generation and Livelihood Diversification for Rural Areas

6.2.2.2. 2.2.1. Irrigation Works

2.2.1. The estimated total cost of Irrigation Works thematic title is 483.354.512 TL and the details are shown in Table 32.

Table 32 2.2.1 Sub Projects for the Thematic Title of "Irrigation Works"

2.2.1. Irrigation Works	**Total External Contribution Estimated Cost (TRY)**	**Total Beneficiary Contribution (TRY)**	**Total Public Contribution (TRY)**
Artova Reservoir Irrigation Renovation Construction	32.000.000	0	0
Seyitnizam Reservoir Irrigation Construction	16.000.000	0	0
İbrahimköy Reservoir Irrigation Construction	11.000.000	0	0
Büyükmahal Reservoir Irrigation Supply Construction	10.000.000	0	0
Kızılhamza Reservoir Irrigation Construction	8.500.000	0	0
Yukarı Karahacılı Reservoir Irrigation Construction	7.800.000	0	0
Ağmusa Reservoir Irrigation Construction	7.000.000	0	0
Irrigation Pond	0	0	800.000
Agricultural Irrigation Trapeze Duct Construction	0	0	8.000.000
Construction of Small and Medium sized Agricultural Irrigation Facilities in Agricultural lands	0	0	5.000.000
Irrigation Facility and Modernization Project	0	0	5.000.000
TOTAL	**92.300.000**	**0**	**18.800.000**

Under the thematic title of 2.2.1. Irrigation Works, there are 11 sub projects and its percentile breakdown is shown in Figure 16.

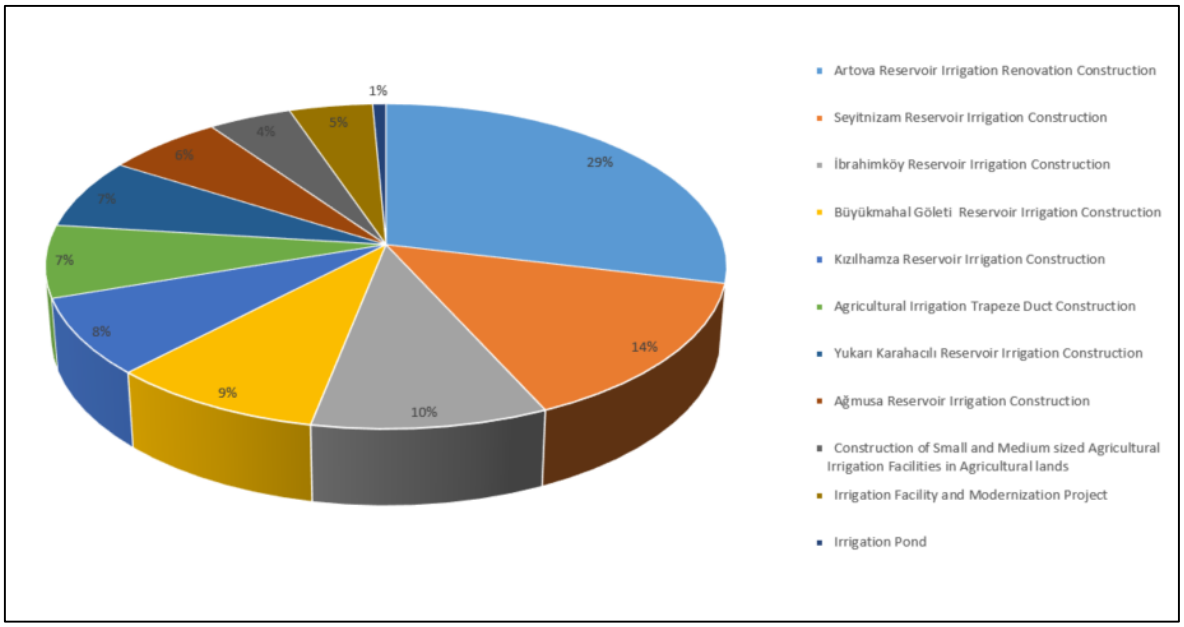

Figure 16 2.2.1 Sub Projects for the Thematic Title of Irrigation Works

6.2.2.3. 2.2.2. Multi-purpose reservoirs

(2.2.2.) Total foreseen cost of the thematic title of multi-purpose reservoirs is 226.976.744 TRY and the details is shown in Table 33.

Table 33 2.2.2 Sub Projects for the Thematic Title of "Multipurpose reservoirs"

2.2.2. Multipurpose Reservoirs	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
Ağmusa Reservoir Construction	40.000.000	0	0
Yukarı Karahacılı Reservoir Construction	27.800.000	0	0
TOTAL	**67.800.000**	**0**	**0**

There are 2 sub-projects in the thematic title of multi-purpose reservoirs (2.2.2.) and percentile breakdown is shown in Figure 17.

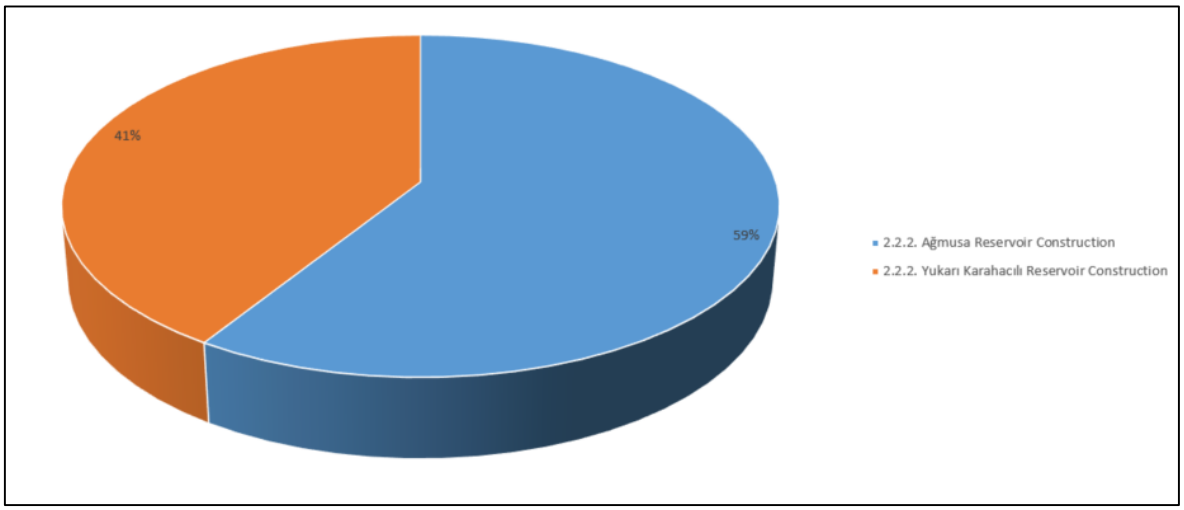

Figure 17 "2.2.2. Sub Projects for the Thematic Title of Multipurpose reservoirs"

6.2.2.4. 1.1.4. Income generation and livelihood diversification for forest villages

(1.1.4) Total foreseen cost of the thematic title resilient infrastructure for income generation and livelihood diversification for forest villages is 115.642.500 TRY and the details are shown in.Table 34.

Table 34 1.1.4. Sub Projects for the Thematic Title of "Income generation and livelihood diversification for forest villages"

1.1.4. Income generation and livelihood diversification for forest villages	Total External Contribution Estimated Cost(TL)	Total Beneficiary Contribution	Total Public Contribution
Dairy Cattle Breeding	20.000.000	20.000.000	0
Recreation Area Installment (Çekerek)	10.000.000	0	0
Dairy Sheep Breeding	9.000.000	9.000.000	0
Recreation Area and Picnic Areas Project	5.000.000	0	0
Project for the Improvement of Dairy Cattle Breeding	4.250.000	4.250.000	0
Dissemination of Medicinal Aromatic Plant Production and Processing Facility Project	2.800.000	0	0
Soil To Table Bread Project(Village Ovens)	2.500.000	0	0
Scientific Beekeeping and Diversification of Bee Products	2.150.000	2.150.000	0
Ecotourism Management Plan and Route Work for Çayıralan	2.000.000	0	0
Scientific Beekeeping	1.877.750	1.877.750	0
Dissemination of Rosehip Production	1.800.000	0	0
Greenhouse Cultivation	1.770.000	1.770.000	0
Dairy Cattle Breeding	1.750.000	1.750.000	0
Truffle Mushroom Production Project	1.500.000	500.000	0
Oven Construction Work	1.000.000	0	0
Dairy Sheep Breeding	990.000	990.000	0
Project for the Improvement of Dairy Sheep Breeding	950.000	950.000	0
Establishment of Honey Forests Project	750.000	0	0
Improvement of Mushroom Production Project	675.000	675.000	0
Mushroom Production Project	420.500	420.500	0
Lavender	126.000	0	0
TOTAL	**71.309.250**	**44.333.250**	**0**

(1.1.4) There are 21 sub-projects in the thematic title of income generation and livelihood diversification for forest villages and percentile breakdown is shown in Figure 18.

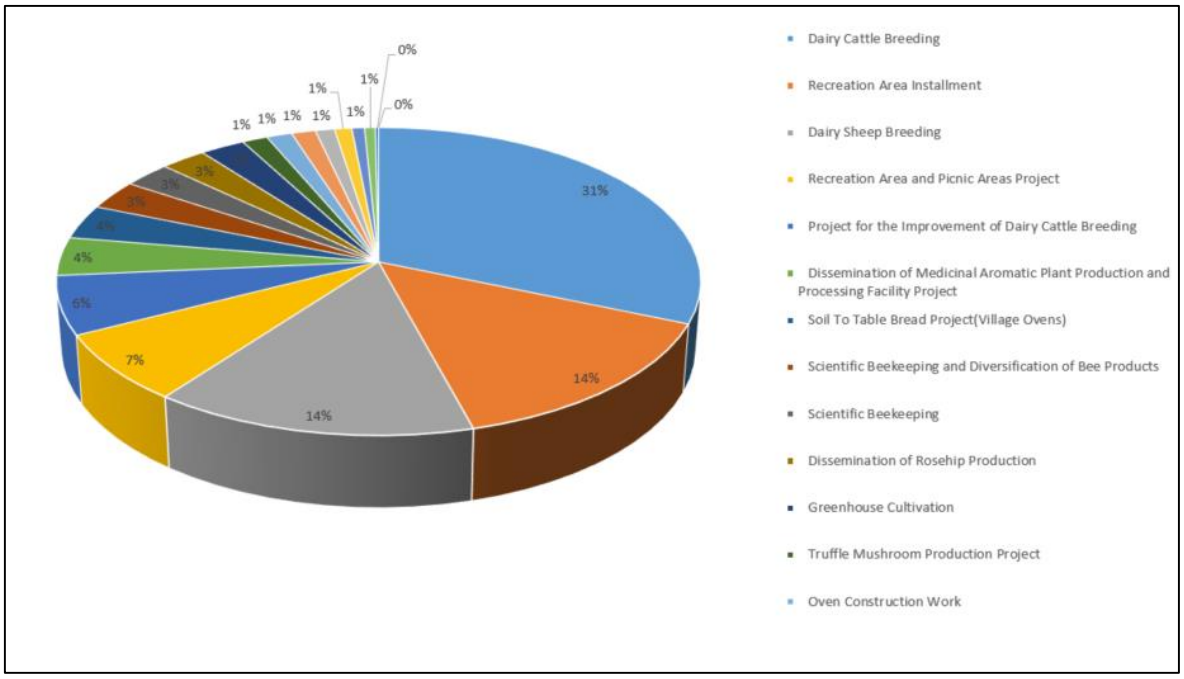

Figure 18 1.1.4. Sub Projects for the Thematic Title of Income generation and livelihood diversification for forest villages

6.2.2.5. 1.1.3. Forest rehabilitation, protection and sustainable management

The total cost of 1.1.3. Forest rehabilitation, protection and sustainable management thematic title is 48.667.000 TL and the details are shown in Table 35.

Table 35 "1.1.3. Sub Projects for the Thematic Title of "Forest rehabilitation, protection and sustainable management"

1.1.3. Forest rehabilitation, protection and sustainable management	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
Afforestation Project	13.250.000	0	0
Rehabilitation Project	10.400.000	0	0
Thermal Insulated Sheathing	6.460.200	4.306.800	0
Preparation of Sapling Production Cushions and Areas for Çekerek Project (Rehabilitation of Drainage Channels, Irrigation, Greenhouse, Boom Irrigation System, Shading)	4.900.000	0	0
Solid Fueled Heating System	4.147.500	2.765.000	0
Water Heating System with Solar Energy	1.462.500	975.000	0
TOTAL	**40.620.200**	**8.046.800**	**0**

Under the Thematic title of 1.1.3. Forest rehabilitation, protection and sustainable management, there are 6 sub projects and its percentile breakdown is shown in Figure 19.

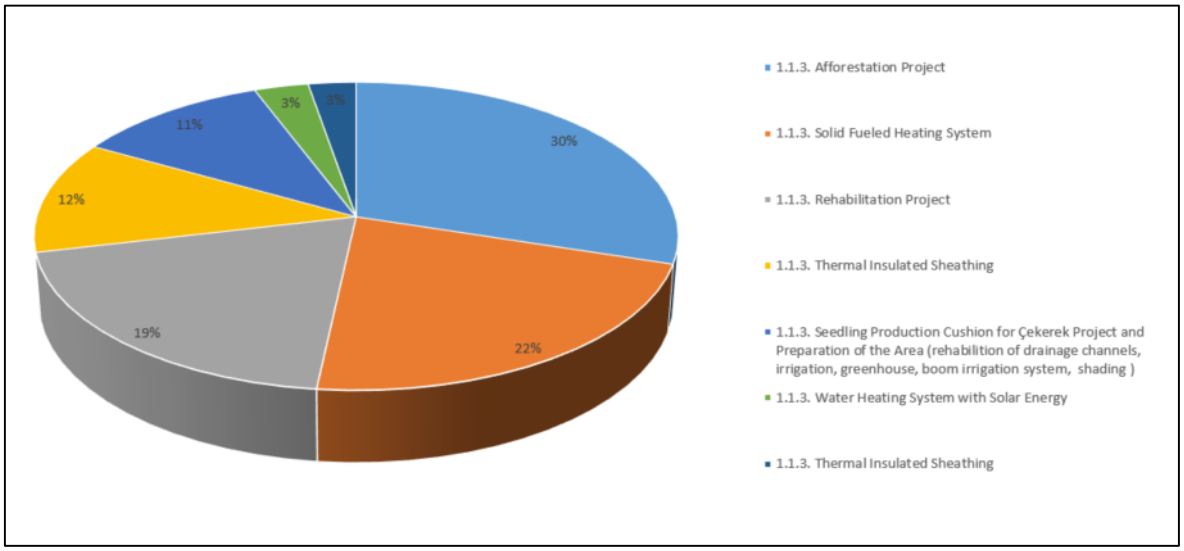

Figure 19 "1.1.3. Sub Projects for the Thematic Title of "Forest rehabilitation, protection and sustainable management"

6.2.2.6. "3. Institutional coordination, project management and sustainability" Component

Cost of "Sub-Component 3.1: Technical assistance and institutional capacity building for integrated landscape management" and "Sub-Component 3.2: Project management, environmental and social management and monitoring and evaluation" is 43.315.724 TL in total with External contribution of 20.089.046 TL and Public Contribution of 23.226.678 TL. (See Table 36).

Table 36 "3. Institutional coordination, project management and sustainability" Component Sub Projects

Sub-Component	External Contribution Estimated Cost (TL)	Public Contribution
Sub Component 3.1: Technical assistance and institutional capacity building for integrated landscape management	6.686.898	1.825.913
Sub Component 3.2: Project management, environmental and social management and monitoring and evaluation	13.402.148	21.400.765
TOTAL	**20.089.046**	**23.226.678**

6.2.2.7. 1.1.1. Erosion control, landslide, and flood control works

"1.1.1. Erosion control, landslide, and flood control works" component's total estimated cost is 75.050.000TL and details are shown in Table 37.

Table 37 "1.1.1. Erosion control, landslide, and flood control works" Component Sub Projects

1.1.1. Erosion control, landslide, and flood control Works	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
Soil Conservation Project	48.700.000	0	0
Erosion/Flood Control Project	16.000.000	0	0
Flood Control Project	10.350.000	0	0
TOTAL	**75.050.000**	**0**	**0**

Under "1.1.1. Erosion control, landslide, and flood control works" component there are 3 sub-components and their percentile breakdown is shown in Figure 20.

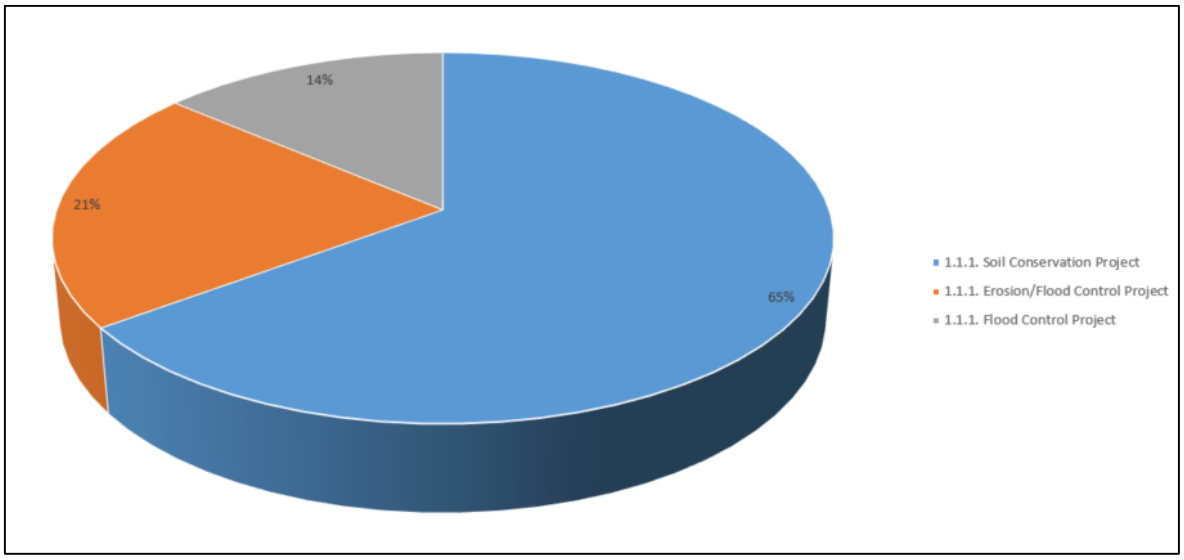

Figure 20 "1.1.1. Erosion control, landslide, and flood control works" Component Sub Projects

6.2.2.8. 2.2.3. Resilient infrastructure for flood and sedimentation control

The total cost of 2.2.3 Resilient infrastructure for flood and sedimentation control thematic title is 22.900.000 TL and details are shown in Table 38.

Table 38 2.2.3. Sub Projects for the Thematic Title of "Resilient infrastructure for flood and sedimentation control"

2.2.3. Resilient infrastructure for flood and sedimentation control	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
Karalar Village Flood and Sedimentation Control Construction	6.000.000	0	0
Çandır Village- Kabak and Seynikkızıyunak Streams Flood and Sedimentation Control Project Implementation and Construction	4.500.000	0	0
Külekçi Village- Sarsak and Deve Streams Flood and Sedimentation Control Project Implementation and Construction	3.500.000	0	0
Özderesi - Çime -Village Flood and Sedimentation Control Construction	1.900.000	0	0
Çamsaray Village- Kuru Stream Flood Control Project Implementation and Construction	1.500.000	0	0
Arpaç Village- Kavaklı and Hocanınpınar Streams Flood and Sedimentation Control Project Implementation and Construction	1.500.000	0	0
Yelten Village-Seyhan Stream and its tributary stream (Kirazlı Stream) Flood and Sedimentation Control Project Implementation and Construction	1.400.000	0	0
Yeniköy-Kurt Stream Flood and Sedimentation Control Construction	1.300.000	0	0
Kuzgun Village- Armutlu ve Karanebi Streams Flood Control Project Implementation and Construction	1.300.000	0	0

2.2.3. Resilient infrastructure for flood and sedimentation control	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
TOTAL	**22.900.000**	**0**	**0**

Under the thematic title of 2.2.3. Resilient infrastructure for flood and sedimentation control, there are 9 sub projects in total and their percentile breakdown is shown in Figure 21.

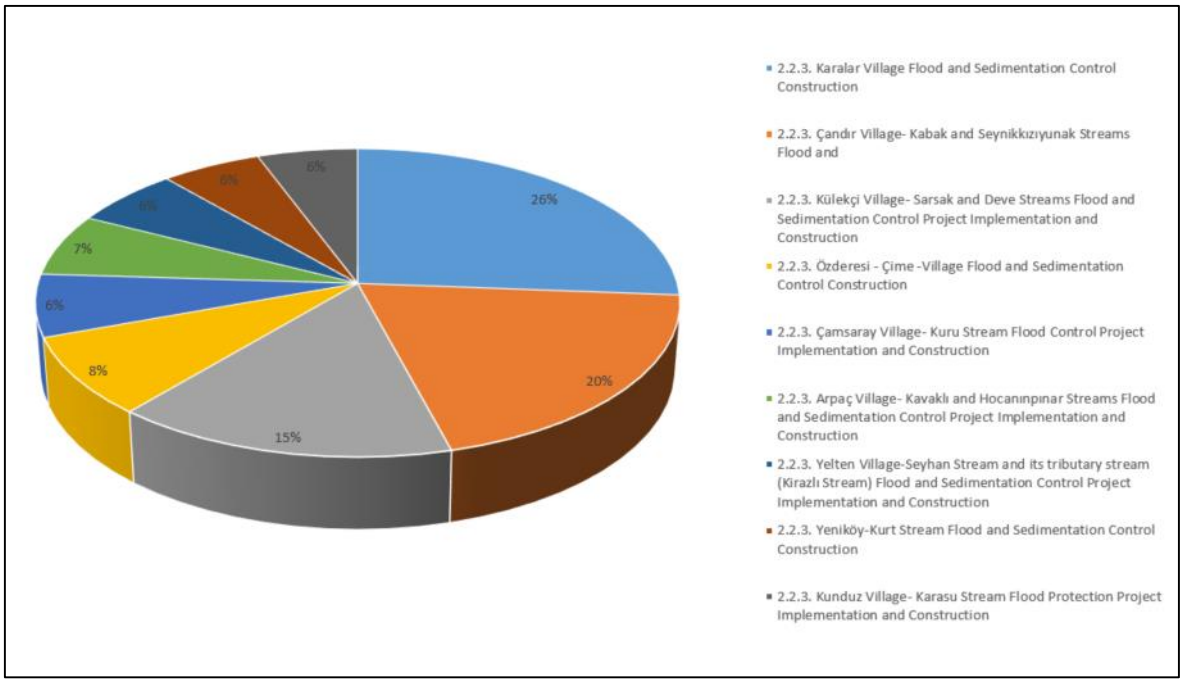

Figure 21 2.2.3. Sub Projects for the Thematic Title of "Resilient infrastructure for flood and sedimentation control"

6.2.2.9. 1.2.3. Sustainable agricultural value chains

The total cost of 1.2.3 Sustainable agricultural value chains thematic title is 910.000 TL and the details are shown in Table 39.

Table 39 (1.1.3) Sub Projects for the Thematic Title of Forest rehabilitation, protection and sustainable forest management

1.2.3. Sustainable agricultural value chains	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
Grape Juice Extracting Machine	450.000	300.000	0
Noodle Production Machines	80.000	80.000	0
TOTAL	**530.000**	**380.000**	**0**

1.2.3. Under the thematic title of "Sustainable agricultural value chains", there are 2 sub projects and their percentile breakdown is shown in Figure 22.

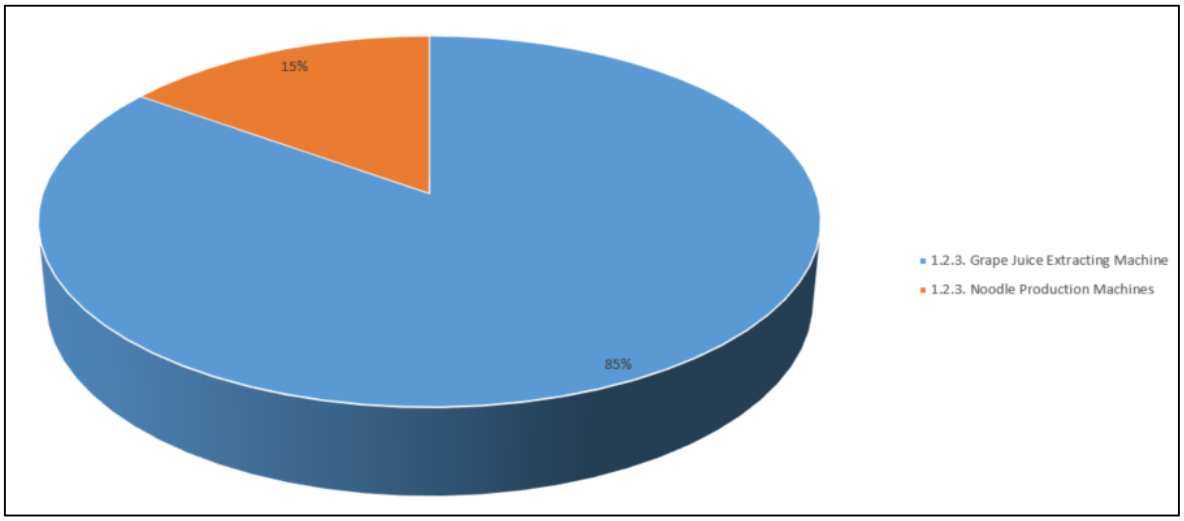

Figure 22 1.2.3. Sub Projects for the Thematic Title of "Sustainable agricultural value chains"

6.2.2.10. 1.2.1. Sustainable and climate-smart agricultural practices

The total cost of 1.2.1 Sustainable and climate-smart agricultural practices thematic title is 8.168.000 TL and the details are shown in Table 40.

Table 40 1.2.1. Sub Projects for the Thematic Title of "Sustainable and climate-smart agricultural practices"

1.2.1. Sustainable and climate-smart agricultural practices	Total External Contribution Estimated Cost(TL)	Total Beneficiary Contribution	Total Public Contribution
«I Have An Idea To Go Back To The Village» Project	2.525.000	2.525.000	0
Installation of Irrigation Systems	1.420.800	947.200	0

1.2.1. Sustainable and climate-smart agricultural practices	Total External Contribution Estimated Cost(TL)	Total Beneficiary Contribution	Total Public Contribution
‘‘Soil Analysis From Us, Production From You’’ Project	750.000	0	0
TOTAL	**4.695.800**	**3.472.200**	**0**

Under the thematic title 1.2.1. Sustainable and climate-smart agricultural practices, there are 3 sub projects and their percentile breakdown is shown in Figure 23.

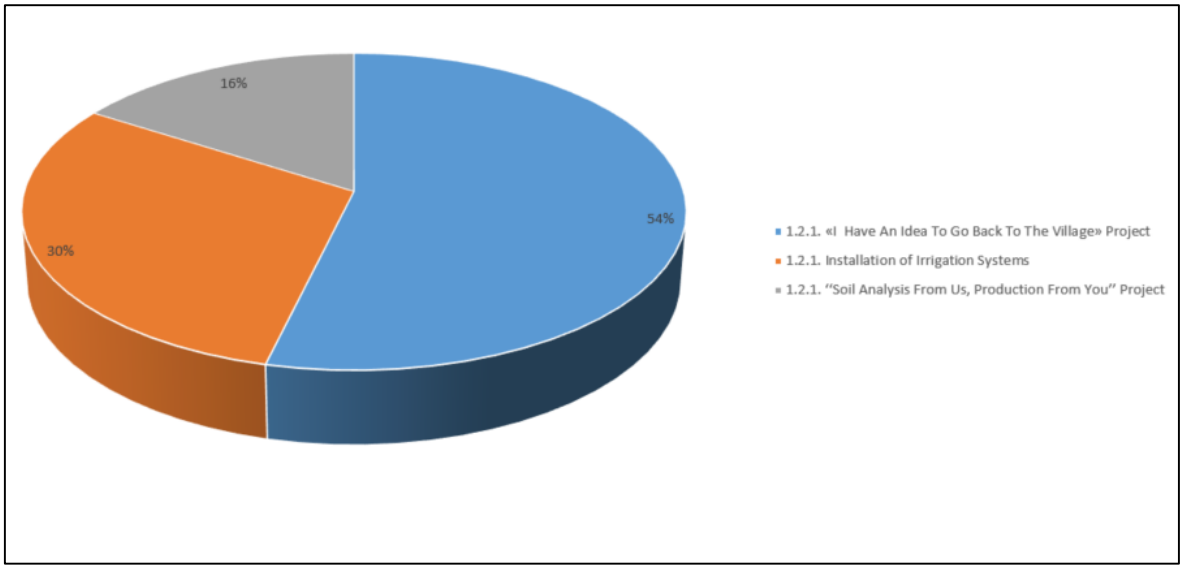

Figure 23 Sub Projects for the Thematic Title of “1.2.1. Sustainable and climate-smart agricultural practices”

6.2.2.11. 2.1.1. Reservoirs

The estimated total cost of 2.1.1. Reservoirs thematic title is 10.000.000 TL and the details are shown in Table 42.

Table 41 Sub Projects for the thematic title of “2.1.1. Reservoirs”

2.1.1. Reservoirs	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
Reservoir	0	0	10.000.000
TOTAL	**0**	**0**	**10.000.000**

6.2.2.12. "1.1.2. Climate-smart pasture management"

The details of "1.1.2. Climate-smart pasture management" theme are shown in Table 43.

Table 42 Sub Projects for Thematic Title of "1.1.2. Climate-smart pasture management"

	Total External Contribution Estimated Cost (TL)	Total Beneficiary Contribution	Total Public Contribution
1.1.2. Pasture Improvement Project	3.146.000	0	0
TOTAL	**3.146.000**	**0**	**0**

6.3. Economic Cost Benefit Analysis

In this section, cost-benefit analyses of the monetizable projects were carried out. In this section, the effects of the projects whose effects are visible in economic and commercial life at the first stage, and which will increase the living standards of the local community by directly including them in the production processes were examined in the framework of cost-benefit.

6.3.1. Economic NPV

The Net Present Value of an investment project is defined by the difference between that project's total reduced income throughout its economic life calculated by a certain rate of discount and the total of its reduced costs.

$$NBD = \sum_{t=0}^{n} \frac{Bt}{(1+r)^t} - \sum_{t=0}^{n} \frac{Ct}{(1+r)^t}$$

Bt = project income/cash inflow in year t
Ct = project costs/cash outflow in year t
r = rate of discount
n = economic life of the project
As can be seen in the formula above, rate of discount (r) is used in the calculation of NPV method. As the rate of discount has a direct influence in determining the results of analysis, this ratio must be determined correctly.

Rate of discount reflects the expected return ratio from the project. Approaches to be followed when determining the rate of discount differ depending on whether the project is funded by institutions' own resources or external resources.

Source of funds in this (consolidated) project with a feasibility report and with a total expected investment cost of 669.946.974 TRY is shown below:

Table 43 Consolidated Project Source Funds

External Contribution (External Money) (₺)	Public Contribution (Internal Money) (₺)	Beneficiary Contribution (Internal Money) (₺)
496.855.546	52.376.678	120.714.750

74% of the funding of foreseen total investment cost of 669.946.974 TRY is credit (external money), 8 % is public contribution and 18% is beneficiary contribution.

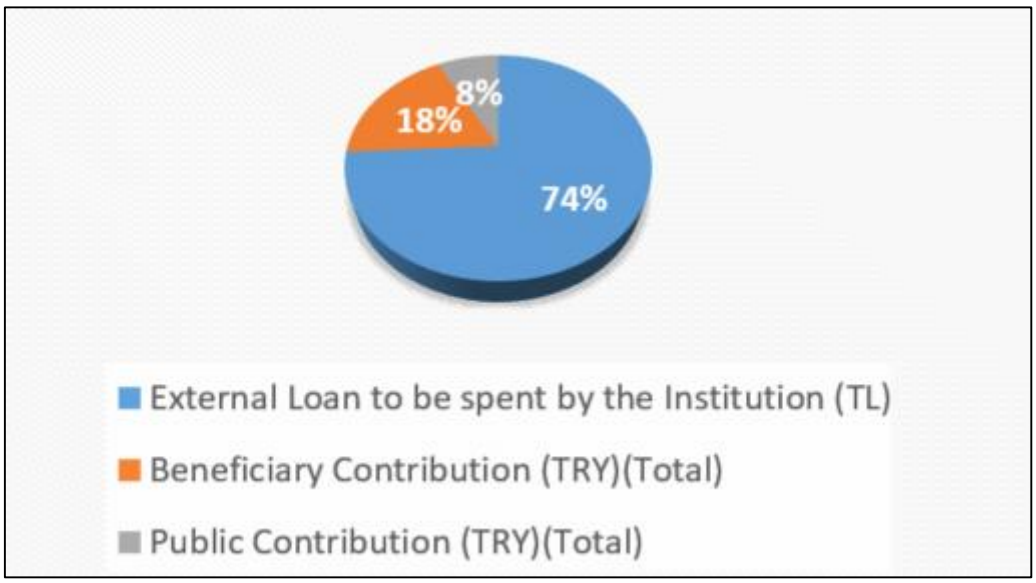

Figure 24 Percentile Distribution of Consolidated Project Finance Resource

When it is considered that the public contributions substantially remain the same, more than 90% of the funding is provided by external resources. In these cases, the interest rates of the credits provided (libor+1=%1,44) will be more accurate as rate of discount.

In cases where the calculated NPV is bigger than zero (0), the investment in question is considered to be doable. If one project has to be selected amongst several projects, in this case the project with the highest NPV above zero (0) is accepted to be more investable compared to others.

$$\text{NBD} = \sum_{t=0}^{n} \frac{Bt}{(1+r)^t} - \sum_{t=0}^{n} \frac{Ct}{(1+r)^t}$$

Bt = project income/cash inflow in year t
Ct = project costs/cash outflow in year t
r = rate of discount
n = 25 years

Because of the reasons explained above, when a calculation with the rate of discount as (libor + 1=) %1,44 is done, below values are reached.

Table 44 Net Present Value

Period	Year	Credit with instalments ($)	Income ($)	NPV Income ($)	Cash Flow
1	2021	0	0	0	0
2	2022	0	2.881.718	0	2.881.718
3	2023	0	2.976.814	0	2.976.814
4	2024	0	3.075.049	0	3.075.049
5	2025	0	3.176.526	0	3.176.526
6	2026	0	3.281.352	0	3.281.352
1	2027	4.248.691	3.389.636	0	-859.054
2	2028	4.248.691	3.501.494	0	-747.197
3	2029	4.248.691	3.617.043	0	-631.647
4	2030	4.248.691	3.736.405	0	-512.284
5	2031	4.248.691	3.859.707	0	-388.984
6	2032	4.248.691	3.987.077	0	-261.613
7	2033	4.248.691	4.118.651	0	-130.040
8	2034	4.248.691	4.254.566	0	5.876
9	2035	4.248.691	4.394.967	0	146.277
10	2036	4.248.691	4.540.001	0	291.310
11	2037	4.248.691	4.689.821	0	441.131
12	2038	4.248.691	4.844.585	0	595.895
13	2039	4.248.691	5.004.456	0	755.766
14	2040	4.248.691	5.169.603	0	920.913
15	2041	4.248.691	5.340.200	0	1.091.510
16	2042	4.248.691	5.516.427	0	1.267.737
17	2043	4.248.691	5.698.469	0	1.449.778
18	2044	4.248.691	5.886.518	0	1.637.829
19	2045	4.248.691	6.080.773	0	1.832.083
TOTAL		**80.725.116**	**103.021.860**	**84.689.697**	**22.296.744**

It is possible to calculate NPV in 2 different ways according to project owners and sources of funds.

Table 45 Breakdown of Sources of Funds

Institution\Source of Fund	External Money	Beneficiary Contribution	Public Contribution	TOTAL
DSI	183.000.000	0	0	183.000.000
GDF	210.214.496	52.380.050	23.226.678	285.821.224
TRGM	103.641.050	68.334.700	0	171.975.750
SPA	0	0	29.150.000	29.150.000
Grand Total ₺	496.855.546 ₺	120.714.750 ₺	52.376.678 ₺	669.946.974
Grand Total USD	64.763.037 $	15.734.662 $	6.827.080 $	87.324.779 $

1. When the public contribution is calculated as costs by capital in cash, total of External Money, Public Contribution and Beneficiary Contribution 64.763.037USD +

6.827.080 USD + 15.734.662 USD =) 87.324.779 USD is the NPV of the consolidated project cost.

In this case, present value of the cost, which is 87.324.779 USD, is higher than present value of the benefit, which is 84.689.697 USD. In other words, for this consolidated project:

NPV = 84.689.697 USD - 87.324.779 USD = -2.635.082 USD. This shows that the net present value of the project is negative.

But as nearly half of this project is infrastructure investments like road/reservoir/recreational spot and as the public contribution will be in-kind contribution, the calculation of the net present value with the method below seems more appropriate.

2. Considering the public contribution will be in-kind contribution, total of External Money and Beneficiary Contribution (64.763.037USD + 15.734.662 USD =) 80.497.699 USD is the NPV of the consolidated project.

In this case, 80.497.699 USD, which is the present value of the cost, is lower than present USD value of 84.689.697. In other words, for this consolidated project:

NPV = 84.689.697USD – 80.497.699 USD = 4.191.998 USD. This shows the project is doable because of the social projects.

6.3.2. Economic Internal Rate of Return

Internal Rate of Return is defined as the rate of discount that makes the net present value of an investment project zero (0). For this reason, the rate of discount (r) that equalizes the total of project's reduced income and the total of reduced income costs is that project's internal rate of return (IRR).

$$\text{İKO} = \left(\sum_{t=0}^{n} \frac{Bt}{(1+r)^t} = \sum_{t=0}^{n} \frac{Ct}{(1+r)^t} \right)$$

Internal rate of return is also called as internal rate of return in the literature. When the IRR of a project is calculated, a rate of discount is used by trial and error method, by this way, through iterations, IRR that equalizes reduced cash inflows to reduced cash outflows is calculated.

In this consolidated project: IRR = 1,2086929%.

In cases where a project is evaluated by IRR: if IRR is higher than the rate of discount (r) determined by the capital cost, project is considered as doable. But:

Our rate of discount (r) that was determined by capital cost was (r) = %1,44 (libor+1).

In this case, IRR < (r).

Even though according to IRR < (r), i.e. a project seems not doable, when the following reasons are evaluated altogether, analysis with economic IRR will result in misleading results:

- Half of the consolidated project having public investment qualities (road, reservoir, recreational spot);
- Investments with projects like roads, reservoirs, recreational spots having a useful life of more than 25 years;
- Not having non-monetizable indirect benefits of public investments in the income total used in the calculation;
- Because of the ratio of public investments being high, the need to have high valued non-monetizable indirect benefits.

6.4. Cost Effectiveness Analysis

Çekerek Basin is not a region that receives assistance or investments from outside because of its current situation. There is a need for national and international funding to increase the development of the local community in the basin where investors avoid from investing because of several factors.

Multidirectional development will be provided with the project that has its feasibility report conducted. With the infrastructure and superstructure projects in the project, both the environmental negative impacts will be reduced and also the production capacity of the local community will be increased. In this context, it is expected that the investments to be made will result in long-term economic results. By increasing the quality of social life, immigration to outside of region will be prevented. Furthermore, with the increase in the appeal of the basin, domestic and foreign tourist numbers are expected to increase.

6.5. Other Economic Benchmarks of Analysis

It is expected that because of the project which will provide development at the regional level in accordance with the Eleventh Development Plan, local community's quality of life will increase, and along with new investments and rehabilitation projects conducted in infrastructure and superstructure, the production capacity and economic diversity of the region is expected to be increased.

Economic development indicators are expected to improve with the increase in local community's production capacity and with the increase in women and youth employment. Furthermore, along with the employment created, as a result of the infrastructure investments made the immigration to outside of the region is expected to decrease.

7. RISK ANALYSIS

7.1. Sensitivity Analysis

Infrastructure projects constitute the biggest cost items in Çekerek Basin Rehabilitation Project. In the implementation phase of the project, it was examined what kind of changes can happen in analyses and indicators when some of the basic parameters that can affect economic and financial benefit indicators take different values in construction works and procuring materials. The sensitivity of analysis results to these parameters were evaluated.

Because the project is outsourced in dollars, the “exchange rate”; as the debt will be paid over time, the “income” is considered to be the critical variable. Accordingly, sensitivity analysis has been conducted in 6 different scenarios:

In the first scenario, the exchange rate is increased by 10%: There is no change in NPV in the income, but the NPV-Investment Cost is negatively affected due to the increase in the exchange rate, and the feasibility of the investment evolved to a negative direction.

In the second scenario, the exchange rate is decreased by 10%: There is no change in NPV in the income, but the NPV-Investment Cost is positively affected due to the decrease in the exchange rate, and the feasibility of the investment evolved to a positive direction.

In the third scenario, the exchange rate is increased by 20%: There is no change in NPV in the income, but the NPV-Investment Cost is negatively affected due to the increase in the exchange rate, and the feasibility of the investment evolved to a negative direction.

In the fourth scenario, the exchange rate is decreased by 20%: There is no change in NPV in the income, but the NPV-Investment Cost is positively affected due to the decrease in the exchange rate, and the feasibility of the investment evolved to a positive direction.

Scenario (Rate)	NPV Income ($)	NPV Income (₺)	Investment Cost (₺)	NPV – Investment Cost (₺)	NPV – Investment Cost ($)
10% Increase in Exchange Rate	84.689.697	649.730.886	714.703.975	-64.973.089	-8.468.970
10% Decrease in Exchange Rate	84.689.697	649.730.886	584.757.798	64.973.089	8.468.970
20% Increase in Exchange Rate	84.689.697	649.730.886	779.677.063	-129.946.177	-16.937.939
20% Decrease in Exchange Rate	84.689.697	649.730.886	519.784.709	129.946.177	16.937.939

In the 5th scenario, the income is increased by 10%: There is no change in the exchange rate, but the NPV-Investment Cost is positively affected due to the increase in the income, and the feasibility of the investment evolved to a positive direction.

In the 6th scenario, the income is decreased by 10%: There is no change in the exchange rate, but the NPV-Investment Cost is negatively affected due to the decrease in the income, and the feasibility of the investment evolved to a negative direction.

Scenario (Income)	NPV Income ($)	NPV Investment Cost ($)
10% Increase in Income	93.158.666	5.833.887
10% Decrese in Income	76.220.727	-11.104.052

7.2. Risks about the Project and Their Impacts

Most important priority for implementing Çekerek Basin Rehabilitation Project is providing a source of funds. In the current situation, funds required for the implementation of the project will be provided by the World Bank resource. One of the risks that can occur in the funding phase is the exchange rate risk. Sudden and fast increases in the exchange rate can be counted among the other risks that can occur.

When it is considered that infrastructure investments included in the project have the biggest cost item in the project, basic risks will happen in cases when costs that exceed the foreseen budget happen in construction and good procurements in the implementation phase. Approximate costs within the context of the project were prepared by beneficiary institutions.

No adequate offers to tender bids for the large projects that will be implemented in the context of the project can also be listed amongst the risks that can occur in the project and can cause delays.

The risk that can occur in the investments that will provide economic development to the local community is the fact that local community does not use the supports they get efficiently and effectively.

In the implementation phase, difficult climate and geographical conditions, low labor force as a result of emigration, inadequate number of labor force in the relevant administrations and problems in the coordination between units can be counted among other risks. Project Risk Analysis is shown in Table 50.

7.3. Risk Mitigation Measures for Key Risks

In the case where the relevant administrations execute tenders for infrastructure investments in a competitive way, the costs will remain convenient despite potential price increases. In the investment phase, there is a risk of work getting no attention from bidders because of the reasons like economic stagnancy and unstable exchange rates. To overcome this risk, companies with sufficient experience and proof of work can be identified and selected to attend the tender by invitation procedure.

The risk of beneficiary's inability to use grants within the context of income generating activities for local community effectively and properly will be overcome with supervision and additional measures. Project Risk Analysis is presented in Table 50.

8. ENVIRONMENTAL ANALYSIS

Environmental analysis is the examining of the environmental impacts of projects or activities and determining the environmental measures to be taken, while the socio-economic analysis examines how current demand foresights in the context of the planned projects can be best met socially and economically (SAĞDIÇ, 2015). Environmental and social risks of the projects represent the possibility of a dangerous situation to occur and the strength of the impact in the case it occurs, while environmental and social effects represent how the project environment and project area will be affected naturally, physically and culturally and the possibility of being affected (Environmental and Social Management System Implementation Handbook, 2015).

Projects suggested by various institutions and organizations in the context of Çekerek Basin Rehabilitation Project might have undesirable negative environmental impacts which might lead to significant economic and social results. All positive or negative impacts of the project to the environment were evaluated within the context of environmental analysis and presented in this section.

8.1. Pre-Assessment of Environmental Impacts

8.1.1. Environmental Analysis Methodology

There are environmental impacts that are created by the projects in field preparation and construction and operation phases. Environmental analysis methodology was determined considering the features of projects, magnitude of the impact and sensitivity of receptive field. In addition, the sensitivity of the physical and social environment has been taken into account within the scope of the legislation in force in the measures proposed to reduce the impacts.

Selected environmental analysis methodology includes the following procedures:

1) Determination of project contents, areas, environmental and social conditions and recipients through desk and field-based studies;
2) Determination of recipient sensitivities;
3) Determination of the magnitude of impact;
4) Determination of the importance of impact;
5) Determination of environmental and social effects of activities;
6) Determination of potential negative effects, and methods to avoid and decrease them;
7) Monitoring and reporting of environmental effects.

In the preliminary examination phase, some project areas of projects suggested across Çekerek Basin were examined. After these examinations, project components and activities as well as environmental and social conditions were taken into account. For the construction and operation phases of the project, elements that are included in environmental analysis and social and environmental impacts were determined based on professional expert knowledge and within the frame of national legislation and international agreements that Turkey is a party. Projects were defined as environmental components that would be affected positively

or negatively from the activities, physical environment (air, water, soil and cultural heritage), ecological environment (flora, fauna and habitat) and human.

In the process of impact definition and assessment, foreseeing impacts, assessing impacts, increases or decreases in impact and assessment process of remaining impacts were monitored.

In the impact assessment, positive and negative impacts were determined in accordance with basic environmental subjects under 11 thematic titles covered by 2 main components foreseen to have environmental impacts, recipient environment sensitivity and limited values in the legislation and other provisions.

While in the magnitude of the impact which is a measure of change in current conditions, spatial size, impacted population, interaction period of impact with recipient, frequency of impact and period of impact to disappear from recipients were considered.

In the assessment of recipient sensitivity, sensitivity level of the receiving environments to the impact was considered. Biodiversity and sensitive areas study included in Section 2 was also considered.

Importance of impact was determined by projects listed in Annex-I or Annex-2 lists of the EIA Regulation, or if they are not listed, checking whether they are exempt from EIA Regulation. According to the regulation in question, investments that have negative impacts on the environment are in Annex-I list of the regulation, and those that have less impact on the environment (insignificant or negligible) are in the Annex-II list of the regulation.

Measures to avoid potential negative impacts and to reduce them were determined within the context of the legislation in effect.

Monitoring and recording of the environmental impacts include monitoring of positive and negative environmental impacts of the projects periodically, correction of the non-conformities that occur during these monitoring activities in accordance with the related legislation and reporting of all monitoring activities by Project Implementation Unit.

Within the context of Çekerek Basin Rehabilitation Project, all of the projects suggested by various institutions and organizations were assessed without checking whether the positive and negative environmental impacts of them are within the context of EIA Legislation or not. Positive environmental and all social impacts were broadly considered.

8.1.2. Impacts on the Environment

These activity groups organized under three interconnected components are expected to strengthen integrated management of natural resources at the level of landscape throughout the project life and to increase access to climate resilient infrastructure for flood and landslide control, water and sanitation services and the mobility of communities. Projects were categorized under 3 main components with the titles of ‘Green and sustainable rural development’, ‘Grey infrastructure resilient to the climate’ and ‘Institutional coordination, project management and sustainability’. All positive and negative impacts of the projects during their investment and operation periods were determined under 11 thematic titles, by considering project features of each project and by using the analysis methodology

mentioned in Section 8.1.1. As the environmental impact of the projects under the Component 3 'Institutional coordination, project management and sustainability' could not be foreseen, they were not included in the environmental analysis. 2 main components and thematic titles under them which have their environmental impact analysis conducted are presented in Table 47.

Table 46 Project Main Title, Sub Title and Thematic Titles

1.Green and sustainable rural development	1.1. Upper basin landscape and rural livelihoods	
		1. Erosion control, landslide and flood control works
		2. Climate-Smart Pasture Management
		3. Forest rehabilitation, protection and sustainable management
		4. Income generation and livelihood diversification for forest villages
	1.2. Climate-smart agricultural practices and sustainable value chains	5. Sustainable and climate-smart agricultural practices
		6. Income generation and livelihood diversification for rural areas
		7. Sustainable agricultural value chains
2. Climate resilient gray infrastructure	2.1. Resilient Infrastructure	8. Reservoirs
	2.2. Resilient infrastructure for disaster risk and water security	9. Irrigation Works
		10. Multipurpose reservoirs
		11. Resilient infrastructure for flood and sedimentation control

Basic environmental subjects evaluated are air, water, soil and noise pollution, waste management, loss of biodiversity and habitat destruction, risk of occupational health and safety, effect on health and security of community, local economy, use of land, livelihoods and public welfare, cultural heritage and transportation infrastructure. Biodiversity study across Çekerek Basin and sensitive areas within the context of EIA Regulation Annex-5 were given in Section 2.4.3. Abiding by the findings presented in the section and measures that need to be taken have importance.

According to the analysis methodology, positive and negative environmental impacts of the projects under the thematic titles were assessed in accordance with Environment Law and

within the framework of enacted regulations related to it, and environmental impacts during construction and operation periods and measures to be taken were presented in detail in the table included in Annex-10. Even though the important impacts that are expected to occur during the construction phases differ between projects, there are common environmental impacts that will be caused by basic construction works. Air, water, soil pollutions and noise problems will be the most commonly encountered environmental risks. Dust generation caused by land activities and air emissions caused by construction equipment will cause air pollution. In addition to this, oil, fuel and derivative substances that can leak from the construction equipment will create water and soil pollution risks. Large amount of excavations will result from land grading, earth movement and drilling operations. Earthworks and excavations may cause biological soil losses and negative impacts on flora and fauna may arise from construction works. Noise pollution and vibration will occur during all these activities. Wastewater and hazardous/non-hazardous waste will be created by construction works and personnel needs, and if left unchecked, these will create odour and can cause water pollutions. Along with these, there are different environmental risks that can arise from the constructions of various projects.

Environmental risks similar to those will be encountered during construction, can be experienced in operation period, too. There are risks that will vary in accordance with the scope of the project. Environmental risk mitigation measures will be implemented, in order to make sure that all impacts that may occur during the operation are kept at the lowest level. All envisaged environmental risks that may occur and the measures to be taken against all these risks within the scope of the projects mentioned under thematic titles are detailed in Annex 9.

On the other hand, with soil conservation, pastura rehabilitation, afforestation, rehabilitation, fruit gardens, greenhouse cultivation projects etc. that will be carried out by General Directorate of Forestry and General Directorate of Agricultural Reform within the context of Çekerek Basin Rehabilitation Project, reduction in carbon emissions will be provided. To calculate amount of the reduction in carbon emissions, Ex-AnteCarbon-balance Tool (EX-ACT) developed by Food and Agriculture Organisation of the United Nations was used. Ex-AnteCarbon-balance Tool (EX-ACT) is used to identify the impacts of agriculture and forest development projects on carbon balance. As a result of the calculations, a carbon emission reduction equivalent to 2,518,351 tCO_2 will be achieved within the context of the project. Throughout the whole duration of the project it is equivalent to carbon emission reduction of 135,5 tCO_2 per hectare or 8,5 tCO_2 per hectare annually. Program inputs used in the calculation of carbon balance are presented in below table and details of programme outputs are given in Annex-11.

Project	**Area (ha)**
Soil conservation	9000
Erosion control projects	2170
Pasture management (OGM)	2976
Afforestation	1000
Rehabilitation	4250

Project	Area (ha)
Recreational area installation, lavender garden	100
Honey forest	107
Rosehip growing	600
Medicinal and aromatic plants growing	300
Lavender	3
Fruit garden	8,4
Vineyard facility	50
Fruit sapling	18
Pasture management (TRGM)	7800

8.1.3. Assessment of negative environmental impacts which may cause economic and social consequences

Within the context of Çekerek Basin Rehabilitation Project, all of the environmental aspects with environmental and social impacts of the projects suggested by various institutions and organizations were determined within the framework of national legislation and international agreements that Turkey is a party for the project's construction and operational periods. According to the regulation in question, investments that have negative impacts on the environment are in Annex-I list of the regulation, and those that have less impact on the environment (insignificant or negligible) are in the Annex-II list of the regulation.

There is a "EIA not required" decision for Ağmusa Reservoir, Ağmusa Reservoir Irrigation and Artova Reservoir Irrigation projects which will again be implemented by DSI. The Upper Karacahalı Reservoir Project to be carried out by DSI, the Project Promotion File will be prepared and presented to the Ministry of Environment and Urbanization within the scope of the 'Environmental Impact Assessment Regulation' published in the Official Gazette dated 25.11.2014 and numbered 29186 and "EIA not required" certificates will be obtained. If it is decided that EIA is not required for the project, construction activities will start. However, if it is decided that EIA is required, the EIA Application File will be prepared and submitted to the Ministry within the scope of the same regulation. The investment will start once the EIA process is completed and EIA positive decision is taken. An application will be submitted to the relevant Provincial Directorate of Environment and Urbanization for the projects that are below the threshold values in Annex-I and Annex-II lists of the abovementioned regulation and the projects that are not included in Annex-I and Annex-II lists of the regulation. Then, an official statement will be obtained which declares that the project is outside the scope of the regulation.

There are many positive economic and social effects belonging to the projects and they serve the objectives of Çekerek Basin Rehabilitation Project. Social and economic effects of the project are presented under thematic titles in Annex-10.

8.1.4. Environmental Impact Reduction Measures and Costs

Environmental impacts and impact reducing measures of projects determined within the context of related legislation under thematic titles are included in Annex-10. Limit values in the related legislation will be adhered to reduce environmental impacts or to control them.

Among the risk reducing measures there are basic measures like water spraying practices during construction period, usage of maintained vehicles, disposure of water and solid waste within the context of the relevant legislation, finding new living spaces for flora and fauna that might be impacted, usage of excavations in suitable places as filling material without causing biological soil loss or disposal of it. During the operational period, to reduce environmental impacts, appropriate measures against different environmental impacts that might occur because of project contents will be taken within the context of the relevant legislation.

As a result of the environmental analysis, thenegative impacts that can be reflected in the cost benefit and economic analysis are as follows: the cleaning of all kinds of materials that will accumulate in front of many flood control and landslide prevention structures. Project owner institutions carry out these activities by including them in operating costs during the operation of these facilities. As cost benefit analysis was not performed on the basis of sub projects, these expenses in the operational period were not reflected in the feasibility.

As the projects have many socio-economic positive impacts, negative environmental impacts that will occur in the construction period are foreseen to be at an acceptable level by the local community. But an effective complaints mechanism will have to be established to abate complaints and conflicts.

8.1.5. Result

Within the framework of the environmental analysis methodology determined in this section, environmental analysis of projects suggested by various institutions were conducted under 11 thematic titles. The projects are will be assessed within the context of EIA Regulation Annex-II (project lists where selection-elimination criteria will be applied). Possible negative impacts of these projects on environment will be at acceptable levels according to the relevant legislation and scientific principles as a result of measures that will be taken. Environmental analysis of projects presented by various institutions are given in a detailed way in Section 8.2 without checking whether they are within the scope of EIA Regulation or not. As can be seen in this section, environmental risks were assessed as insignificant impacts in field preparation and construction phases. While in the operational phase, risks deemed as significant are preventable impacts if regulations related to the Environment Law are applied efficiently. The environmental analysis methodology used was created with expert evaluation within the framework of EIA Regulation, Strategic EIA Regulation and other regulations issued based on the Environment Law. Especially for projects that are subject to EIA regulation, project owners have an obligation to prepare an EIA report and project introduction document. More comprehensive environmental evaluations will be carried out in these studies and by means of Ministry of Environment and Urbanization/ Çorum-Tokat-Sivas-Yozgat Provincial Directorates of Environment and Urbanization receiving opinions of the relevant institutions and organizations, investments will be able to start by getting an EIA Positive or EIA Not Required decision.

Introduction of sustainable and climate-smart agricultural practices, diversification of livelihoods, providing habitats to increase biodiversity, improving green infrastructure like critical system to provide income generating resources from the ecosystem and to protect

soil, regulation of water and projects like creation of landslide and flood preventing structures will create very positive environmental impacts on the area. Green infrastructure will be designed with grey infrastructures for the functionality and integration of the systems to be constructed and which are natural. These types of grey infrastructures will include construction of multi-purpose reservoirs for effective use and regulation of water sources in the basin. Flood control structures, sedimentation control structures, emergency maintenance of current infrastructure and repair works, rehabilitation and improvement of drinking water infrastructure systems are included in grey infrastructure works. Environmental and social risks of conducting construction works on grey infrastructure are risks about various waste types, dust and noise, not enforcing requirements of occupational health and safety (OHS), disruption of biodiversity and temporal disturbance. These risks can be short-term and temporary for the duration of field preparation and construction periods but can also be permanent and long-term during the operational period. But these can be prevented effectively, reduced to its lowest level and alleviated depending on creation of a suitable environmental and social system. It is planned that the environmental impact that can occur can be managed for a long duration in a sustainable way with measures that will be taken. It was foreseen that basic problems that can cause air, water and soil pollution can be reduced in a controlled and sustainable way with measures that will be taken within the context of the relevant legislation by the relevant institutions and organizations.

8.2. Environmental Risks and Reduction Measures

Regardless of the fact that they are within the scope of EIA Regulation or not, possible negative environmental impacts of all projects and suggested measures to minimize these impacts are given in a detailed way under thematic titles in the table included in Annex-10. Water need will occur for drinking and utility and to prevent dust creation in construction and operation periods of all projects. This need will be met by running water, underground water and with water cooler bottles. Required energy for the projects will be provided by current network or from generators. In the project areas, required permissions will be taken and/or expropriation will be conducted depending on whether they are public lands, forest lands or lands owned by persons.

To minimize the environmental impacts of risks that will occur and to keep them under control, measures will be taken and limit values in the relevant legislation will be adhered to.

Measures to be taken against environmental impacts during field preparation and construction periods included in Annex-10 determined by environmental analysis were determined by laws presented in Table 48, regulations that were issued in line with these laws and presented in Table 49 and the other sub-regulations. If the environmental impact reduction measures that are regulated in the legislation and evaluated primarily as air emissions, water pollution and wastewater, noise, odor, soil pollution, protection of species and habitats, use of well-groomed equipment, control of chemical substance entry are effectively implemented and supervised by relevant institutions and organizations, possible adverse environmental effects will be tolerable.

Table 47 Primary Legislation to Consider for Environmental Assessment

Date	Official Gazette No.	Law No.	Law Title
8.09.1956	9402	6831	Forest Law
23.12.1960	10688	167	Law of Groundwater
4.04.1971	13799	1380	Fisheries Law
23.07.1983	18113	2863	Law on the Conservation of Cultural and Natural Property
11.08.1983	18132	2872	Environment Law and Law Amending the Environment Law No. 5491
18.10.1983	18195	2918	Highway Traffic Law
28.02.1998	23272	4342	Law on Pastures
19.07.2005	25880	5403	Law on Soil Preservation and Land Utilization
25.04.2006	26148	5488	Agriculture Law
30.06.2012	28339	6331	Law on Occupational Health and Safety

Table 48 Secondary Legislation to Consider for Environmental Assessment

Date	Official Gazette No.	Regulation Title
18.03.2004	25406	Regulation of Excavation Soil, Construction and Demolition Waste Control
31.12.2004	25687	Regulation for Water Pollution Control
03.07.2009	27277	Regulation on Industrial Air Pollution Control
04.06.2010	27601	Regulation on the Assessment and Management of Environmental Noise
08.06.2010	27605	Regulation on Point Source Land Soil Pollution and Soil Contamination Control
04.04.2014	28962	Regulation on Protection of Wetlands
25.11.2014	29186	Environmental Impact Assessment Regulation
02.04.2015	29314	Regulation on Waste Management
23.12.2016	29927	Regulation on Determination of Sensitive Water Bodies and Areas Affecting These Bodies and the Water Quality Improvement
21.12.2019	30985	Regulation on Waste Oil Management

Conformity requirement with the above legislation is a mandatory provision of Environment Law no. 2872. Breaches on this topic is penalized by the sanctions stated in the article 20 of the same law. Conformity requirements to this legislation for each project are pledged in EIA reports in accordance with the status of the project by the EIA legislation that the project is subject to and in project introduction documents. Breaches and non-conformities within the context of these requirements are subject to sanction in the article 20 (c).

Furthermore, illegal activities against environment are subject to liberty binding punishments stated in Articles 81 and 82 in Turkish Criminal Code. In addition, positive and negative impacts of the projects to the environment will be monitored periodically, nonconformities that occur during this monitoring will be corrected in accordance with the legislation and all monitoring activities will be reported by Environment Expert/Experts in Project Implementation Unit. Consultants will be utilised along with environment experts in the environmental monitoring.

9. SOCIAL ANALYSIS

This section which analyzes the social sensitivities of the region and the impacts of the project on them is based on secondary data sources. Potential impacts are presented by subjecting the resources to expert assessment and by using professional recognition of the previous projects' effects. These resources are TURKSAT statistics, Regional development plans, reports of Chamber of Commerce and Industry, Academic studies, publications of official institutions and organizations (such as the Ministry of Environment and Urbanization and the Ministry of Agriculture and Forestry), Master plans, data gathered from the Governor's Office, district governorship and municipality resources.

As presented in the second chapter, Çekerek Basin is a sensitive region in terms of its socio-economic characteristics. There is a serious need to improve social and economic opportunities. The theme of this chapter is to examine the possible socio-economic positive and negative impacts of the projects planned to be implemented within the framework of Çekerek Basin Rehabilitation Project. What kind of social and economic impacts these projects will create (especially those which can not be monetized) and which groups (such as old, young, women, forest villagers, seasonal agricultural workers) they will affect in accordance with their types are presented under following headings:

- Erosion control, landslide and flood control works
- Climate-smart pasture management,
- Rehabilitation, protection and sustainable management of forests,
- Income generation and livelihood diversification for forest villages,
- Sustainable and climate-smart agriculture practices,
- Income generation and livelihood diversification for rural areas,
- Sustainable agricultural value chains,
- Reservoirs
- Irrigation works,
- Multipurpose reservoirs,
- Resilient infrastructure for flood and sedimentation control.

9.1. Social Impacts of the Project

Çekerek Basin Rehabilitation Project investment will mostly have positive effects on the socio-economic sensitivities of the region. Project components are expected to have impacts on the issues summarized below. These impacts will be investigated on a project-based approach in the future:

- Yozgat, Çorum, Tokat ve Sivas provinces are among the provinces with high rates of immigration. Especially in larger cities, the number of people migrating from them is close to the current population of these cities.
- Basin population has a downward tendency.

- Basin population is decreasing due to the low fertility rates and migration. Studies demonstrate the fact that migration which is experienced for education purposes and finding a job is important. On the one hand, young people leave the province for educational purposes, on the other hand people with vocational training leave the province due to the low wages in the provincial market,
- In the districts of Çekerek Basin, ratio of the old population is higher than Turkey's average.
- While agricultural activities decrease in the rural areas, migration is directed to the city center and other provinces.
- In socio-economically underdeveloped districts, population decreases with migration. Together with this, aging and age dependency rates increase,
- Due to the high population rate of the elderly in the basin, measures are required to improve the welfare of the elderly in social and economic areas, to respond quickly to their health problems and provide support socially and psychologically. Measures are also necessary to create a workforce that can actively work in the economy of the province.
- The current demographic structure in the rural areas makes it difficult to establish a sustainable social and economic structure. There are problems in accessing public services in rural areas with a declining population.
- Young workforce remains inactive in rural areas.
- Asylum seekers and refugees have important problems about issues such as accommodation, education, employment and cohesion.
- Those who work as seasonal workers have problems in areas like accommodation, health and social security.
- The economy of the Basin is largely based on agriculture. However, due to the insufficient rainfall and limited irrigation opportunities, Çekerek Basin is confronted with problems of drought and agricultural unproductivity.
- Industry and trade are not developed in the region,

As summarized above, Çekerek Basin is a region that needs investment due to its low agricultural productivity, rural socio-economic level, education rates, high elderly population, migration, unemployment of women, limited social life and infrastructure opportunities and drought which makes economic activities risky. Therefore, the implementation of projects that have the potential to create a high improvement will positively affect the people of Çekerek Basin economically and socially. The improvement potentials of the planned projects according to their types are examined below.

9.2. The Impact of the Project on Communities

9.2.1. Erosion control, landslide and flood control works

Erosion control, landslide and flood control activities will protect economic resources such as infrastructure and soil. Such investments are expected to have a positive impact on soil quality and agricultural productivity. Increased agricultural productivity will create positive effects on the socio-economic levels of the local people. As a consequence of these developments, a decrease in the external migration rates of the basin can be expected.

9.2.2. Climate-smart pasture management

Climate-smart pasture management projects protect the sustainability and long-term productivity of livestock activities by combating climate change that threatens the environment, human and animal health. These will also affect the diversification of income generating activities. When the barriers especially before women's participation to this kind of activities are removed, the integration of women into economic life will be ensured. As in all income-improvement projects, climate-smart pasture management projects can have a cumulative effect on reversing migration.

9.2.3. Rehabilitation, protection and sustainable management of forests

There is a danger of harming of the environment during the small-scale construction works of forest roads and energy lines. Furthermore, triggering of landslides and introducing some access limitations during the construction may cause problems for the users. While pioneering in the creation of new roads by the residents of villages/settlements may have positive effects in terms of access, it also has the potential of creating effects that cause harm to the environment. Because of the positive impacts on the environment, protection of forests may also affect the community health positively. If the forest maintenance and management projects do not include elements that will prevent forest subsistence activities, it will also have an effect that ensures sustainability of forest village livelihoods.

9.2.4. Income generation and livelihood diversification for forest villages

Projects related to income generation and diversification of livelihoods for forest villages will become sustainable with the participation of young people. Because of the elderly population structure, it should be considered that the human potential that will utilize the investments are limited. For this reason, in the short term, projects in question can provide limited inputs to socio-economic life. However, as the developments in livelihood sources will have an effect that will slow down immigration and speed up reversal of immigration, positive effects of project components like beekeeping, forest products and ecotourism will be seen. These kinds of investments may have positive effects on quality of life, health and security. Increases in the number of enterprises will not only increase the economic opportunities but also may create other positive developments like increase in the registered employment of women, increase in women's skill and knowledge, better use of forest resources by women. It is expected that the projects will positively affect the quality of life for destitute forest villagers who are one of the most disadvantaged groups.

9.2.5. Sustainable and climate-smart agricultural practices

Projects that increase productivity in economic activities like sustainable and climate-smart agricultural practices can be sustainable by the participation of young population. Because of the elderly population structure, it should be considered that the human potential that will utilize the investments are limited. For this reason, in the short term, projects in question can provide limited inputs to socio-economic life. However, as the developments in livelihood sources will have an effect that will slow down immigration and speed up reversal of immigration, positive effects of project components like diversification of agricultural products and smart agricultural production implementation will be seen.

Following activities have the potential to attract young people and women to the economy and increase tourism revenues: Supporting future generations to stay in the village in agricultural sector; production, marketing and promotion centers of handicrafts and local products; supporting next generations to stay in the village; providing equipment; developing cooperatives and unions, and calls for project development

Projects that will provide protective, diversifying and innovative agricultural production positively impact the disagreements regarding access to economic resources in the region indirectly. Another indirect positive effect of the agricultural production increase can be seen on the seasonal agricultural workers who will see increases in their job potentials. It is essential to take measures facilitating access to supports for sensitive group members during the implementation phase. Increases in the number of enterprises can be beneficial in increasing registered women employment.

9.2.6. Income generation and livelihood diversification for rural areas

Projects like income generation and diversification of livelihoods of rural areas that increase productivity in economic activities are only sustainable by the participation of young population. Because of the elderly population structure, it should be considered that the human potential that will utilize the investments are limited. For this reason, in the short term, projects in question can provide limited inputs to socio-economic life. However, as the developments in livelihood sources will have an effect that will slow down immigration and speed up reversal of immigration, positive effects of project components like terracing, agricultural product diversification and smart agricultural production practices will be seen. Seeking equality of women may have positive effects on the employment of women and increasing their income generating knowledge and skills.

9.2.7. Sustainable agricultural value chains

Agricultural food value chain projects have a potential to create employment as they include the branch of industry. But the low young population can create problems in accessing human resources in short term. However, as the components of Çekerek Basin Rehabilitation Project are expected to have a reversing effect on the population structure and migration trends, positive socio-economic effects are expected in the long term. The project, from which positive effects of increase in women employment and income, increase in knowledge and skills of women, gender-based division of labour are expected, can also facilitate access to labour market by sensitive groups.

9.2.8. Reservoirs

The people of the region need infrastructure for agricultural irrigation. Reservoirs that will be built by Special Provincial Administration projects are expected to have positive effects on public health. When the fact that seasonal agricultural workers can also benefit from these investment is considered, the positive effect of the project increases.

During the construction phase, the access roads of the local people can be blocked. If security measures are not taken, this phase can cause some risks for human and animal health. These impacts can be minimized by taking public health and security measures considering vulnerable groups, too.

9.2.9. Irrigation Works

Rain and irrigation insufficiencies are the first among the main problems of the basin. This issue primarily reduces the efficiency and productivity of agricultural activities. Therefore, irrigation projects are of great importance. The construction of irrigation reservoirs and ponds, the construction and modernization of agricultural irrigation facilities, and the development of irrigation systems have a positive impact on the socio-economic level, as they increase the agricultural productivity in the region. This effect can be expected to reduce and slightly reverse the migration in the long run.

Projects aimed at income generation and diversification of the livelihood for forest villages can be sustained with the participation of young people. It should be considered that the human potential to make use of these investments is limited due to the older population share in the demographics of the region. Therefore, in the short run, these projects can provide a limited input to socio-economic life. However, developments in livelihoods in the long run will have an impact which will slow down migration and accelerate reverse migration. Thus, positive effects of the project components on income generation and diversification of livelihoods will be seen.

Construction works to be carried out during the improvement of irrigation systems cause short term restrictions on the use of land by the farmers. Imposing these restrictions before the harvest, damages agricultural products.

9.2.10. Multipurpose Reservoirs

Multipurpose reservoirs can serve only a limited number of farmers due to the size of the basin. They may also have negative effects such as loss of life and property, if safety legislation is not followed during the operation. However, such investments will also allow the control of natural disasters such as floods that make economic and social activities risky. This may result in an increase in the quality of life of the local people. The positive effects on the quality of life may both have facilitating effects on the daily lives of the vulnerable groups and may have effects on preventing migration.

While the construction of a dam responds to the energy need of the region, it indirectly affects daily life and economic resources by creating negative effects both on the land owned and on the climate.

9.2.11. Resilient infrastructure for flood and sedimentation control

Control of river overflows has positive effects on both safety of life and property and will reduce maintenance and repair costs by reducing infrastructure damages. Overflows have a pushing effect on the population by threatening the everyday life. Taking modern measures may increase the attachment of the local community and may have a reversing effect on the migration trends. Income generating resources like agricultural products and animals are also damaged by overflows. For this reason, positive effects of overflow control can also be mentioned in avoiding socio-economic losses.

During the construction phase, in cases where the access roads of local community are blocked and security measures are not taken, risks for public and animal health can be expected. These effects should be minimized by taking public health and safety measures that also consider sensitive groups.

9.3. Regional Impact of the Project

As underlined before, Socio-Economic Status (SES) of the local community in Çekerek Basin including variables such as income, leisure time activities, use of technology, benefitting from healthcare services, assets and properties is highly under the average in Turkey. The majority of the population living in Yozgat, Çorum, Tokat and Sivas provinces are concentrated in group D, which represents the lowest SES status. This group is generally composed of the unemployed, agricultural workers, small business owners or individuals occupied with marginal jobs. The income and education levels of these individuals are very low. They are predominantly primary school graduates. In general, they don't have a bank account, they do not go to the cinemas or theatres, they do not read books but they watch TV. Men usually go to coffeehouses. The populations (especially rural populations) of the provinces of Yozgat, Çorum, Sivas and Tokat which are included in the SES group representing these general characteristics, are in need of economic, social and cultural improvement moves.

Projects planned under Çekerek Basin Rehabilitation Project are expected to have direct effects on the infrastructure and socio-economic indicators of the region and indirect effects on education level and human health indicators. The increase in these indicators increases the tendency of the local population to stay in the region and even some returns may be expected. Therefore, in the long run, changes in the population indicators are expected. The good implementation of the projects that aim to attract especially young people to rural areas will positively affect the workforce potential of the region and will create a change in the population pyramid.

The objectives of Çekerek Basin Rehabilitation Project are in comply with the current national and regional development plants. For example, the following points are especially underlined in the Eleventh Development Plan (2019-2023):

- sustainable use of soil and water resources;
- ensuring food safety and keeping agricultural population in rural areas;
- diversification of marketing channels and organizing production in a demand-responsive manner;

- planning of the reuse of treated wastewater safely for beneficial purposes, primarily in agriculture at the river basin level, thus reducing pressures on water resources.

Besides, in the Plan the main objectives of the rural development are specified as follows:

- to increase the production capacity of producers' associations and family enterprises and increase the employability of rural labor force;
- to improve the quality of life, fight against poverty and increase the level of welfare of the rural community;
- to keep the population in rural areas with the understanding of sustainable rural development.

As underlined above, all these objectives of the Eleventh Development Plan covering 2019-2023 are in comply with Çekerek Basin Rehabilitation Project.

9.4. Cumulative Social Impacts of the Project

When the projects under all of the sub-components of Çekerek Basin Rehabilitation Project are evaluated together, there will be cumulative positive impacts on ensuring sustainable and environmentally friendly life and livelihood environment and on two negative social indicators in the region, i.e. (1) socio-economic status (SES) and (2) population. Çekerek Basin Rehabilitation Project covering agriculture, husbandry, tourism, industry and trade sectors will have a cumulative impact with all the factors ensuring that there will be increase in SES score, decrease in out migration and increase in remigration with development of economic activities in terms of diversity and efficiency/profitability thanks to investments.

When the socio-economic impacts of Çekerek Basin Rehabilitation Project together with other private and public investments in the region are considered, land acquisition is an important subject. When the lands owned by local people or public lands are procured in small pieces for construction works or for various reasons, in total a large land acquisition happens. This situation causes a reduction in private lands on which local people conduct agricultural activities and in public lands they utilize, in time. For this reason, land acquisitions should be planned considering cumulative impacts.

The sustainability of these projects which aim to attract young people to the region will be increased when they are combined with other projects that boost the possibilities in the city center, improve the roads connecting the rural to cities and connecting provinces like Yozgat, Çorum, Tokat and Sivas to other provinces, notably to Ankara.

It is not correct to degrade the analysis of regional development projects only to economic dimension. In cases where economic and social life engage, it is inevitable that social movements affect economic structure and economic developments lead to social changes. Thus, when indicators and numbers are checked, economic and financial analysis of big infrastructure and regional development projects for which feasibility reports are prepared may not seem doable. However, in cases where cost is higher than benefit, it is necessary to focus on cumulative dimensions of the project, which are not visible. Çekerek Basin Rehabilitation Project for which the feasibility report has been prepared may not seem a profitable, i.e. applicable project when only indicators are taken into consideration since Net Present Value seems economically lower than the current value of the investment. However,

the total development of the region will be ensured with the rehabilitation projects and infrastructure projects.

The lack of agricultural irrigation in the region will be solved by the reservoirs to be built. Thus, the agricultural production capacity of the region will increase. In addition, with the support of road construction and rehabilitation projects, the transportation means in the region to reach other regions will increase. This means that the products produced in the region will have easier access to the foreign markets. The reduced production costs as a result of support projects demonstrate that the products produced in the region will have competitive prices. All this economical transportation, production and distribution ecosystem will increase the income of the region and living standards will increase with infrastructure projects. This situation will stop the migration to the other provinces on the grounds that there is not sufficient employment possibilities in the region. Besides, recreation areas constructed recently are expected to contribute to domestic tourism. One of the most important contribution of the increase in production capacity in the region, the improvement of recreation areas and of the economic activities is the development of rural tourism. In this respect, each component implemented within the project contains economic effects that will trigger each other and increase the value-added effect.

10. PROJECT MANAGEMENT AND SCHEDULE

10.1. Project Implementing Organization and its Technical Capacity

The project owner and implementing organization is the General Directorate of Forestry (GDF) affiliated to the Ministry of Agriculture and Forestry of the Republic of Turkey. The General Directorate of Forestry will act as the Project Coordination Unit. It will be the institution that will provide the communication of the project with the creditor.

GDF, TRGM, DSI and Çorum, Tokat, Sivas and Yozgat Provincial Special Administrations are the project partners and part of the project implementing unit. Sub-projects determined by Special Provincial Administrations, as supportive and complementary sub-projects of Çekerek Basin Rehabilitation Project will be implemented by Special Provincial Administrations. It is expected that cooperation between GDF and DSI will contribute to the basin management positively. In addition, DSI started implementing a rehabilitation project in the field of irrigation together with the World Bank in 2019. This experience will provide an important advantage to DSI in the project implementation. On the other hand, active participation of the local community and NGOs in the project implementation will be encouraged and promoted.

As the project is an integrated project, it requires an active participation of all the relevant parties in the project management and implementation. All the relevant parties put forth a will in terms of cooperation and contribution.

10.2. Project Organization and Management

The following organizational arrangements are recommended:

Project Coordination Unit (PCU): It will be established under GDF and have the standards of the World Bank and it is foreseen to establish a team profile consisting of project management, technical and financial management, procurement, environmental and social assessment expertise. It is also planned that this unit will host the Project Monitoring and Evaluation System. At the same time, OGM will act as the Central Project Implementation Unit.

Agency Central Project Implementation Unit (ACPIU): Considering different procedures and capacities of the institutions, it should be evaluated either to use an existing unit as in the example of DSI or to establish a unit.

Agency Regional Project Implementation Unit (ARPIU): Depending on the local organization of the relevant institution and the nature of the work to be carried out, it should be evaluated either to use an existing unit at the regional directorates or provincial directorates or to establish a unit.

Project Steering Committee (PSC): It is recommended to establish a structure of which Deputy Minister and secretariat will be assumed by GDF and that will consist of the general directors of all the implementing institutions and the other key stakeholders, if necessary, that will observe the progress of the project with a general strategic direction and evaluate annual budget and expenditures.

Local Basin Steering Committee (LBSC): A structure of which chairpersonship and secretariat will be assumed by GDF and in which local representatives of the implementing institutions and the other key stakeholders will participate will be established in order to ensure the participation of the basin stakeholders at local level in the process and ensure interinstitutional coordination at local level.

Details of the Project Management which is outlined above will be addressed in Project Operational Manual that is requested before the relevant Loan Agreement by the World Bank.

10.3. Implementation Plan and Critical Stages of the Project

Çekerek Basin Rehabilitation Project will be implemented in seven years in the period of 2021-2027. GDF will carry out work for the project preparations covering the period starting from finalization of the discussions conducted with the World Bank and the implementation of the Project, and a Project Implementation Plan requested by the Bank will be developed.

Project schedule is presented in Annex-4.

10.4. Next generation planning and interventions that will achieve the goals and objectives of the project

Although this feasibility report only prepared for the projects to be implemented in Çekerek Basin, as per the decision which was made by World Bank and General Directorate of Forestry, the implementation of the project will also include the Bolaman basin (Turkey Resilient Landscape Integration Project-TULIP). The Project will aim to lay the foundations for developing a model for other integrated basin/landscape projects in vulnerable areas under a national approach/strategy/program. Scaling up such an integrated model can potentially provide a significant number of jobs, raise incomes, and build resilience for rural communities in lagging regions, while meeting multiple sustainable development objectives in the long run related to poverty reduction, rural development, agricultural productivity, sustainable management of natural resources, food and water security, land degradation, climate change adaptation and mitigation, and disaster risk management.

In the TULIP Project, the basin-based landscape approach will be applied in order to achieve the goals and objectives determined in the main themes of project's agricultural production, provision of ecosystem services, conservation of biodiversity and improvement of local livelihood, health and welfare. The landscape approach creates long-term cooperation and synergy between different land use managers and stakeholder groups to achieve multiple goals. An integrated approach that takes into account social and environmental benefits and costs as well as economic benefits and costs in order to balance the expected economic, social and environmental results of the project by managing the natural resource capital consisting of soil, water and forest resources is possible with landscape management. In addition, policies and strategies at the landscape level will ensure the achievement of development goals and the realization of climate resistance-adaptation by increasing productivity with practices in a "climate-smart" perspective. Landscape based approach and management system to be applied in Bolaman and Çekerek Basin will also be a model example for the other regions of Turkey. In addition, the experiences to be gained from the

practices and the applied approach, model and methodologies will be scaled at national level and can be used in preperation of National Integrated Basin Projects Strategy Document to be carried out under the coordination of the Ministry of Agriculture and Forestry in accordance with the Presidental Circular No. 2020/14.

Because the integrated basin rehabilitation projects are multiple in every respect, are requiring integrated implementation, results, goals and objectives, it is necessary to implement and monitor them by a strong institutional capacity. The institutional structure includes not only the project partners but also internal and external stakeholders and beneficiaries. As a result of this, institutional capacity building activities should be determined and planned initially with an institutional capacity analysis study to be conducted by applying a serious methodology. The activities to strengthen the institutional capacity should be implemented within the scope of a strategy and action plan. Institutional capacity analysis and capacity building activities are important project components that require professional support.

Within the scope of basin based integrated landscape management, in order to implement the new generation management tools such as “integrated landscape management”, “integrated natural resource managemement”, “climate-smart”, “integrated intervention”, “multi-application”, “development of eceosystem services”, “natural capital valuation and quantitative data creation”, “intervention prioritization”, “diagnostic evaluation”, “institutional capacity analysis and capacity building”, it is beneficial to obtain technical consultancy services from structures that have the capacity to transfer experiences to the project in similar applications in the world.

The following outputs and results should be produced for the goal of creating an institutional framework for integrated landscape management with the implementation of the project's managerial activities;

1. The result of developing a national strategy for integrated natural resource management will be achieved with the following outputs;
   a. A diagnostic assessment for landscape resilience and sustainable recovery in vulnerable lagging rural areas
   b. A national strategy for landscape resilience and sustainable recovery in vulnerable lagging rural areas with selected priority areas that would also include a framework (and, may be guidelines) for prioritization of investments envisaged for the landscapes
   c. Integrated planning tools at the landscape level, including but not limited to, a blueprint for landscape based integrated development and management plan developed as well as micro landscape implementation plan as frameworks for incorporation of landscape development approach
   d. An integrated national landscape development data/GIS platform to be developed for nationwide landscape basins
2. The results of the dissemination of integrated natural resource management models and tools through integrated pilot studies to the foreseen investments in the Bolaman

and Çekerek basins and other selected priority areas will be achieved with the following outputs;

a. Landscape rehabilitation and management plan preparation for the priority areas identified in Bolaman and Çekerek basins
b. Preparation of integrated landscape rehabilitation and management plan for Bolaman and Çekerek Basins and re-prioritization of the foreseen investments
c. Sub/micro landscape implementation plans for Bolaman and Çekerek basin Project areas

3. Institutional capacity building for integrated landscape development and management will be achieved with the following outputs;
   a. Technical capacity building program to be implemented addressing the capacity needs assessed to identify the capacity building needs of relevant national and sub-national implementing agencies for the implementation of the proposed national strategy/plan/program for landscape resilience and sustainable development
   b. Capacity building program to support the producers with sustainable landscape management practices and, the producers and other local population with skill development and employment creation

The details of technical support and project management and their foreseen costs for TULIP project which as programmed as including both Bolaman and Çekerek Basin is given in Annex-12.

11. CONCLUSION

Investments have big importance in economic development of countries and specifically regions/basins. Countries do not only take into account material return like companies when taking an investment decision. Many non-monetizable impacts form the basis of the implementation of many investment projects. Çekerek Basin Rehabilitation Project is a consolidated project consisting of various sub-project items such as (public investment nature possessing) infrastructure projects, rehabilitation project, construction projects and projects to create income generating activities for the local community. In this context, commercial and economic feasibility and sustainability of the project should not be only evaluated over economic and commercial returns but also the other non-monetizable values.

11.1. Project Outcomes Concerning Commercial and Economic Feasibility

Financial and economic analysis carried out in the feasibility report show that the project is a feasible project in economic terms. Çekerek Basin Rehabilitation Project is a feasible project with the long-term returns of the investments made and long-term and appropriate debt ratio of the funding.

11.2. Sustainability of the Project

Sustainability is one of the main issues that is addressed by the project partner institutions. Project partner institutions put especially two issues to forefront concerning the sustainability:

- Financial sustainability
- Institutional sustainability

Financial sustainability

With the sub-projects under the main component *institutional coordination, project management and sustainability,* costs that are necessary for the continuation of this project at the end of the project were determined except for the one-off fixed investment expenditures to be made within the scope of the projects. In this regard, financial sustainability of the project will be ensured by taking into consideration needs such as personnel, training, conference.

Institutional sustainability

With the institutional structures to be established under the main component *institutional coordination, project management and sustainability,* projects will be monitored in the investment and operation phases and sustainability will be ensured.

Best practices gained from the projects completed by the General Directorate of Forestry which is the project implementing institution are as follows:

In Greenhouses

1- Grant support of the General Directorate of Forestry will be followed by ORKÖY branch offices and forestry operation directorates of the regional directorates of forestry.

Commitment letter will be received from those who are provided with grant support. Those who receive grant support are obliged to use these grants within the scope of the rules

specified in the commitment letters that they give. Continuation and operation of the greenhouses established with grants given throughout the project and for 5 years after the project is over will be ensured. In case of death, greenhouse activities are maintained by inheritors. In case that they are not maintained, inheritors are warned in terms of continuation of the activities within one year by the Administration in written. On the condition that necessary actions are taken for the warning, the Administration commences the necessary procedures in order to remove and give the greenhouse to a willing person.

2- Those who are provided with greenhouse support are responsible for using and making production within the rules specified in the commitment letters in line with the project objectives. The Administration gives a written warning for greenhouses in which production is not made and that are left empty. In case that production is not made in the greenhouse within one year and a valid excuse is not provided, the greenhouse is taken and provided to the use of other willing persons.

Cattle and Small Cattle Support

1- Grant support of the General Directorate of Forestry will be followed by ORKÖY branch offices and forestry operation directorates of the regional directorates of forestry.

Commitment letter will be received from those who are provided with grant support. Those who receive grant support are obliged to use these grants within the scope of the rules specified in the commitment letters that they give. Those who receive cattle grant support are obliged to maintain cattle with the condition that the amount of cattle is not below than the required throughout the project and for 5 years after the project is over. Cattles given will naturally breed and animal owners will generate income with the sale of them. However, those who sell the animals given and do not maintain cattle, reduce the number of animals under the given number except for the diseases such as pandemic etc. are warned by the Administration. It is requested to take the necessary action within 90 days. In case that it is not taken, the grant given will be reimburse with the legal interest through execution. Once the necessary action is taken, legal proceedings are dropped. In case that the same situation reiterates for the second time, the grant is taken from the relevant person through execution without the need for a warning.

Photovoltaic (PV) Power Generation, Solar Energy Water Heating, Room Heater, Heating Insulating Sheathing, Machine and Equipment etc. Grants

1- Grant support of the General Directorate of Forestry will be followed by ORKÖY branch offices and forestry operation directorates of the regional directorates of forestry.

Commitment letter will be received from those who are provided with grant support. Those who receive grant support are obliged to use these grants within the scope of the rules specified in the commitment letters that they give.

Those who receive grant support are obliged to use this support in line with its purposes and keep it functioning. They cannot transfer it to other persons. Those who are identified as using the support against the commitment letter by the Administration are warned in written. They are asked to take necessary action within 90 days. In case that they do not take this action, the amount of the grant will be taken with the legal interest through execution.

Shepherd Shelters

1- Grant support of the Provincial Directorates of Agriculture and Forestry by favor of TRGM will be followed up by the Provincial Directorates of Agriculture and Forestry.

Commitment letters will be received from persons and mukhtars which are provided with grant support. Persons and mukhtars which receive grant support are obliged to use moving and fixed shepherd shelters given as a grant within the scope of the rules specified in the commitment letters that they give.

Persons and mukhtars who receive grant support are obliged to use this support in line with its purposes and keep it functioning. They cannot transfer it to other persons. Those who are identified as using the support against the commitment letter by the Administration are warned in written. They are asked to take necessary action within 90 days. In case that they do not take this action, the amount of the grant will be taken with the legal interest through execution.

Village Bakeries

1- Grant support of the Provincial Directorates of Agriculture and Forestry by favor of TRGM will be followed up by the Provincial Directorates of Agriculture and Forestry and grant support of the General Directorate of Forestry will be followed by ORKÖY branch offices and forestry operation directorates of the regional directorates of forestry.

Commitment letters will be received from mukhtars who are provided with grant support. Mukhtars who receive grant support are obliged to use village bakeries established as a grant within the scope of the rules specified in the commitment letters that they give. They cannot transfer it to other persons. Those who are identified as using the support against the commitment letter by the Administration are warned in written. They are asked to take necessary action within 90 days. In case that they do not take this action, the amount of the grant will be taken with the legal interest through execution.

Infrastructure projects have long-term effects. Infrastructure projects are complementary to investments to be made in order to increase the income of the local community within the scope of the project. Projects such as projects reducing the negative impacts of natural disasters, road construction and rehabilitation projects and rehabilitation projects will contribute to development of the region on the whole although their economic effects cannot be directly monetized. Besides, it will be possible through the infrastructure investments in question to transport products to be produced in the region to the other regions and generate income. Payment conditions of the project and income items occurring show that the project is a long-term and sustainable project.

As the investments to be made under the project will be implemented by the public institutions, solution of the problems to occur for long-term by the relevant administration will support the sustainability of the project. Involvement of the project beneficiary public institutions in the projects regarding their areas of activity will facilitate the follow-up of the project.

As mentioned before, ownership of the project which also includes income generating activities by aiming at improving the local community economically by the local community is an important factor for ensuring sustainability.

Rehabilitation projects and forest rehabilitation projects which aim at reducing the damaging effects of natural disasters include environmental improvements as well as observing the needs of people.

11.3. Main Risks Concerning Project

Risks have been divided into the following 4 categories in the determination of the main risks about the project:

- External, unanticipated, uncontrolled
- External, anticipated, uncontrolled
- Internal, non-technical, generally controllable
- Technical, generally controllable

3x3 risk matrix was used in the risk assessment and assessment carried out according to the risk groups under the abovementioned 4 categories are presented in Table 50.

POSSIBILITY	**High**	**Moderate risk**	**High risk**	**Exceptional risk**
	Moderate	Low risk	Moderate risk	High risk
	Low	Insignificant risk	Low risk	Moderate risk
		Mild	**Moderate**	**Severe**
	EFFECT			

Table 49 Project Risk Assessment

Risk category	Sub Category	Risk definition	Possibility	Impact	Risk Score	Risk prevention/mitigation measures
External, unpredictable, uncontrollable	Legislation based	Change of legislation by unpredictable state intervention	Low	Severe	Moderate risk	-
	Natural disasters	Flood, earthquake	Moderate	Moderate	Moderate risk	-
	Default events	Anarchy, sabotage	Low	Moderate	Low Risk	-
	Non-completion insufficiencies	Failure of the design	Low	Moderate	Low Risk	-
External, predictable, uncontrollable	Market Risks	Embargo, competition	Low	Moderate	Low Risk	As international embargos will not affect the products to be introduced in the domestic market, no risk prevention measures are suggested.
	Management	Not performing maintenance services after the commissioning of the facility	Moderate	Moderate	Low risk	Within the scope of the Component 3 designated within the framework of the project, monitoring and sustainability of the projects will be monitored and will be ensured.
	Social Effects	Migration	Low	Mild	Insignificant risk	-

Risk category	Sub Category	Risk definition	Possibility	Impact	Risk Score	Risk prevention/mitigation measures
	Monetary Changes	Changes in the exchange rate	Moderate	Mild	Low risk	-
	Inflation, taxation	High inflation, new taxes	Moderate	Moderate	Moderate risk	-
	Global Pandemic	-	High	Mild	Moderate risk	By their nature, projects are not expected to be affected by the pandemic.
Internal, nontechnical, usually controllable	Management	Change of management, Inadequate project management	Moderate	Moderate	Moderate risk	It will be ensured that the project is not affected by these changes with the support of effective project management practices.
	Cost	Insufficient estimation	Low	Moderate	Low risk	In the event that calculated costs are inadequate, state support will be provided.
	Money flow	Pressed for money, cut, not being able to solve	Low	Severe	Low risk	Compliance to the previously determined payment plan will be ensured.
Technical, usually controllable	Changes in technology	Not adapting to new technologies, technologic wear	Low	Mild	Insignificant risk	-

Risk category	Sub Category	Risk definition	Possibility	Impact	Risk Score	Risk prevention/mitigation measures
	Design	Insufficient data, design flaw	Low	Severe	Moderate risk	Each institution has designated their projects in accordance with their scope of authority and responsibility by the experts within their body.
	Magnitude of the Project or complexity	-	Moderate	Severe	High risk	Within the scope of the Component 3 designated within the framework of the project, effective management of the sub projects will be ensured. Additionally, the fact that OGM, the project implementer, has conducted similar projects as an institution will serve as an advantage.

12. ANNEXES

Annex-1	Project Classification and Project Characteristics List
Annex-2	Analysis Table for Project's Compliance with High-Level Policy Documents
Annex-3	Institutional Legislation and Duties Table
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Annex-10	Environmental Analysis and Impact Mitigating Measures Table
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Annex-12	Details of Component 3

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