Food and Agriculture Organization of the United Nations

FEASIBILITY REPORT ON

BOLAMAN

RIVER BASIN REHABILITATION PROJECT

MARCH, 2021

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DEFINITIONS & ABBREVIATIONS

R&D	Research and Development
UN	United Nations
EIA	Environmental Impact Assessment
FRS	Farmer Registration System
TurkStat	State Statistical Institute
EBDA	Eastern Black Sea Development Agency
EBDP	Eastern Black Sea Development Plan
DSI	State Hydraulic Works General Directorate
IWMP	Integrated Waste Management Plan
FAO	Food and Agriculture Organization of the United Nations - Turkey Office
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
SPA	Special Provincial Administration
OHS	Occupational Health and Safety
ISKUR	Turkish Employment Agency
GDH	General Directorate of Highways
SME	Small and Medium Size Enterprises

GDM	General Directorate of Meteorology
MRE	Mineral Research and Exploration
OGM	General Directorate of Forestry
ORBIS	Forestry Information System
GDFRA	General Directorate of Forestry and Rural Affairs
OSKI	Ordu Water and Sewerage Administration
SES	Socioeconomic Status
NGO	Non-Governmental Organization
TEPAV	Economic Policy Research Foundation of Turkey
MoAF	Ministry of Agriculture and Forestry
TOBB	Union of Chambers and Commodity Exchanges of Turkey
TRGM	General Directorate of Agricultural Reform
TULIP	Turkey Resilient Landscape Integration Project
TurkStat	Turkish Statistical Institute

PROJECT SUMMARY

a. Project's ID Card

i. Main Project Details

Project Title/Investment Schedule (if any) Project No.	BOLAMAN River Basin Rehabilitation Project
Sector/Sub-Sector:	**AGRICULTURE**/Irrigation-Vegetative Production-Animal Breeding-Forestry **TRANSPORTATION**/Road Transportation
Project Beneficiaries:	General Directorate of Forestry, General Directorate of Agricultural Reform and General Directorate of DSI of Ministry of Agriculture and Forestry/General Directorate of Highways of Ministry of Transportation and Infrastructure
Location:	Ordu & Tokat
Implemented By:	General Directorate of Forestry, General Directorate of Agricultural Reform and General Directorate of DSI of Ministry of Agriculture and Forestry/General Directorate of Highways of Ministry of Transportation and Infrastructure
Cost and Main Items:	Total Cost of the Project: 603.309.379 TL ✓ Component 1: Green and Sustainable Development ✓ Component 2: Climate-Resilient Gray Infrastructure ✓ Component 3: Institutional Coordination, Project Management and Sustainability
Projected Outputs	The Bolaman River Basin Rehabilitation Project is intended to achieve the objectives of "green and sustainable rural development that promotes the growth of prosperity", "gray infrastructure resilient to the effects of the climate change" and "an institutional structure that successfully implements the integrated basin management and secures its sustainability" and run the sub-project and activities set out in the

Project Title/Investment Schedule (if any) Project No.	BOLAMAN River Basin Rehabilitation Project
	feasibility report to achieve the objectives of the project. The outputs of the activities and sub-projects will help achieve the goals. The goals achieved by means of outputs will help achieve the objectives of the Project. Following this hierarchy, a result-oriented approach will be adopted at the investment and operational phases of the Project. The sub-projects to be run under the project and their outputs are presented in the Table of the Annex-1 under the columns of "Sub-Project Title" and "Project Characteristics".
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

Bolaman River Basin suffers from natural disasters caused by the climate change such as landslides and flood, and decline in vegetative production and animal breeding, drought caused by poor infrastructure despite high rainfall, and problems of mobility caused by poor and not climate-resilient transportation infrastructure. The poor level of welfare and limited livelihoods cause pressure on natural resources especially on forests and lead to migration. To this end, the Project is intended to "improve livelihoods and achieve the average welfare level in the country by income-generating activities for the people of Bolaman Basin to be supported by rehabilitated natural resources, sustainable land use, landslide and flood control and adequate infrastructure for water, sanitation and local mobility".

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 Bolaman River 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 Bolaman River 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.

In addition, the project's capability to achieve the objectives of other development and sectoral plans was reviewed in Section 1.1 based on Eleventh Development Plan (2019-2023), Mid-Term Programme (2020-2022), Regional Plans, EBDP Strategic Plan and Sectoral Strategy Documents (Eastern Black Sea Regional Plan (2014-2023), Strategic Plan of the Regional Development Administration of Eastern Black Sea Project (2019-2023), Climate Change Strategy of Turkey (2010-2023), 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)) and Institutional Strategic Plans, and it was concluded that the objectives set for the basin would be achieved and that a contribution would be made to the fulfillment of the objectives at the national level.

v. Financial Resource 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 67.412.714 (TRY 517.183.600). It is estimated that the loan will be paid back over the course of 19 years starting from year 7.

vi. Analytical Outcomes of the Project (Comparison of Alternatives)

Without the project, the site will continue to suffer from natural disasters such as flood and pose safety threats. In addition, the local climatic conditions, natural landscape and economic characteristics offer limited development opportunities. The proposed project is intended to prevent potential natural disasters, raise the level of income for the basin communities and thus improve their living standards. The Project will also offer non-monetized contributions from the perspective of social impacts. If the project is to be

carried out solely based on domestic funds without an external loan, the return on investment and internal rate of return will be much less. The second-best alternative in case of no project puts the project below the NBD investment sum and offers much more limited social and economic impacts compared what the project could offer.

	No-Project Case (Public + Beneficiary)	**Maintenance & Repair/Expansion**	**Second Alternative (Beneficiary)**	**Alternative (External Source + Public + Beneficiary)**
Investment Cost	86.125.779	136.250.000	65.880.000	603.309.379
Net Present Value (Commercial/Economic)	82.551.577	130.595.654	63.145.994	579.947.977
Internal Rate of Return (Commercial/Economic)	-			1,20869290%
Time Frame for Repayment (Commercial/Economic)	7			25
Cost-Benefit Ratio (Commercial)	3.30%		3.30%	3.30%
Cost-Benefit Ratio (Economic)	4.46%		4.46%	4.46%
Major Non-Monetized Benefits and Costs	28.893.052		22.101.098	202.981.792
Non-Numerical Major Considerations	12.382.737		9.471.899	86.992.197

vii. Study 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 the Project

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

- Landslides in the basin,
- Severe pollution in rivers,

- Decline in vegetative production and animal breeding
- Failure to fully realize the natural potential,
- Challenges in natural tourism and conventional tourism planning and execution,
- Shortage in sustainable use of natural resources especially forests,
- Pressure on natural resources,
- Poor livelihoods,
- Poor mobility caused by climatic pressure on infrastructure,
- Migration,
- Drought,
- Flood.

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 the Project

Overall Objective of the Project: To strengthen natural resources based on integrated management at the landscape level and improve the access of Bolaman River Basin communities to climate-resilient infrastructure.

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 Bolaman 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: Bolaman River Basin, where the project would be carried out, covers a total of 15 districts including 12 districts in the province of Ordu and 3 districts in the province of Tokat. The basin has 158.886 hectares of land and a population of 257.500 people.

Term of the Project: 7 years

Location: The province of Ordu including 12 districts and the province of Tokat in Bolaman River Basin.

Technical Content of the Project The project consists of sub-projects to be run by the General Directorate of Forestry, the General Directorate of Highways, 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. Sustainable management of forest and forest connected pastures

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. Rangeland rehabilitation and management

1.2.4. Sustainable agricultural value chains

Component 2: Climate-Resilient Gray Infrastructure

Sub-Component 2.1: Resilient infrastructure for disaster risk and water security (General Directorate of State Hydraulic Works)

2.1.1. Multi-purpose reservoirs

2.1.2. Resilient infrastructure for flood and sedimentation control

Sub-Component 2.2: Climate-resilient rural road system (General Directorate of Highways)

2.2.1. Climate-resilient rural road rehabilitation

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: Bolaman River 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".

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. Analytical Results of the 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 "Bolaman 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. Impacts of the Project

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 Bolaman River 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. Only 2 out of 75 projects proposed are subject to the EIA Regulation and a resolution has been or will be made for them as to why there is no need to seek EIA clearance for them. 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, Bolaman River Basin Rehabilitation Project includes short- and long-term outcomes that financially and commercially leverage one another with its sub-projects.

1. DESCRIPTION and SCOPE of the PROJECT

1.1. Project's Conformity with the 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 and GDH 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. High-level 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 General Directorate of Highways (2019-2023),
   - Strategic Plan of Eastern Black Sea Project Regional Development Administration (2019-2023),
   - Eastern Black Sea Regional Plan (2014-2023).
2. Sectoral strategy papers
   - 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, objectives and goals of high-level 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 outcomes of the sub-projects under the components of the project

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. An assessment of whether the outputs and outcomes foster the priorities, objectives and goals

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. Sustainable management of forest and forest connected pastures

The theme of "sustainable management of forest and forest-connected pastures" includes projects of pasture rehabilitation and ecosystem reservoirs that the GDF is responsible to execute. The execution of these projects will yield the outputs set out in the table of the Annex-2. The project outputs of this theme will make sure that natural ecosystems (forests, pastures) are restored and made more functional. Other outcomes of the ecosystem reservoirs built in upper basins are the reduction of the likelihood of any flood by slowing down the flow of rainfall into lower basins and prevention of erosion by preventing any loss of soil. In addition, these reservoirs meet the needs of animals for water and provide shelter for buffalo-like animals throughout a day. As it is evident, the outcomes of the project outputs in this thematic group make sure that the objectives of the eleventh development plan and the strategic plan of the GDF are achieved at the micro basin level.

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. 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. Rangeland rehabilitation and management

"Rangeland rehabilitation and management" is a thematic group consisting of rangeland rehabilitation projects that the TRGM is responsible to execute. The outcome of rangeland rehabilitation, which is to be achieved by the execution of the projects, corroborates the objective to "protect and make efficient use of soil and water resources" set under the strategic plan.

1.2.4. 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 for disaster risk and water security

2.1.1. Multi-purpose reservoirs

The thematic group of "Multi-purpose reservoirs" consists of projects focused on reservoirs. The objectives of the high-level documents in this regard are to make investments in improving irrigation lands and to make efficient use of water for agricultural purposes. The construction of reservoirs will help achieve the goals at the micro basin level.

2.1.2. 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.

Sub-Component 2.2: Climate-resilient rural road system

2.2.1. Climate-resilient rural road rehabilitation

Climate-resilient rural road and rehabilitation to be executed by the GDH will help rehabilitate two roads. The outcomes of the project outputs will enable to achieve the objectives of the high-level policy documents to improve and develop the standards of roads set out in Annex-2 at the micro basin level.

Component 3: Institutional Coordination, Project Management and Sustainability

The component 3, which is under the responsibility of GDF, includes the capacity increase 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 in capacity increase and technical assistance can be made with FAO Office in Turkey. 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, preparation of institutional framework, integrated landscape management and distribution of implementation tools and technical support and institutional capacity increase for the integrated landscape management will be carried out.

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 formed; office equipment will be purchased for the project coordination unit and the regional technical support unit; monitoring and impact assessment, complaint and compensation 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 subsistances will be covered and annual surveys will be conducted.

1.1.6. Conformity with the 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 Bolaman River Basin and at the national level.

1.1.7. Conformity with the sectoral policy documents

Eastern Black Sea Regional Plan (2014-2023)

The outcomes of the project outputs will make sure that the Eastern Black Sea Regional Plan helps

strengthen the supply-demand equilibrium and social security, engagement, organization and doing business together and build institutional capacity based on Well-Qualified People, Social Welfare and Quality of Life,

prevent the rural population from emigrating by strengthening the rural and urban ties, help farmers generate a steady income and achieve high level of welfare by making effective use of agricultural, animal and aquatic products, achieve sustainability for forestry by engagement, improve the income generated from the forests, and promote the growth of local products based on Rural-Oriented Prosperity and Welfare,

and gain insight into the environmental sustainability and protect and make use of natural assets based on Habitable Settlements and Sustainable Environment.

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, GDH and TRGM 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. Sustainable management of forest and forest connected pastures

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. Rangeland rehabilitation and management

1.2.4. Sustainable agricultural value chains

Component 2: Climate-Resilient Gray Infrastructure

Sub-Component 2.1: Resilient infrastructure for disaster risk and water security

2.1.1. Multi-purpose reservoirs

2.1.2. Resilient infrastructure for flood and sedimentation control

Sub-Component 2.2: Climate-resilient rural road system

2.2.1. Climate-resilient rural road rehabilitation

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 for disaster risk and water security, **General Directorate of State Hydraulic Works**

Sub-Component 2.2: Climate-resilient rural road system, **General Directorate of Highways**

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. Bolaman Basin, which is the project site, is situated within the jurisdiction of Giresun and Amasya Regional Directorates of Forestry. The organizational chart of the General Directorate of Forestry is presented in **Hata! Başvuru kaynağı ulunamadı.**.

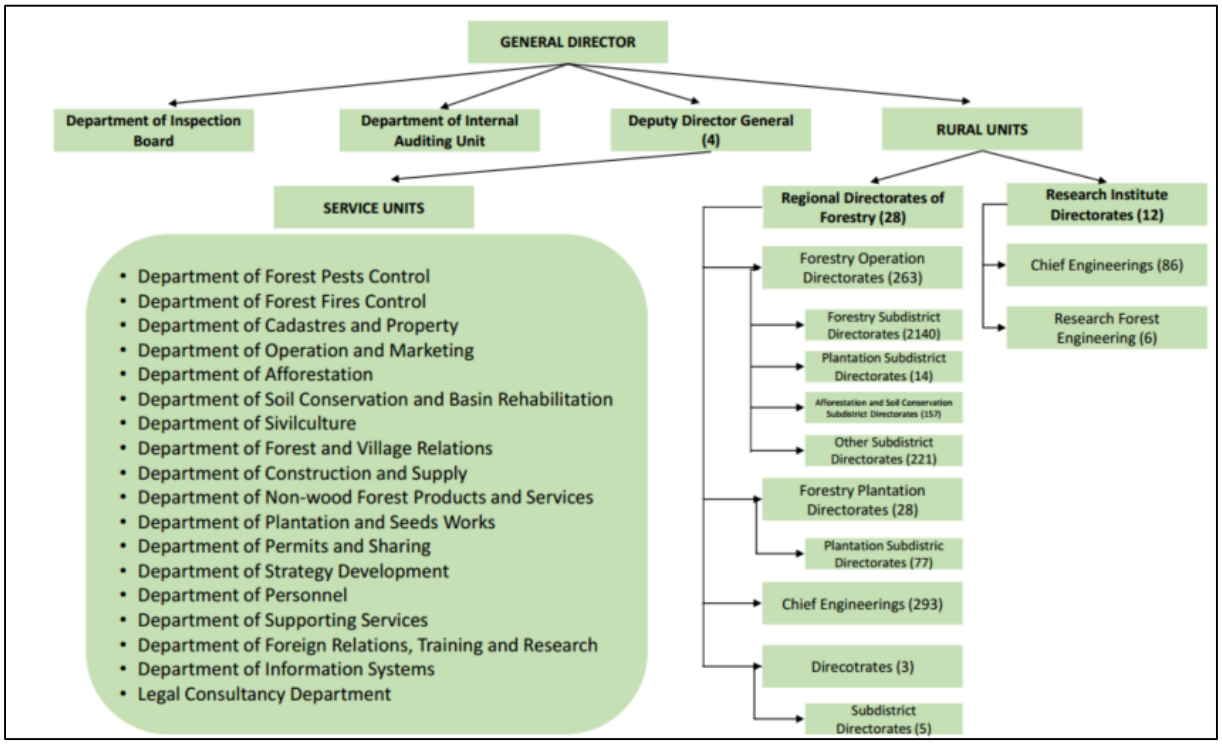


Figure 1 Organizational Chart of the General Directorate of Forestry

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. Bolaman Basin, which is the project site, is located within the jurisdiction of the Ministry's provincial directorates of Ordu, Tokat, Giresun and Amasya as a rural administration. The organizational chart of the General Directorate of Agricultural Reform is presented in Figure 2.

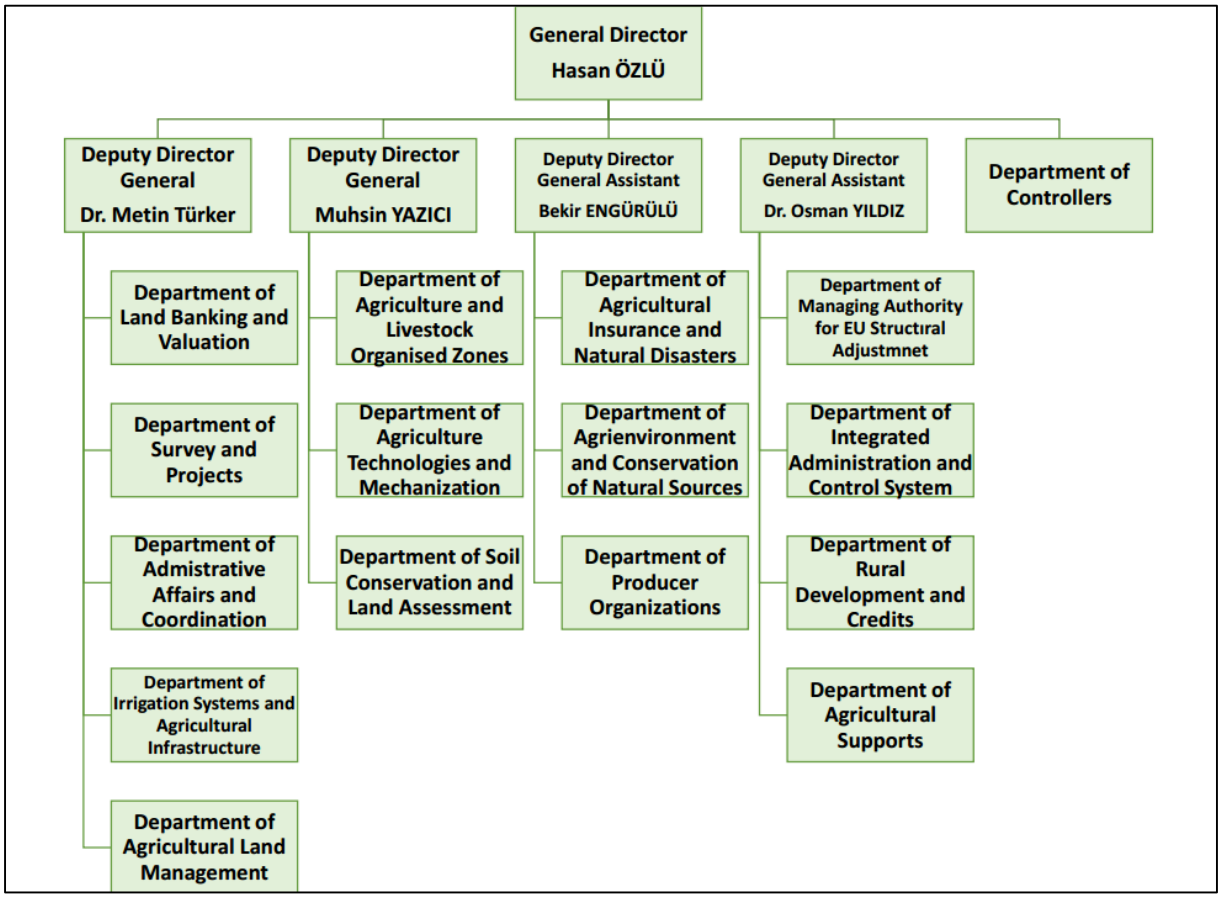


Figure 2 Organizational Chart of the General Directorate of Agricultural Reform

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 branding.

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-3.

General Directorate of State Hydraulic Works - Component 2.1: 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. Bolaman Basin, which is the project site, is located within the jurisdiction of Samsun 7th Regional Directorate. The organizational chart of the State Hydraulic Works is presented in Figure 3.

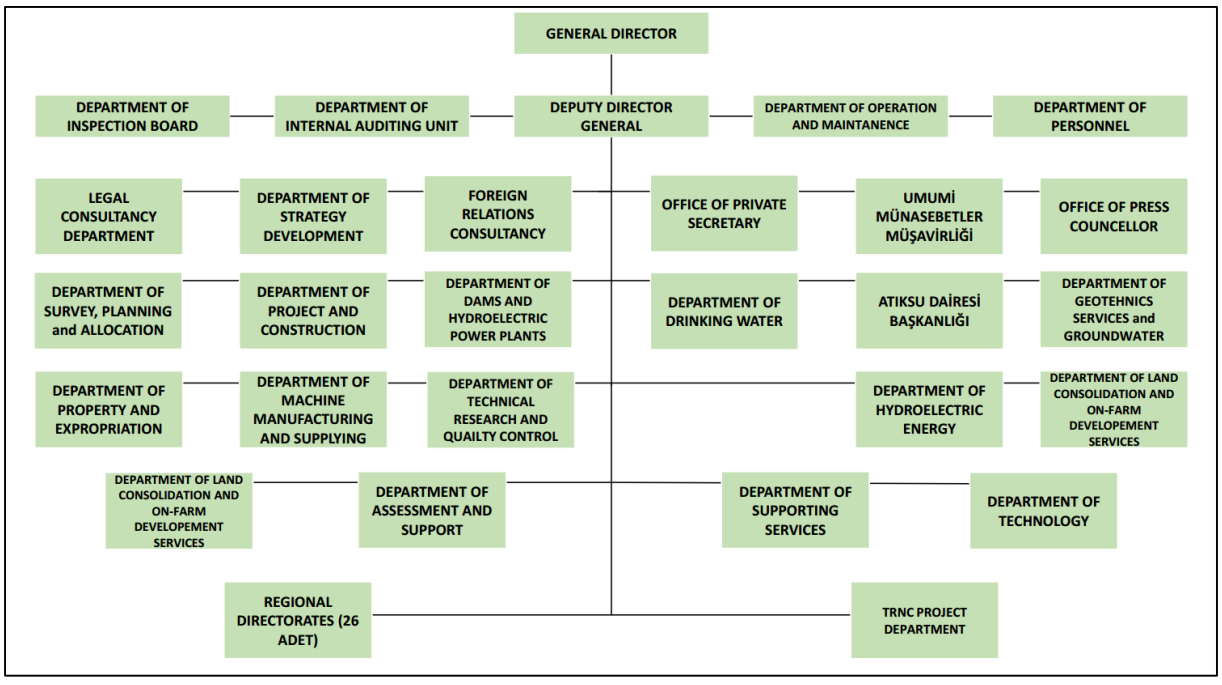


Figure 3 Organizational Chart of the General Directorate of State Hydraulic Works

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 roles and responsibilities assumed by the DSI under the project themes of multi-purpose reservoirs for flood and sedimentation control, and drinking water infrastructure systems are projects that it is highly experienced about such as multi-purpose reservoirs and flood control structures. 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.

General Directorate of Highways - Component 2.2: Climate-resilient rural road system

The General Directorate of Highways is a public organization with a dedicated budget founded in line with the article 210 of the Presidential Decree No.4, commissioned to perform tasks given in line with the applicable laws and Presidential decrees, affiliated to the Ministry of Transportation and Infrastructure, equipped with a public entity, and based in Ankara. The GDH consists of a general directorate, central and rural administrations. The general directorate consists of central departments, rural administration, regional directorates, supply directorates, workshop directorates and technical, administrative and maintenance offices, chief engineering offices and divisions affiliated to the regional directorates. The organizational chart is as follows. Bolaman Basin, which is the project site, is located within the jurisdiction of Samsun 7th Regional Directorate. The organizational chart of the General Directorate of Highways is presented in Figure 4.

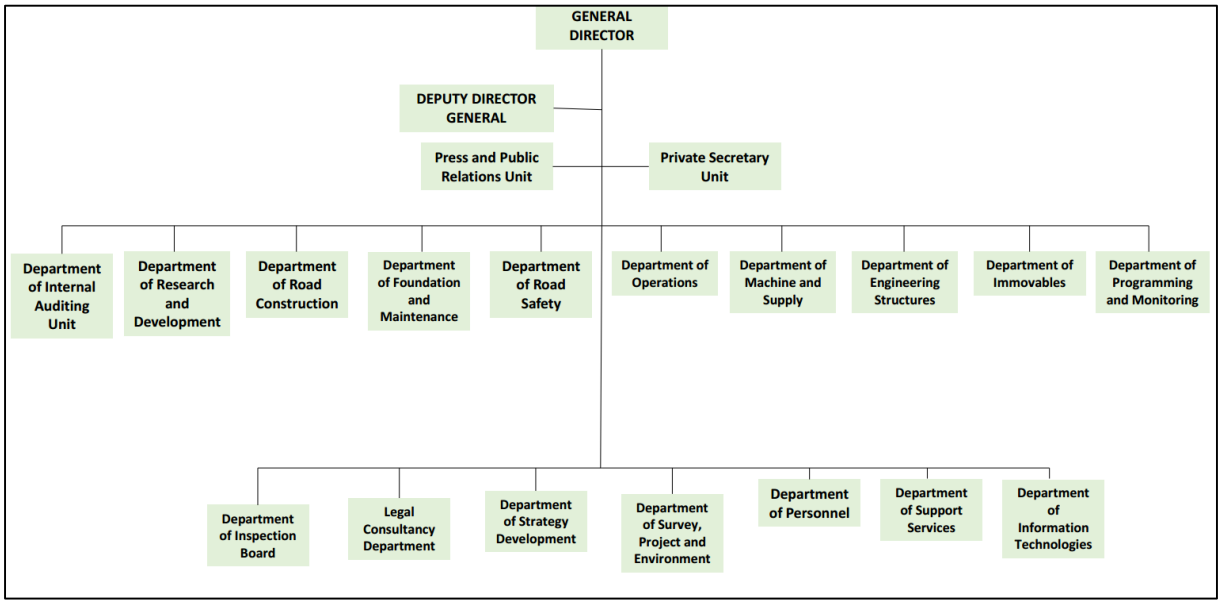


Figure 4 Organizational Chart of the General Directorate of Highways

The assessment on the legal basis of the GDH's tasks and responsibilities and those assumed under the project is presented in Section 1.2.2 under the title of "Applicable legislation" and in the table of Annex-3.

GDH 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 unique institutional aspects of GDH has 27.877 staff members as of late 12.31.2019.

Under the project, GDH assumes sub-projects that it is highly experienced about such as road rehabilitation. GDH 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.

Built by GDH for the coordination and management of the project, the institutional structure is described in detail under the 11th title of "Project Management and Implementation Programme".

The institutional structure commissioned by the project partners to execute the project is not limited to the foregoing. Other departments of the project partners will assume direct or indirect roles and responsibilities for the execution and sustainability of the sub-projects in the investment and operational phases. The sub-projects planned under the Sub-Component 3.1 titled "Technical assistance and institutional capacity building for integrated landscape

management" under Component 3 are intended to boost the efficacy of the project by building institutional capacity for all the project partners and beneficiaries including the GDF in particular that assume coordination and management roles and responsibilities, and make an institutional analysis for sustainability, adopt institutional capacity building measures set as a part of the analysis, and thus generate outputs for the sub-projects to achieve the outcomes that enable to achieve the objectives of the project.

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 (planning of decreasing the risk for landslide projects, reclamation levee, gabion boxes, steel rubble barrier, retaining wall, culvert, in-line grout reclamation bench, landslide, rockfall, avalanche, flood)
- Sustainable management of forest and forest-connected pastures (forest-connected and forest-adjacent pasture rehabilitation project)
- Rehabilitation, protection and sustainable management of forests (production and equipment of tubular saplings, soil elimination equipment, soil protection, nature protection, areas reserved for the function of protecting important bird areas, photovoltaic systems, solar water heating systems, exterior sheathing, roof cover, reporting and supporting of non-wood forest products and services sector)
- Income generation and livelihood diversification for forest villages (income-generating afforestation, honey forests project, construction or capacity building of picnic and recreational sites, medicinal aromatic plant growth, truffle graft sapling production and maintenance, blueberry cultivation, strawberry cultivation, production of truffle grant chestnut, mushroom cultivation, dairy sheep breeding, buffalo breeding, dairy cattle improvement, scientific beekeeping, queen bee reproduction, women-supporting village bakeries, chainsaw, occupational safety outfits)

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 (mainstreaming greenhouse cultivation, mainstreaming modern kiwi cultivation, mainstreaming persimmon cultivation, mainstreaming rainwater harvesting, and mainstreaming pocket terraces and good agricultural practices in hazelnut orchards),
- Income generation and livelihood diversification for rural areas (dairy cattle improvement, dairy sheep improvement, mainstreaming sheep breeding, buffalo breeding improvement, animal barns and shepherd's houses, mainstreaming free system organic egg poultry, mainstreaming goose breeding, scientific beekeeping and diversification of bee products, buffalo breeding development, fight against bee diseases and pests, diversification of bee products
- Pasture rehabilitation and management (pasture/highland rehabilitation and forestry),
- Sustainable agricultural value chains (Establishing portable threshing and portable hazelnut drying stations, improvement of rural employment for women),

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 development of animal breeding and growth in production. 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 pasture rehabilitation and management projects, which are under the theme of "pasture rehabilitation and management", are directly related to the rural development by means of improvement of quality of life and economic diversity based on the improvement of animal breeding and growth in agricultural production. The aforementioned projects are among the

mandates of the TRGM under the sub-paragraph (a) and the sub-paragraph (b). The Law No. 4342 on Pastures sets roles and responsibilities for the maintenance, rehabilitation and management of pastures.

The theme of "sustainable agricultural value chains" includes projects focused on processing plants to enhance the added value of agricultural productivity through agricultural value chains. 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.

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:

- Multi-purpose reservoirs (construction of Çatalpınar Reservoir, construction of Aybastı (Baydarlı) Reservoir),
- Resilient infrastructure for flood and sedimentation control (execution and construction of Bolaman River flood control project, execution and construction of Bolaman River levees project, construction of Şahsene River flood control, construction of Fatsa-Industrial Zone flood and sedimentation control, construction of Fatsa-Karaderetaşkın control, construction of Çatalpınar-Elmaköy Quarter-Şifalısu Site flood control, construction of Gölköy-Karahasan Quarter-Karaağaç River flood and sedimentation control, construction of Korgan-Tepealan Quarter Güllü River flood and sedimentation control, and construction of Ordu-Çatalpınar District Center Keş River flood and sedimentation control),

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 theme of "multi-purpose reservoirs" includes two pieces of 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".

General Directorate of Highways

In addition to the management and coordination of the project, the GDH 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:

- Climate-resilient rural road rehabilitation (Kabataş - Aybastı Road, Aybastı - Gölköy Road)

The roles and responsibilities of the General Directorate of Highways 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 GDH under the project fall within the remit of the GDH or not are presented below.

The theme of "climate-resilient rural road rehabilitation" includes projects focused on road rehabilitation. The sub-paragraph (b) and the sub-paragraph (c) of the paragraph 1 of the Presidential Decree clearly indicate that the execution of such tasks is the mandate of the GDH.

In the light of the findings above, it is clear that all of the sub-projects that fall within the scope of "sub-component 2.2: climate-resilient rural road system" under the component 2 titled "gray infrastructure" and that the GDH is responsible to execute also cover the mandate of the GDH set out in 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".

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. Association of the Project with the Organization's Past, Ongoing and Planned Projects

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 Agriculture and Rural Affairs	Ministry of Environment and Urbanization, Ministry of Agriculture and Rural Affairs	TEMA Foundation in Bayburt	Ministry of Forestry and Hydraulic Works, Ministry of Food, Agriculture and Livestock, Provincial Special Administrations	Ministry of Forestry and 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	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

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
				and water resources in Çoruh River Basin and diversification of income-generating activities.	residing at a high altitude.
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 Bolaman River 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 Bolaman River Basin Rehabilitation Project.

1.4. Association of the Project with the Projects of Other Organizations

1.4.1. Projects of Other Organizations to be Simultaneously Run on the Sidelines of the Project

The management and coordination of the Bolaman River 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 Highways, the General Directorate of Agricultural Reform and the General Directorate of State Hydraulic Works. 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 the Project to Avoid Physical Overlap with the Project of Other Organizations

As the Bolaman River 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 Bolaman River 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 Efforts About the 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:

- A meeting was held in the Governor's Office of Ordu on May 10, 2019 and attended by the MPs of Ordu and the officials of Ordu Metropolitan Municipality and heads of its departments.
- Tens of houses collapsed as a result of a landslide in the district of Aybastı on May 15, 2019, and it became a topical issue in the country.
- The Presidential Office gave instructions to take necessary actions.
- The official requests of Ordu Metropolitan Municipality and the Governor's Office of Ordu to draw up a project for "integrated basin management" were communicated to the Ministry of Agriculture and Forestry in May 2019.
- The requests were affirmatively responded by the Ministry, and the Department of Soil Conservation and Watershed Rehabilitation of the General Directorate of Forestry was commissioned as a coordination body.
- Upon the official letter submitted by the Ministry of Treasury and Finance on 8.5.2019,

the proposition of the General Directorate of Forestry to enter into a loan agreement with the World Bank was approved by the Ministry and then the negotiations with the World Bank ensued.

- To this end, the officials held many meetings, engaged in talks and paid a site visit in Ankara and Ordu. The rural administration of the General Directorate of Forestry held interviews with muhtars (heads of villages/neighborhoods) on the basis of a needs analysis. In addition, the challenges were established as a part of the interviews with the muhtars and other target group based on a methodology, and the projects that the basin needs were determined based on a needs analysis. A group of experts from the project partners paid a site visit and engaged in field surveys for site selection.
- Some high-level meetings were held in the premises of the General Directorate of Forestry and attended by the experts of the Presidency of Strategy and Budget, the World Bank and project partners.
- To be executed by the GDF to conduct a feasibility study and make necessary preparations, the Study Project called "Bolaman Basin Integrated Project" was incorporated into the Investment Programme 2020 with the project number 2019A05-152962 and provided with a grant.
- A series of talks were held with the General Directorate of Sectors and Public Investments (Division of Agriculture) of the Presidency of Strategy and Budget.
- On April 7, 2020, the World Bank decided to sponsor the project with a loan worth USD 300 million.

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.

The problem analysis was performed based on desktop reviews and field visits by the project partners and rural administration. The main problems established about the basin as a result of the aforementioned efforts are itemized below while more information is provided in the

following paragraphs:

- Landslides in the basin,
- Severe pollution in rivers,
- Decline in vegetative production and animal breeding
- Failure to fully realize the natural potential,
- Challenges in natural tourism and conventional tourism planning and execution,
- Shortage in sustainable use of natural resources especially forests,
- Migration,
- Drought,
- Flood.

The natural resources in Bolaman Basin have been degraded by floods and landslides as the basin is home to steep slopes, shallow and poorly-productive soil, heavy and irregular rainfall, and the degradation has been expedited by human activities such as deforestation and overgrazing. The need for the project arose from such human activities and natural disasters, gender discrimination, limited livelihoods, poor socio-economic conditions and failure to put institutional collaborations into practice.

3 main reasons lie behind the selection of the project basin.

1. As a whole, the main problems of the basin are 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 and floods.

   The reason why the quality of water bodies deteriorates in Ordu, which is one of the provinces in the lower basis, is pollution caused by mining operations, procurement of materials that degrade the natural fabric of water bodies, and environmental and water pollution caused by the leakage of waste water into water networks and rivers due to the poor infrastructure of cities and towns that stretch along the rivers. In addition, agricultural pesticide, unchecked use of manure, unplanned housing, and unsanitary disposal of solid waste into rivers, sea and streams reduce the water quality.

   Bolaman Basin is under pressure of domestic waste water generated by the districts of Aybastı, Kabataş, Gölköy, Çatalpınar and Çamaş and their towns and villages. There is a waste water treatment plant under construction in the district of Çatalpınar, Kabataş in the basin, and waste water generated outside Kabataş is released into the basin without any treatment.

   Intensive use of manure and agricultural pesticide puts pressure on the rivers located within the lower basin. The reckless use of chemical manure in agricultural lands directly or indirectly leads to the seepage into receiving water bodies, and causes an

increase in the amount of nitrogen and phosphorus in them. The sloping lands make it easier for agricultural pollution to find its way to the rivers.

The district of Fatsa meets its need for drinking and domestic water from the caisson wells dug in Bolaman River. Water collected in caisson wells in the district centrum is treated and pumped back to the water main. Bolaman River, which is the drinking water supply of Fatsa, is under pressure of domestic and industrial waste water, seepage water originating from unsanitary landfill of solid waste, use of manure and pesticide for agricultural production, and mining operations.

Lower Basin of Ordu-Giresun Waters

Drinking water is usually provided by the rivers in the lower basin. The need for water is met by wells when the amount of water falls short. Drinking and domestic water is provided by the rivers for 47% of the lower basin population and it is followed by wells with 35%. Provided by wells, water is pumped up and delivered to water reservoirs. 23% of the drinking and domestic water provided for the basin population is pumped into the water main without any cost for energy. For disinfection purposes, almost all of the settlements in the lower basis chlorinate the water.

The drinking water networks partially have asbestos in pipes. These pipes are replaced from time to time as a part of municipal efforts. As the water supply declines in drought seasons in settlements where rivers serve as a drinking water supply, some problems such as turbidity in rainy seasons and blockage in conveyance lines are common.

Animal breeding is largely based on pastures in Ordu and Tokat as a part of family business. Market-based plans are limited. Animal-based production has been declining over the years. Animal breeding activities largely rely on businesses engaged in vegetative production. This results from the obligation to meet the need for roughage from their own business since feed stuff is expensive, and from the concept of historically meeting their needs on their own in rural parts of the province.

2. The basin is one of the poorest and disaster-torn regions in Turkey due to its challenging topography and climate.
3. Based on a policy of prioritization to be adopted by the Turkish government, the unsustainable use of natural resources by the forest communities should be mitigated.

In addition, there is a vicious cycle between the degradation of natural resources and poverty. The degradation of natural resources causes the rural communities to make a living with no efficiency and exacerbate their poverty. This makes people even more dependent on natural resources and further degrades them.

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) • General Directorate of Highways (GDH) • General Directorate of Agricultural Reform (TRGM) • Ordu Provincial Directorate of Agriculture and Forestry • Samsun 7th Regional Directorate of Highways • Samsun 7th Regional Directorate of DSI • Giresun Regional Directorate of Forestry	• 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 CDE • Eastern Black Sea Development Agency (EBDA) • General Directorate of Nature Conservation and National Parks • Eastern Black Sea Project Regional Development Administration (EBPRDA) • Ordu Water and Sewerage Administration (OSKI) • Ordu Metropolitan Municipality • Tokat Municipality • Hazelnut Research	• 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 • People migrating from the basin to metropolitan cities • Indirectly relevant national, regional and district-level public organizations • Muhtars of indirectly-affected settlements	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 • Ordu University • Tokat Gaziosmanpaşa University • Karadeniz Technical University Press and Media • News agencies • Local newspapers

Direct Stakeholders		Indirect Stakeholders	Other Stakeholders
Internal Stakeholders	**External Stakeholders**		
• Amasya Directorate of Forestry • FAO (Food and Agriculture Organization of the United Nations) • World Bank	Institute - Ministry of Agriculture and Forestry • Beekeeping Research Institute - Ministry of Agriculture and Forestry • Ordu Provincial Directorate of Culture and Tourism • Governor's Office of Ordu • Governor's Office of Tokat • Provincial Directorates of Family, Labor and Social Services • Muhtars of directly-affected settlements • Agricultural farmers (hazelnut cultivators in particular) • Animal farmers • Beekeepers • Forest village communities • People residing in disaster-stricken sites • Vulnerable groups		

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, hazelnut

cultivation, beekeeping, 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
		Sustainable management of forest and forest connected pastures
		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
		Rangeland rehabilitation and management
		Sustainable agricultural value chains
		Branding and marketing of sustainable agricultural products
Component 2: Climate-Resilient Gray Infrastructure	Sub-Component 2.1: Resilient infrastructure for disaster risk and water security	Multi-purpose reservoirs
		Resilient infrastructure for flood and sedimentation control
		Drinking water infrastructure systems
	Sub-Component 2.2: Climate-resilient rural road system	Climate-resilient rural road rehabilitation
		Climate-resilient rural road construction
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. No-Project Case

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.

Sustainable management of forest and forest connected pastures

Unless the projects focused on forest-connected and forest-adjacent pasture rehabilitation 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.

Rangeland rehabilitation and management

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

Sustainable agricultural value chains

Unless the projects focused on projects 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.

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.

Climate-resilient rural road rehabilitation

The infrastructure and transportation in the basin will not be improved unless the road rehabilitation efforts are exerted 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 Bolaman 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.

- Maintenance of young forests (5370 ha) (General Directorate of Forestry) (Cost: TRY 4.150.000),
- City Forest Capacity Building for Aybastı (1 in quantity) (General Directorate of Forestry) (Cost: TRY 1.000.000)
- Type-B Recreational Site Capacity Building for Olukdüzü, Çatalpınar (1 in quantity) (General Directorate of Forestry) (Cost: TRY 1.000.000),
- Forest-connected and Forest-adjacent Pasture Rehabilitation Project (Gen. Dir. of Forestry) (Cost: TRY 300.000),
- Forest-connected and Forest-adjacent Pasture Rehabilitation Project (Gen. Dir. of Forestry) (Cost: TRY 2.000.000),
- Pasture/Highland Rehabilitation and Management (General Directorate of Agricultural Reform) (Cost: TRY 52.552.500),
- Kabataş-Aybastı Road Rehabilitation (8 km.) (General Directorate of Highways) (Cost: TRY 21.300.000),
- Aybastı-Gölköy Road Rehabilitation (37 km.) (General Directorate of Highways) (Cost: TRY 81.500.000),

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 Bolaman 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 Bolaman River 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 with the programme priorities:** The project's association with with the Eleventh Development Plan (2019-2023), Mid-Term Programme (2020-2022), Regional Plans, EBDP Strategic Plan and Sectoral Strategy Documents (Eastern Black Sea Regional Plan (2014-2023), Strategic Plan of the Regional Development Administration of Eastern Black Sea Project (2019-2023), Climate Change Strategy of Turkey (2010-2023), 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) and Institutional Strategic Plans was reviewed and deemed to be favorable.
- **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

Bolaman River Basin Rehabilitation Project is an integrated basin rehabilitation project composed of 151 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. SITE SELECTION AND LAND COST

2.1. Physical and Geographical Characteristics

2.1.1. Geographical Location

Covering a land of nearly 158.886 hectares, Bolaman Basin is located in the Eastern Black Sea Basin (nearly 2.28 million hectares in size). The basin is almost 73 kilometers away from the province of Samsun, 55 km. from Ordu and 102 km. from Reşadiye.

Bolaman Basin covers the districts of Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Kumru, Mesudiye, Perşembe and Ulubey within the confines of Ordu, and the districts of Başçiftlik, Niksar and Reşadiye in the province of Tokat. Figure 5 shows the location and borders of Bolaman Basin.

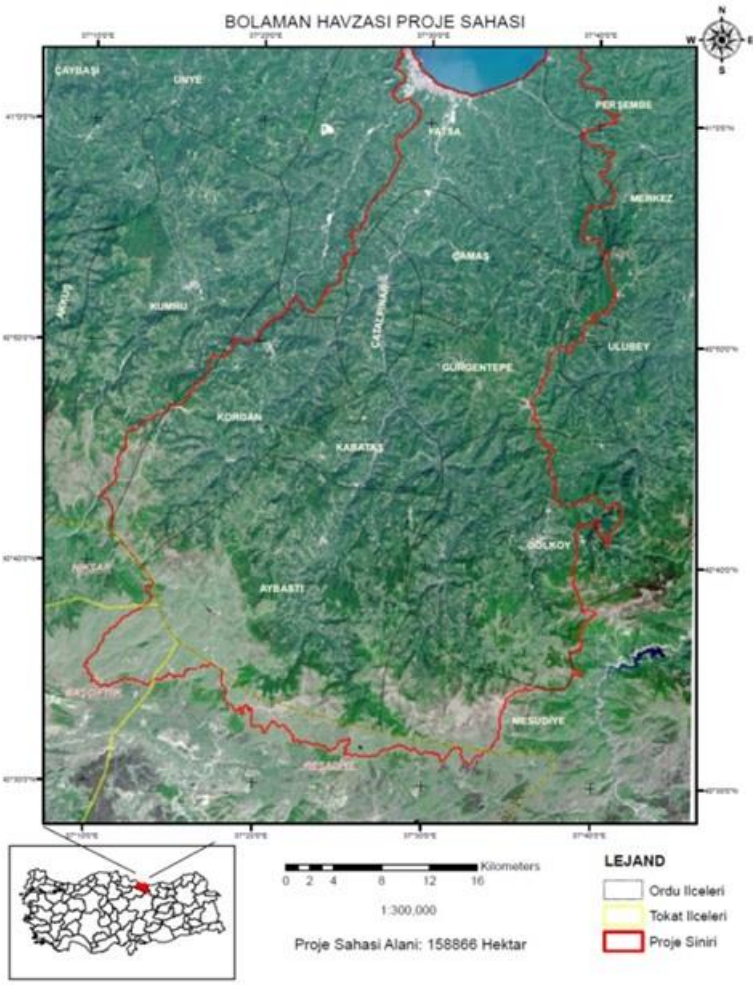


Figure 5 Location and Borders of Bolaman Basin (Ministry of Agriculture and Forestry, 2020)

2.1.2. Climate

Bolaman Basin has a maritime climate. The basin is characterized by the Black Sea Precipitation Regime, which is dominant in every season peaking in the fall. In addition, the basin is divided into two sections: The coastal area with slopes of high mountains overlooking the sea and the area behind the mountains. The climate of the coastal area slightly varies due to the effects of the rough terrain. It usually has a wet climate. The internal territories are rather arid. Being under the influence of the Black Sea, the coastal area is mild and rainy in wintertime and temperate and rainy in summer. However, summertime in internal territories is arid and warm while wintertime is rainy and cold (TUBITAK, 2013)

The current basin-specific meteorological surveys suggest that the precipitation follows a course from the east to the west. This is largely caused by a wide range of rough terrains. While the precipitation is evenly distributed among the seasons in the coastal area, summertime is arid in the internal territories. The precipitation intensity is of importance for the basin. The daily maximum rainfall is noteworthy in the basin (TUBITAK, 2013)

The annual average temperature 14.4 ^{o}C according to the Perennial Parameter Bulletin for Ordu released by the General Directorate of Meteorology of the Ministry of Agriculture and Forestry. August is the hottest month while January and February are the coldest. The highest temperature ever recorded in the town was 37.3 ^{o}C in June 1994 while the coldest one was -7.2 ^{o}C in January 1964. The monthly average relative humidity is 72.7%. It is cloudless (clear sky) for 64 days, cloudy for 248 days and overcast for 70 days a year on average. An average of 153 days a year is rainy. Snowfall is a rare case in the basin. It is never more than 6 days a year on average. The maximum snow depth was 62 cm., which was recorded in February 1967. The monthly average wind speed is 1.8 m/sec. The maximum monthly wind speed was recorded in 1968, amounting to 38 m./sec. in the western direction. The number of days with high wind and heavy storm is 46.

2.1.3. Soil and Land Structure

2.1.3.1. Soil Characteristics

Climatic, topographic and bedrock variations in the Bolaman Basin have led to the formation of various types of soil. The majority of the types of soil in the basin is zonal soil. The common ones are gray-brown podzolic soil, yellow-red podzolic soil, non-calcareous and brown forest soil, brown forest soil and alluvial soil (Dölek, 2008).

Alluvial lands are common in a valley bottom near the entrance of Bolaman River valley. The alluvial soil in the valley bottom can be as thick as 40 to 50 meters. This increases the permeability. This type of soil is common where the slope is rare. That is why it poses a low risk for erosion and a high risk for flood. Colluvial soil is common in narrow sites of the valley

where Keş and Eceli rivers stream through. It is in various sizes around Eceli valley, the northeastern and southwestern parts of Korgan, the coastal areas and the town of Dipköy. Red-yellow podzolic soil is rather common in the southeastern part of Dipköy, the northwestern part of Çamaş, and the site between Bahtiyarlar and Gölköy. Gray-brown podzolic soil is the most common type of soil available in the basin. It can be found anywhere except for coastal areas. Brown forest soil is common across a narrow site between the northern part of Çamaş and Ilıca, and around the coastal areas of Fatsa. The environs of Büyük Akçakese Quarter, the southern part of Aybastı, and the site between Hanutlar and Conkarar Quarters boast brown forest soil. Non-calcareous forest soil is rather common at high altitudes of the basin namely the southeastern and southwestern parts of Cimili highland.

The soil map of the project site is shown in Figure 6.

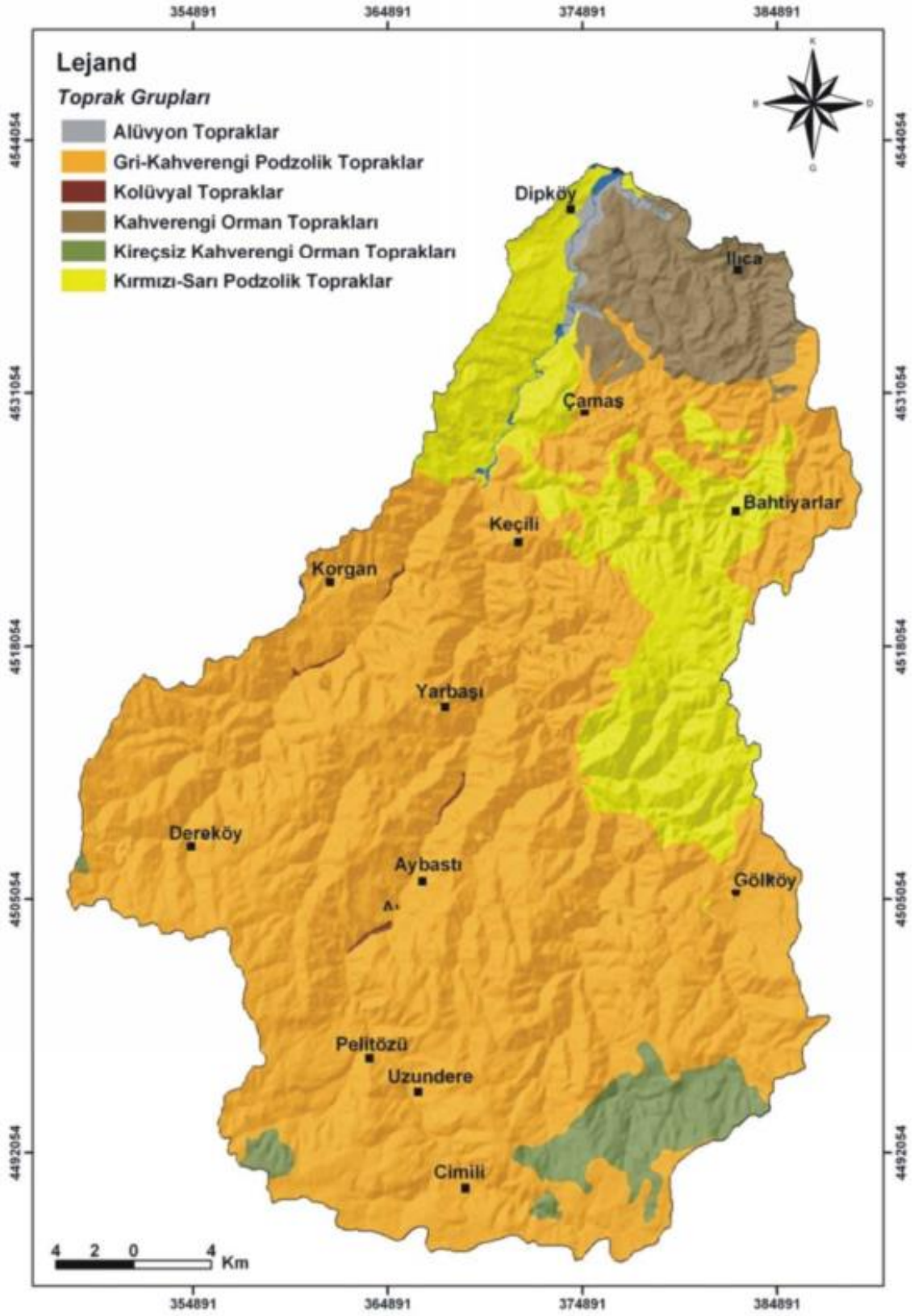


Figure 6 Bolaman Basin Soil Map (Ministry of Agriculture and Forestry, 2020)

2.1.3.2. Geological Structure

The oldest types of rock in Bolaman Basin are cretaceous rocks. They are limestone, sandstone - mudstone - limestone, dacite, pyroclastic rocks, trachyandesite, pyroclastic rocks - andesite - basalt - trachyandesite - andesite, trachyandesite and tuff rocks (Terlemez & Yılmaz, 1980).

Limestone is the oldest type of rock in the basin. It crops out in the environs of Evliya Tepe and Korgan. The thickness of the limestone can range from 250 to 300 meters. While there are some sites with stratified clastic limestone, there is no significant facies change. The limestone, which is deposited in shallow marine environment, is Middle-Upper Jurassic - Early Cretaceous (Terlemez & Yılmaz, 1980).

Sandstone – Mudstone - Limestone formation crops out in coastal sites between Dipköy, Çamaş and Ilıca, and the eastern and western parts of Gölkoy, which is the southeastern part of the basin. Sandstone is situated at the bottom of this formation. The sandstones are slightly calcareous, sporadically green and gray interfingered, they contain plenty of lamellibranch. Limestone, Sandstone – Mudstone – Limestone formation is the most common one. It is also red, regular and thin-medium layer, sporadically sandy, brittle, clastic and sporadically inclusive of marl. Sandstone – Mudstone - Limestone formation can be as thick as 100 to 300 meters. The thickness of sandstone can range from 40 to 60 meters. This formation is deposited where pelagic and submarine volcanism are active (Terlemez & Yılmaz, 1980).

Dacite crops out in Yarbaşı, the northern part of Korgan and the southeastern part of Çamaş. It is also common around Kabataş. The formation is light pink and light gray with a lot of weathering. The post-weathering formation is tattletale gray. In addition, it is breccia in structure and sporadically cut by andesite dikes. Dacites are pre-Maastrichtian and potentially campanian. The basin boasts groups of rock such as Rhyolite, Agglomerate, Basalt - Andesite - Agglomerate, Andesite - Basalt - Proclastic Rock, Basalt, Andesite, Tuff - Agglomerate, Trachybasalt, Trachyte, Granite, Granodiorite, Syenite, Monzonite, Sandstone - Shale - Limestone (Terlemez & Yılmaz, 1980).

Syenite crops out around Çavuşçayır Quarter and the northwestern part of Gölköy. It is usually pink and beeswax in color, with its modified versions of off-yellow and brown. White and pink feldspar, quartz, biolite and albitized amphiboles are common, too. They are usually coarse grained while there are some fine-grained versions, too. They contain clay mineral and sericite as a result of weathering (Terlemez & Yılmaz, 1980).

Limestone is the most common unit of the**Sandstone-Shale-Limestone** formation. The upper layers of limestone, which is available en route from Gölköy to Aybastı, have a growing amount of sand and tuff. This formation creates steep cliffs along the road. This formation is gray and off-yellow in color and of a medium-thick layer. The thickness of the cliffs can range from 30 to 40 meters. They have been formed in a shallow marine environment (Terlemez & Yılmaz, 1980).

Basalt has a sporadic cover within the basin. It crops out the site between the village of Çavuşçayır and Gölköy, and in the southern part of Gölköy. It is usually black and coatless. It is sporadically thick in layers, almost horizontal in layer dips, and of fractures vertical to stratification. However, the weathered parts are red in color. The formation can be as thick as 50 to 100 meters (Terlemez & Yılmaz, 1980).

Tuff–Agglomerate covers the western and southwestern parts of Gölköy. The tuff that constitutes the formation is gray and light yellow. It is of a thin layer in most cases and usually weathered. It contains little clay and sand. It contains a large quantity of decomposed, small-grained volcanic glass and sericite microlites meshed with that glass, and a small quantity of andesine and augite in large crystal forms, and a smaller quantity of biotite and opaque minerals. The agglomerate, which makes up the formation, comprises layers that are as thick as 0.5 meters. In addition, it is coatless, with andesite pebbles angled in various sizes, with little contact with one another, with no gradation, and inside friable tuff and cement (Terlemez & Yılmaz, 1980).

Agglomerate often crops out in the northeastern and southwestern parts of Cimili line and in Pelitözü and Uzundere. Its cement is usually gray, black-like and purple, coatless, and sporadically thick-layered, cropping out in the southern part of Yarbaşı. The granules are in various sizes. It is of andesite, sporadically basalt and tuff, and of no gradation, and angled and with little contact with one another. Its cement is tight and usually of tuff, and sporadically andesite. The thickness increases to the south. Within the basin, the Neogene is characterized by basalt-tuff and basalt-tuff-andesites (Terlemez & Yılmaz, 1980).

Basalt–tuff formation abundantly crops out in the southern part of Dereköy, and the southeastern and southwestern parts of Cimili. It is usually black. It is coatless, sporadically thick-layered and with little layer dips. The thickness of the formation can range from 0 to 500 meters. It dates back to the Pliocene or potentially the Miocene (Terlemez & Yılmaz, 1980).

Basalt-tuff-andesite formed after basalt-tuff formations. It covers the southwestern part of Gölköy. The lavas that constitute the formation are usually gray, dark gray and black. They are coatless, with plenty of pores around and sporadically rope-like and slagged. However, andesites are whitish gray and pink while feldspar, hornblende prisms and biolithite flakes are visible. The basin is characterized by quaternary, travertine, slope wash and alluvial deposits (Terlemez & Yılmaz, 1980).

Alluvions usually cover valley bottoms in the basin. Alluvial deposits tend to increase with the declining slope in the lower parts of the Bolaman river. Alluvions can be as thick as 40 to 45 meters (Terlemez & Yılmaz, 1980).

The most common groups of rock within the basin are pyroclastic rock (30.08%), andesite and basalt.The agglomerate makes up 13.90% of it while the groups of rock comprising sandstone, mudstone and limestone make up 13.39% of it.

Landslides are more common on Cretaceous and Eocene situated on slopes with heavy rainfall (Terlemez & Yılmaz, 1980).

The geological map of the project site is shown in Figure 7.

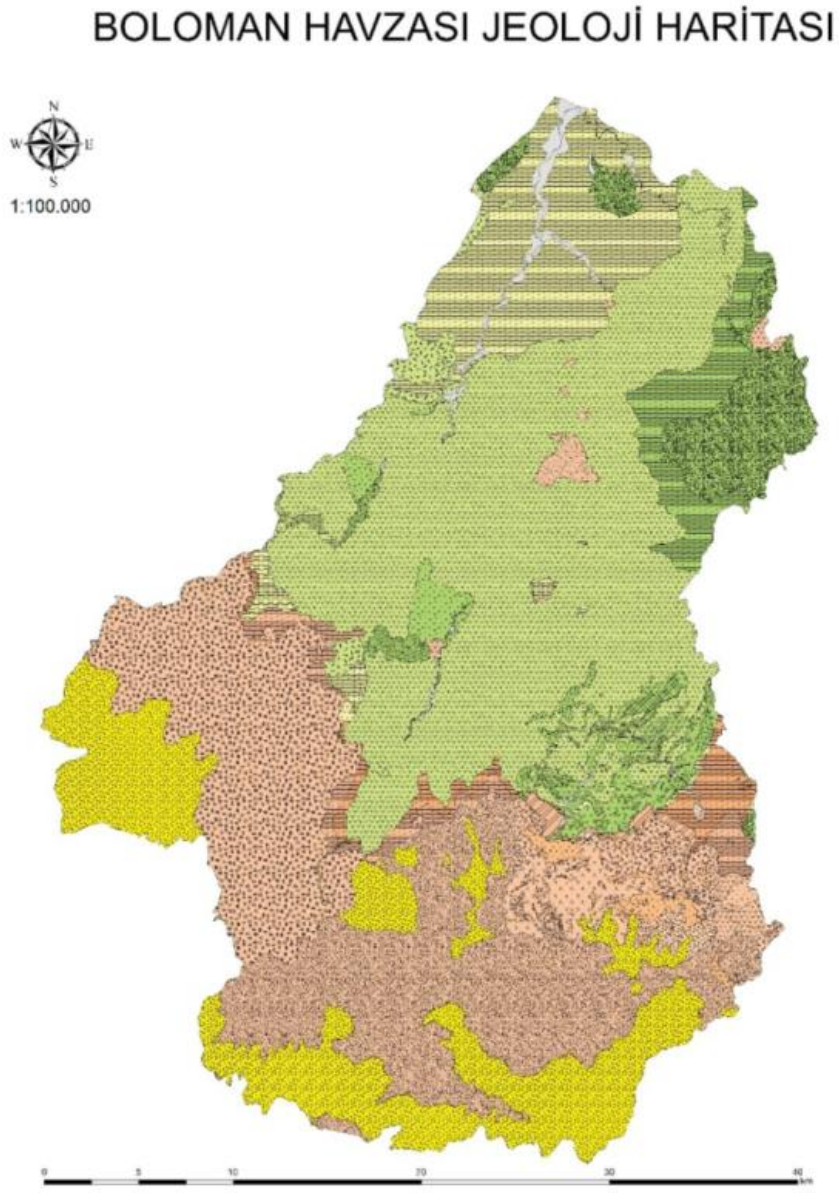


Figure 7 Bolaman Basin Geological Map (Ministry of Agriculture and Forestry, 2020)

2.1.3.3. Earthquakes

The project site is home to faults with a variety of characteristics. However, they do not pose a risk for any major earthquakes and there is no geological data about their Quaternary activity. They are old paleotectonic faults. While there is no active fault with potential to cause a surface tear and lead to an earthquake in the basin, the North Anatolian Fault, which is one of the major earthquake zones in Turkey, is situated to the south of the basin. Ministry of Agriculture and Forestry, 2020) The Disaster and Emergency Management Presidency reports that the latest earthquake recorded in Ordu was on April 10, 2020, with a magnitude of 4.1.

2.1.3.4. Loss of Soil Caused by Erosion, Floods and Landslides

Erosion

A total of 457.411,4 tons of erosion take place in the basin, which is as large as 158.886 hectares. The causes of erosion can be divided into two groups: Natural and man-made. Slope, exposure, rivers and climatic conditions are natural causes of erosion. In addition, improper land use is one of the man-made causes. Large and small weathering products follow a sloping course through a canal over slopes where the physical disintegration is dominant and the slope is high. This is usually caused by volumetric expansion as a result of heating and cooling or as an effect of water. Unless the sites of erosion are taken under control, which requires proper planning, major problems such as loss of top soil, loss of agricultural soil and damage to settlements tend to arise (Ministry of Agriculture and Forestry, 2020)

Flood

While floods and torrents are forces of nature, man-made activities such as improper site selections and land use exacerbate their effects or make it easier for new ones to arise. In addition, geomorphological, climatic and geological characteristics of a basin trigger floods and torrents. Floods and torrents followed by heavy rainfalls and the peak of rainfalls in June, July and August make the summertime a critical period of time for such disasters. Improper land use and unchecked removal of material from river beds are other factors that cause floods and torrents (Ministry of Agriculture and Forestry, 2020)

Landslide

Geological and morphological characteristics and water are the causes of landslides. Man-made problems that landslides pose such as population growth and unplanned urbanization only make them grow. While landslides are natural processes, site selections made with no consideration of such natural processes bring about major problems. Landslides can cause damage to homes and roads and take lives (Ministry of Agriculture and Forestry, 2020)

2.1.4. Vegetation Cover

The coastal area is home to moist, mild and broadleaf forestlands 1000 meters into the territory. The upper territories are home to moist, cold and coniferous forests. Seasons are usually rainy and cool. Locations dominated by oceanic climate are home to deciduous and broadleaf trees with a moderate need for water. In general, the moist forests dominate the basin. The coastal mountain ranges of the Black Sea Region boast beech tree forests at an altitude of up to 1000 meters starting from the sea level all the way through the northern slopes. The higher it is, the more common shrubs and pastures are as the humidity decreases. They are cornelian cherry, erica, heather, common hazel and yellow azalea. In addition, some types of pine are common, too (Atalay, Ecological Zones of Turkey, 2002).

The vegetative cover varies by land forms and soil across the basin. The characteristics of the vegetation cover have been largely transformed by various activities (land clearing, construction of settlements and grazing) The natural forest cover has been substantially and, in some locations, entirely degraded as a result of settlements on the slopes of the mountains between Fatsa and Akkuş in the northern direction (Atalay, Ecological Zones of Turkey, 2002).

2.1.5. Water Resources

2.1.5.1. Surface Water

Rivers

Ordu is home to a myriad of streams and rivers in various sizes. Among the main ones are Turnasuyu River, Melet Brook, Bolaman River, Ceviz Brook, Elekçi River, Cura Brook, Kes Stream, Direkli Stream, Eceli Stream, Ilıca Stream, Medrese Stream and Sahsene Stream. These rivers create deep valleys within the provincial territories and stream into the Black Sea (Ministry of Environment and Urbanization, 2019)

Lakes

Natural Lakes

The basin has lots of natural lakes. Some of the lakes have steady water throughout the year while small-sized lakes formed by karstic pits do not always contain water. Many of the lakes in the basin are landslide lakes. Such lakes are fed by water seeping through landslides.

Lake Gaga

Lake Gaga is 7 km. away from Fatsa-Aybastı road and it is a landslide lake. The lake is situated nearly 70 meters above the sea level. The widest spot is 325 meters while the narrowest one is 265 meters. The size of the lake varies by season. The water is fresh even though the lake has no outlet. Any leakage caused by landslides feeds the lake. This explains why the lake has fresh water (Akkan & Gürgen, 1993).

Lake Gök

Lake Gök is a landslide lake located in the southwestern part of the basin. It is situated 840 meters above the sea level and 95 x 42 meters in size. It has fresh water as it is formed by water leaking through landslides. It is known that the ground water is close to the surface (Turoğlu, 2008).

Lake Sülük

Lake Sülük is a landslide lake located in Korgan. It is situated 840 meters above the sea level. It is fed by water leaking through landslides. It has no outlet on the surface. Water streams outside the lake by leakage off the bed. That is why it has fresh water. The size of the lake increases in rainy seasons. In some seasons, it becomes as large as 200 meters in diameter (Turoğlu, 2008).

Artificial Lakes

In 2019, the State Hydraulic Works reported that the basin is home to the following irrigation reservoirs: Aybastı-Perşembe Highland Reservoir, Kabadüz-Çambaşı Reservoir, Korgan-Absut Highland Reservoir and Ordu University Reservoir (Ministry of Environment and Urbanization, 2019)

Seas

The Ministry of Culture and Tourism reports that Ordu has a 100-kilometer-long coastline. 60 kilometers of the coastline consist of beaches. Of the districts included in the project, only Fatsa and Perşembe have a Black Sea coast. The coastline included in the project is 17.2 kilometers long.

2.1.5.2. Groundwater

Located around the province of Ordu and created by the rivers such as Melet, Civil, Akçaova, Turnasuyu, Bolaman and Elekçi, alluvial deposits are the important underground basins of the province (Ministry of Environment and Urbanization, 2019)

Ground Water Levels

There is no precise data about the changes in levels of ground water aquifers. However, it is safe to argue that there is not much change in ground water level depending on the season (Ministry of Environment and Urbanization, 2019)

2.1.6. Degradation of natural resources

The forest cover of the basin has been degraded by overgrazing, illegal logging and loss of nutrients in soil over the past 20 years. However, the size of hazelnut lands and meadows/pastures has increased (Ministry of Environment and Urbanization, 2019)

2.2. Economic and Physical Infrastructure

2.2.1. Underground Resources and Energy

Ordu is home 40% of the active mine sites in the Eastern Black Sea Region, and 13 different mines are extracted from 55 active mine sites. It has diverse mineral deposits in terms of metallic mineralization and industrial raw material thanks to its position. The surveys performed across the basin uncovered 13 industrial raw material deposits and 40 metallic mines. Manganese (Mn), zinc (Zn), gold (Au), lead (Pb), silver (Ag) and copper (Cu) deposits are common where volcanic rocks are situated. Ordu has reserves in the districts of Fatsa and Kumru. The reserve in Fatsa has a temperature of 48 °C with a flow rate of 1.2 lt/sec. while the one in Kumru has a temperature of 27 °C with a flow rate of 0.04 lt/sec. It has hot springs thanks to the the resources it boasts (EBDA, 2015).

Ordu boasts a more advantageous position than other towns in T90 region in terms of wind power. The total potential energy of the region is 2275 MW, and most of it stems from Aybastı-Mesudiye corridor. A 10 MW-wind power investment is in progress in the district of Akkuş, Ordu (EBDA, 2015).

In addition, Sarmaşık of Fatsa and Yalnızdam of Kumru have geothermal resources. The reserve in Sarmaşık has a temperature of 48 °C with a flow rate of 1.2 lt/sec. while the one in Yalnızdam has a temperature of 27 °C with a flow rate of 0.04 lt/sec. (General Directorate of Mineral Research and Exploration, 2005).

The surveys of MTA in the province of Tokat and its environs revealed major metallic mines and industrial raw material deposits. Among the major metallic mines found in Tokat are antimony, copper, chrome, iron and manganese. Tokat also has a major potential in terms of industrial raw materials. The province is home to high-quality Na-bentonite deposits formed by upper-cretaceous volcanic rocks. Reşadiye is known to be the oldest bentonite production site in Turkey thanks to drilling fluid material, casting industry and pellet cohesiveness, and the districts meets the domestic need for Na-bentonite to a large extent. In addition, the district of Niksar boasts a large bentonite potential suited to use as a foundry bentonite and bleaching earth. High-quality limestone, which is suited to be a raw material for cement with a major potential, was discovered in Niksar. The metallic mines and industrial deposits of raw material discovered in the district are elaborated below (General Directorate of Mineral Research and Exploration, 2010).

In addition, Niksar has geothermal resources in Ayvazılıcası and Korulu. The reserve in Ayvazılıcası has a temperature of 27°C with a flow rate of 1.5 lt/sec. while the one in Korulu has a temperature of 26°C with a flow rate of 0.25 lt/sec. (General Directorate of Mineral Research and Exploration, 2005).

2.2.2. Agriculture and Animal Breeding

Ordu has the largest population of farmers in Turkey, being home to over 120.000 farmers. According to the land use figures of the basin, 56.51% is covered by agricultural lands, with 10.18% by pastures and meadows, and 21.83% by forests. While agricultural products rely on feed production animal breeding in the countryside of the basin, the coastal areas live on potato, corn, hazelnut and kiwi. Ordu provides 30 to 35% of the total hazelnut production in Turkey and ranks the first in honey production, meeting 15% of the need. In addition, fishing is one of the industries essential to the local economy of Ordu. The town provides 7% of the total seafood production in Turkey, offering 25.000 to 30.000 tons of fish a year. It is also home to 30 businesses focused on fish farming. Equipped with capacity to offer 3250 tons a year, 7 businesses farm seabass and trout. In addition, the town has cattle, buffalo, sheep and goat breeding activities (Ministry of Agriculture and Forestry, 2020)

Located within the project site and administratively affiliated to the province of Tokat, the district of Başçiftlik has a total of 228.636 decares of agricultural land including 226.055 decares of dry lands and 2581 hectares of wet lands. The district of Reşadiye has a total of 1.158,715 decares of agricultural land including 1.156,755 decares of dry lands and 1960 hectares of wet lands. Among the agricultural products that the aforementioned districts offer are barley, wheat, common vetch, sainfoin, potato as well as fruits such as pearl, apple, berry, sour cherry, mulberry, walnut and hazelnut, and vegetables such as beans, cabbage, onion, tomato, carrot, cucumber, spinach etc. (Ministry of Agriculture and Forestry, 2019)

2.2.3. Foreign Trade

The majority of exports from Ordu relies on hazelnut kernels and processed hazelnut products. According to the report of the Turkish Statistical Institute (TurkStat) in 2019, Ordu generated revenue in exports worth USD 246 million. Most of the exports consist of hazelnut and hazelnut products. Therefore, it is September, October and November when the export figures peak. In addition, forestry products, food machines and bentonite are exported. TurkStat reported that Ordu imported goods worth USD 25.5 million in 2019, and the main imported goods were hard coal, petroleum products, paper, pulp for paper, nuts, processed fruits and cereals.

2.2.4. Logistics

Ordu offers major opportunities for the logistic development of the region thanks to close proximity to the Middle East and Caucasian markets. The Black Sea Coastal Road and the Ordu ring road the first stage of which has been completed eliminated the transportation infrastructure shortcomings. Additionally, Ordu is expected to have a substantial logistic advantage thanks to Ordu-Giresun Airport launched in 2015, the Black Sea-Mediterranean Road to be completed soon, and the Container Port of Ünye-Port built in the district of Ünye.

2.2.5. Investment

The Presidency of Strategy and Budget reported that Ordu attracted TRY 365 million in public investments in 2017 and the majority of them (TRY 107 million) was made in education. Among other main areas of investment are transportation and communications (TRY 79 million), healthcare (TRY 61 million) and agricultural lands (TRY 21 million).

Based on the number of Investment Incentive Certificates issued, the private investments were made from 2012 when the Investment Incentive System was amended to late 2018 in Textile and Clothing (39 certificates), Tourism (18 certificates), Food and Alcohol (15 certificates), Forestry Products (13 certificates) and Mines and Mine Processing (11 certificates).

2.2.6. Tourism

Ordu has the potential to offer inputs for the growth of tourism thanks to its natural assets, geographical location, seaside, highlands, vast forest lands, indigenous lifestyle and historical fabric. As of March 2020, Ordu has 69 tourism businesses with a total of 4619 beds in capacity (Ministry of Culture and Tourism, 2020). The Governor's Office of Ordu reports that Ordu was visited by 967.741 domestic and international tourists in 2019. Compared to the figures of the year 2018, the number of visitors increased by 14%. The number of domestic tourists increased by 15%, rising from 737.694 to 849.695 while the number of international tourists increased by 7%, rising from 110.692 to 118.046. The scheduled flights kicked off in 2016 from the Gulf countries to Ordu-Giresun Airport and the Green Road Project are intended to raise the number of tourists visiting Ordu to 1 million

2.2.7. Industry

According to a report of Ordu Chamber of Commerce in March 2019, the industrial sector has a smaller share than the agricultural sector as the local economy of Ordu largely depends on agriculture. Industrial investments are largely concentrated on forestry products and furniture, food production, ready-made clothing, cement and ready-mixed concrete, mining and soil-based production. As the agricultural industry heavily relies on hazelnut production, most of the food industry investments are made in hazelnut processing operations and hazelnut products. The town is home to a total of 4 OIZs including 2 active ones (Ordu Organized Industrial Zone and Fatsa Organized Industrial Zone) and 2 under construction (Ordu 2nd Organized Industrial Zone and Ünye Organized Industrial Zone). TRY 5 million in expropriation fund has been provided for Ünye Organized Industrial Zone (OIZ). Ordu Organized Industrial Zone is home to 63 plants that employ 4004 people. Fatsa OIZ is home to 44 companies that employ nearly 4270 people. It aims at employing 10.000 in total in the near future. Expropriation efforts are in progress for Fatsa OIZ to expand.

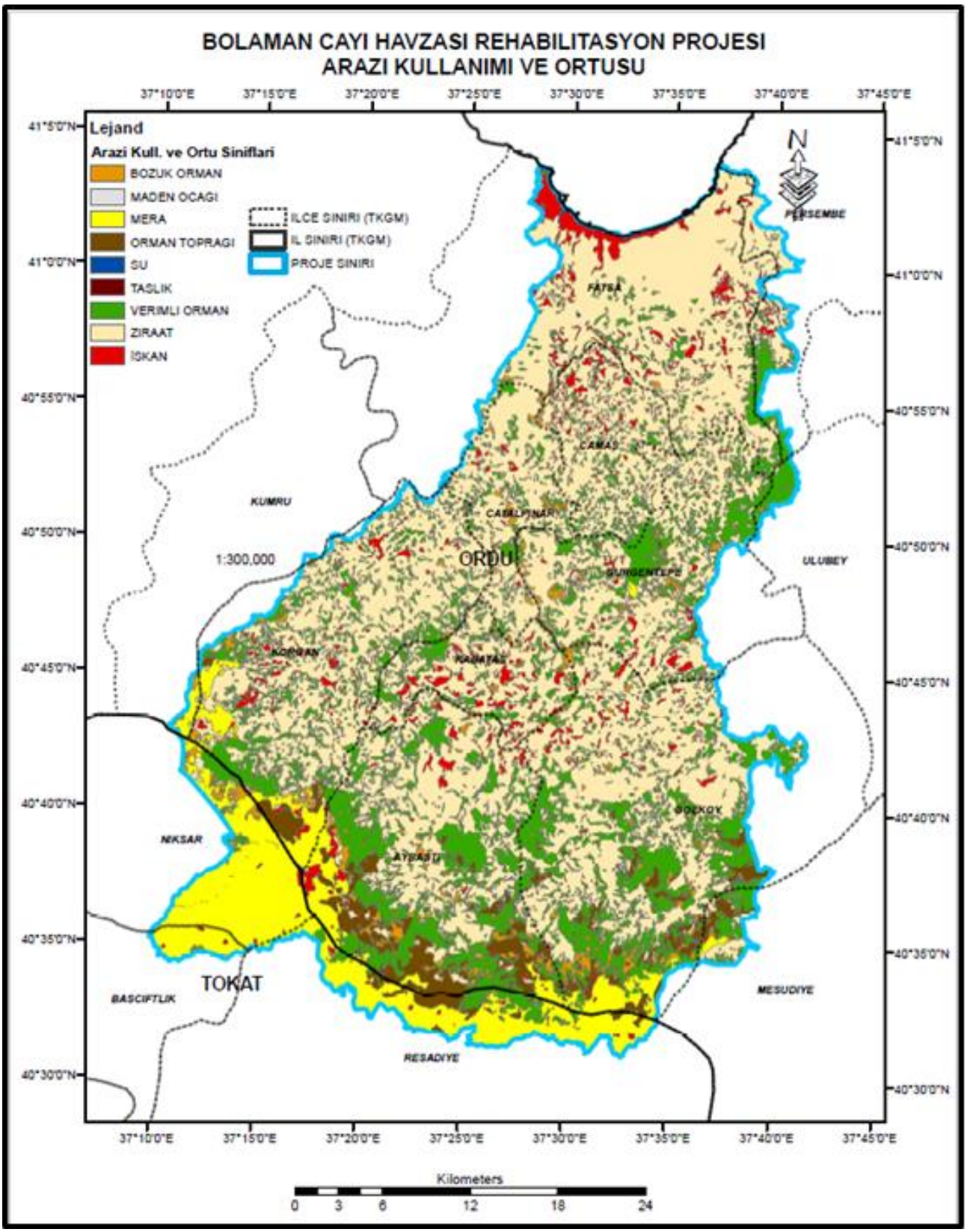
2.2.8. Land Use

The fact that the mountains rise in a number of lines off the coast jams the population in Ordu into the coastline and reduces the size of agricultural lands. As the economy heavily relies on

agriculture, agricultural lands are even more valuable. Forests, meadows and other lands are utilized for hazelnut cultivation as hazelnut has a high economic value.

Among some of the factors that play a role in land use across the basin are changing temperatures and precipitation regimes, difference of altitude in short distances, and fragmented agricultural lands. 56.51% of the basin consists of agricultural lands, with 10.18% of pastures and meadows, 21.83% of forests, 0.02% of mine sites, 4.05% of residential sites and the rest of non-revenue lands. As flat lands are largely situated in valley bottoms along the coast and in locations with slight slopes, they are suitable for irrigated farming. Over 90% of the basin consists of steep or almost-steep lands. Despite this disadvantage, the wide range of agricultural lands points to the use of forests for hazelnut cultivation, too. The villages stretching between Fatsa and Çamaç to Çatalpınar along the Bolaman River live solely on hazelnut cultivation. Cereal and vegetable cultivation is focused rather on a highly-limited size of lands (Ministry of Agriculture and Forestry, 2020)

In Tokat, which is located within the project site, 36.9% of the lands are used for agriculture, with 12.22% for pastures and meadows, 44.2% for forest lands and 7% for others. The total size of the agricultural lands in the district of Niksar, Tokat is 900.202 decares. Of the total land size, 765.181 decares are dry lands while 135.021 decares are wet lands (Ministry of Agriculture and Forestry, 2019) The land use within the project site is shown in Figure 8.


BOLAMAN CAYI HAVZASI REHABILITASYON PROJESI
ARAZI KULLANIMI VE ORTUSU
Lejand
Arazi Kull. ve Ortu Siniflari
BOZUK ORMAN
MADEN OCAGI
MERA
ORMAN TOPRAGI
SU
TASLIK
VERIMLI ORMAN
ZIRAAT
ISKAN
ILCE SINIRI (TKGM)
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PERSEMBE
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CAMLIYAYLA
GUNGOREN
GUNGENTEPE
ULUBEY
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37°45'0"E
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41°0'0"N
40°55'0"N
40°50'0"N
40°45'0"N
40°40'0"N
40°35'0"N
40°30'0"N
Kilometers
0 3 6 12 18 24

Figure 8 Land Use and Cover for Bolaman River Basin Project (Ministry of Agriculture and Forestry, 2020)

2.2.9. Transport and Communication Systems

According to the Ministry of Transport and Communication's 2013-2019 report, the total road network in Ordu as of 2019 amounts to 995 kilometers (283 km of state roads and 713 km of provincial roads).385 km of this network are bituminous hot treated roads, 540 km are surface treated roads and 69 km are other types of roads. The total length of divided roads is 137 km. Connections to neighboring provinces are enabled by divided roads. Traffic and travel comfort have been improved thanks to the improvement of accident blackspots and road superstructure and the use of advanced technologies in traffic signs and signalization systems. In addition, Ordu is located on the Black Sea coastal road that stretches from Samsun to the border with Georgia. Also, Ordu city center is 25 km from Ordu-Giresun Airport, the construction of which was completed in 2015. Ordu port, Fatsa pier, Fatsa port and Ünye port allow sea trade. There are 11 fishing ports in Ordu.

According to a report on Ordu, the total length of fiber cables has been increased to 3,020 km, the number of broadband subscribers to 598,381 and the number of automated PTT offices to 66, leading to the enhancement of Ordu's communication systems. In addition, there are projects underway to be built GSM infrastructure in settlements that are yet to have one. These projects are expected to be finalized in 2020. The goal of these projects is to improve Ordu's communications network.

2.2.10. Water, Electric and Natural Gas Networks

Water

Raw water drawn from resources are treated, rendered consumable and offered for the use of the population. There are 23 drinking water treatment plants in Ordu, of which 7 are package, 11 are rapid sand filter and 5 are slow sand filter plants. There are efforts underway to convert slow sand filter treatment plants into rapid sand filter ones by 2023. Along with surface waters, 21,128,213 m^3 of water is treated annually in Ordu. Urban drinking and utility water need is met by 27,128,213 m^3 of water drawn from bore holes and caisson wells annually. There are 554 chlorination points in the region (General Directorate of Water and Sewerage Administration of Ordu Metropolitan Municipality, 2020).

Electricity

According to data on Ordu provided by the 2019 Energy Market Development Report of the Energy Market Regulatory Board, a total of 1,350,859.52 MWh of electricity was generated in the province, which constitutes 0.46% of the total electricity generated in the country. The licensed installed capacity is 488,90 MW and the unlicensed installed capacity is 2,10 MWe. As of 2019, the amount of surplus energy fed into the system is 4,846.23 MWh. According to billed consumer data, 75,165.25 MWh of electricity was billed for lighting, 477,554.14 MWh for residential use, 314,335.08 MWh for industrial use, 498.37 MWh for agricultural irrigation, and 363,835.30 MWh for businesses, which amounts to 1,231,388.13 MWh in total. This

constitutes 0.54% of the total billed electricity in Turkey.

Natural Gas

According to the data on Ordu provided in the 2019 Natural Gas Sectoral Report by the Energy Market Regulatory Board, in 2019, 118,740.13 Sm^3 of natural gas was sold to the energy sector, 39.005,57 Sm^3 to the transportation sector, 26,693,477.33 Sm^3 to the industry sector, 16,059,330.33 Sm^3 to the service sector, 72,189,378.46 Sm^3 for residential use, and 36,676.46 Sm^3 to other sectors. A total of 115,136,608.29 Sm^3 of natural gas was sold. Furthermore, as of the end of 2019, the number of subscribers has reached 90,356.

2.3. Social Infrastructure and Social Impacts

This section offers information about the population, income distribution and employment, and variables of social infrastructure such as social services provided and cultural structure in the region or area to be invested in. This section also summarizes the social impact of the said investment on the region.

2.3.1. Population structure

2.3.1.1. Population statistics by settlements

With its own unique geographical borders and hydrological structure, Bolaman Basin is located in Ordu and covers an area of 158,886 hectares. More than half of its residents reside in rural areas, which are forest villages. According to 2020 TurkStat estimates, Ordu's population is 756,712. The province covers an area of 5,952 $km^{2.}$ Its population density is 127/km^2. Its population density is quite high compared to four neighboring provinces in the region, except Samsun (135/km^2) (Sivas 21/km^2; Tokat 60/km^2; and Giresun 63/km^2). The population density of Ordu is also higher than the Turkish average (108/km^2). That being said, as shown in Table 4, the province has had a negative population growth in most years since 2008. Only in 2012, there was a slight population growth (3.74%). This is due to the province's net migration gain of 21,645 people that year and possibly Syrian migrants arriving in the province. Except for 2012, Ordu has been sending migrants since 2008.

Table 4 Population and Population Growth in Ordu (2008-2019) (TurkStat, 2019)

Years	Total Population	Population growth rate
2008	719.278	% 0.54
2009	723.507	% 0.59
2010	719.183	% -0.60
2011	714.390	% -0.67

Years	Total Population	Population growth rate
2012	741.371	% 3.78
2013	731.452	% -1.34
2014	724.268	% -0.98
2015	728.949	% 0.65
2016	750.588	% 2.97
2017	742.341	% -1.10
2018	771.932	% 3.99
2019	754.198	% -2.30

The law no. 6360 changed the status of municipalities with a population over 750,000 to metropolitan municipalities. With the same law, village municipalities and village legal entities in provinces with the same population size were abolished, these areas became quarters and the borders of metropolitan municipalities were overlapped with the borders of provinces. Based on the above-mentioned law, the Turkish Statistical Institute (TurkStat) considers a population within the borders of a metropolitan municipality as "urban population." As a result, the quality and quantity of "rural" population are reflected to the public in a way that it does not comply with geographical and sociological terminology. Ordu became a metropolitan municipality in 2013 and although it is not legally considered a village, it is one of the most rural provinces in Turkey.

In Ordu, Bolaman Basin covers villages from the districts of Aybastı, Çamaş, Fatsa, Gölköy, Gürgentepe, Korgan, Kabataş and Çatalpınar. The Table 5 shows that according to 2019 data, the total population of these districts corresponded to 32.72% of Ordu's total population. In other words, the population of Bolaman Basin is about one-third of the population of Ordu (234,643 out of 754,198). However, it must be noted that not all villages in the above-mentioned districts are in Bolaman Basin. According to Özdemir (2006: 166), the rate of rural population growth in Bolaman has increased over the years, although it is below the national average. The rural population in the Basin is concentrated in the northern parts and along Bolaman River, while the urban population is concentrated in Fatsa.

Table 5 Population of Ordu by District (2019) (TurkStat, 2019)

District	Population	Men	Women	Proportion in population (%)
Altınordu	**217.640**	106.296	111.344	% 28,86

District	Population	Men	Women	Proportion in population (%)
Ünye	**128.101**	63.734	64.367	% 16,99
Fatsa	**119.094**	59.186	59.908	% 15,79
Perşembe	**31.542**	16.380	15.162	% 4,18
Kumru	**29.945**	15.053	14.892	% 3,97
Korgan	**28.609**	14.570	14.039	% 3,79
Gölköy	**28.332**	14.363	13.969	% 3,76
Akkuş	**22.192**	11.564	10.628	% 2,94
Aybastı	**22.027**	11.003	11.024	% 2,92
Ulubey	**19.450**	9.997	9.453	% 2,58
Mesudiye	**16.809**	8.735	8.074	% 2,23
İkizce	**14.570**	7.524	7.046	% 1,93
Gürgentepe	**14.100**	7.184	6.916	% 1,87
Çatalpınar	**13.809**	6.930	6.879	% 1,83
Çaybaşı	**12.687**	6.451	6.236	% 1,68
Kabataş	**10.617**	5.313	5.304	% 1,41
Çamaş	**9.058**	4.623	4.435	% 1,20
Gülyalı	**8.269**	4.135	4.134	% 1,10
Kabadüz	**7.347**	3.892	3.455	% 0,97

93% of the population of Ordu was born in Ordu. 4% of the population are from three provinces in the region, namely Giresun, Samsun and Trabzon. The remaining 3% was born in other provinces in the region and across Turkey. According to Ozdemir (2006:197), almost 40% of people who left the province between 1970 and 1999 immigrated to Istanbul. Other popular destinations for migrants are Samsun and Ankara.

Fast is the conduit of settlements of Bolaman Basin to the outside world. Due to increasing agricultural production, new agricultural areas of business, and the revival of industry and trade, Fatsa grew horizontally and vertically,increasing the need for new settlements. This led the population of Fatsa to grow considerably. Its population grew from 39,467 in 1990 to 63,721 in 2000. This corresponds to a 61% increase. Without a doubt, such a high population growth is caused by immigration to Fatsa (Dölek, 2008). Settlements outside the coastal cities and towns are dispersed due to rugged terrain and fragmented farmlands. Apart from Fatsa, in Bolaman, Çamaş and Çatalpınar, houses are located far away from each other and on slopes. In

light of all this information, it is safe to say that migration from rural to urban areas is quite common in Ordu, which will reduce agricultural output.

The population is dense in the survey site from the shore to up to 500 meters. Due to the limiting effect of climate conditions on agricultural activities, there are no permanent settlements above 1200-1300 meters. Due to the altitude, the population also thins out. The areas higher than 1200-1300 meters are called the highland belt, where the population increases during summer months. In other words, the geographical features of the region have an impact on its socio-economic and demographic characteristics.

Apart from the migration inside region, there is also intense migration from rural areas to outside the region. The main reason for this is economic. In the region, where livelihoods are already scarce, fragmented and limited number of hazelnut fields are not enough to feed the growing population. During the year, Bolaman Basin experiences vertical population movement. Starting from the south of Kabataş, Aybastı and Gölköy, the locals engage in animal breeding and agricultural activities up in the highlands from mid-May to the end of September (Dölek, 2008). People also migrate outside the province seasonally for beekeeping.

2.3.1.2. Migration statistics

Table 6 shows the historical background of rural and urban population in Ordu after 1927. In Ordu, the urban population constantly grows and it is safe to say that this growth is the result of births, migration to district centers, increase in the number of district centers, and the expansion of district centers as they absorb neighboring rural settlements. While this was the case in the province, the rural population kept on increasing until 1985. However, starting from 1985, rural areas started to lose population significantly (details provided in Table 6). Ordu lost about one third of its rural population between 1990 and 2007. In the same time period, the annual rural population growth was -4.25.

Table 6 Historical Background of Rural and Urban Population in Ordu (1927-2017) (TurkStat, 2017) (State Statistical Institute, 2000)

Year	Urban	Rural	Total
1927	16,823	207,408	224,231
1935	20,342	262,712	283,054
1940	24,334	280,683	305,017
1945	27,056	305,952	333,008
1950	32,922	340,106	373,028
1955	39,655	368,032	407,687
1960	58,134	411,245	469,379
1965	83,585	460,278	543,863

Year	Urban	Rural	Total
1970	118,041	490,680	608,721
1975	134,970	515,553	650,523
1980	169,820	543,715	713,535
1985	220,067	543,790	763,857
1990	348,028	478,858	826,886
1997	368,063	446,095	832,158
2000	416,631	471,134	887,765
2007	395,283	320,126	715,409
2012	423,295	318,076	741,371
2017	468,757	273,584	742,341

The majority of the population migrating from rural areas is young people. An indicator of the decrease in this young rural population is the increase in the proportion of the elderly population. In rural Ordu, the child population is 14.9%. This figure is well behind the national and provincial average, which are 23.6% and 19.5%, respectively. This shows that the child population in rural areas is smaller than other age groups (see Table 7 for details).

Table 7 Youth, Adult and Elderly Population in Ordu (2017)

Population	Province		Rural areas	
	Population	%	Population	%
Children	144,752	19.50	40,812	14.92
Adult	498,371	67.14	174,476	64.10
Elderly	99,218	13.37	58,296	21.31
Total	742,341	100	273,584	100

In addition, the elderly population in the districts in Bolaman Basin is much higher than the average in Ordu. For example, the rate of population of 65 years and older is 29% in Mesudiye, 25% in Ulubey, and 19% in Çamaş and Gürgentepe (City Population, 2020).

2.3.2. Economic Structure

2.3.2.1. Economic activities

According to the 2015 report of DOKAP, Ordu's economy is largely based on agriculture and 80% of the active population is employed in agriculture. In Ordu, arable land is limited, however hazelnut is cultivated on non-arable slopes. The first thing that comes to mind when one says agriculture in Ordu is hazelnut. In Ordu, there are about 1 million hazelnut trees

yielding about 80,000 tons of produce per year.

In the survey site, where forest lands were destroyed and turned into hazelnut fields, hazelnut is grown on 98% of the cultivated area. Forests were converted into hazelnut fields at an increasing pace between 1975 and 1995 (Özdemir, 2006). Although the yield and quality decrease at altitudes above 500 meters, hazelnut is still cultivated. Hazelnut is planted as monoculture up to 600 to 700 meters from the coast. Hazelnut is the single livelihood of every village in the site starting from Fatsa to Çatalpınar along Bolaman Stream. In coastal areas, grains and vegetable are farmed in very small sections of the land. However, grain and vegetable farming are of little commercial value. In coastal areas, the majority of the forests have been transformed into hazelnut fields.

Agricultural products that are cultivated other than hazelnut are corn, potato, beans, soy, wheat, barley, citrus fruits, tea, cabbage and shell beans. Highlands in Ordu are suitable for animal breeding. It is quite developed in Aybastı, Gölköy, Mesudiye and Korgan. Sheep and cattle are the animals bred the most. Beekeeping is also developed. Fishing is quite advanced.

In Ordu, the industry started to pick up after 1970. There are over 120 industrial businesses with 10 or more employees. 35 of these are factories where hazelnut kernels are separated from their shells. The most modern plant processing and releasing hazelnut to domestic and foreign markets is Sagra. Other industrial businesses are rubber and shoe, feed, flour, fish oil, soybean oil, cement, brick, timber and wire nail factories and shipyards.

2.3.2.2. Industry, trade, agriculture, tourism sectors

In Bolaman Basin during the republican period, field agriculture and animal breeding were the most common sustainable economic activities. However, as agricultural fields were turned into hazelnut fields and other sectors started to develop (transport, trade, industry, forestry, etc.), economic activities in the region started to diversify. Yet, the agricultural sector, and especially hazelnut production, is still the main driver of economy in Ordu and the Basin.

According to the Agricultural Master Plan, even though Ordu is home to only 1.2% of Turkey's agricultural land, it ranks first with regard to highest number of registered farmers. As shown in Table 8 below, 74% of businesses registered to the Farmer Registry System (FRS) have a size of 0.1 to 20 decares. This is a clear indication that agricultural land in Ordu is fragmented and small in size.

Table 8 Size of Agricultural Lands in Ordu Based on FRS Records (Ministry of Agriculture & Forestry, 2014)

	<5 decares	<5-10 decares	10-20 decares	20-50 decares	50-100 decares	100-200 decares	200-500 decares	Total

Number of agribusinesses	16,702	30,288	36,036	25,404	3,063	302	17	111,812

Animal breeding is an important activity for settlements in the inner parts of the Basin. As hazelnut production ceases to be of economic importance in areas with an altitude above 1000 meters, animal breeding becomes a major potential due to important plateaus. In rural areas, beekeeping is the second-most income-generating activity after hazelnut production. After Muğla, the Basin has the most hives in Turkey (Özdemir, 2006). A considerable part of the locals engages in mobile beekeeping. Also, Ordu produces the highest volume of honey in mobile beekeeping. The forests in Bolaman Basin are not fully made use of economically.

According to 2017 data, 21.1% of industrial businesses in Ordu are micro-sized, 61.3% are small-sized, 14.3% are medium-sized and 3.2% are large-scale. In Ordu, there are 279 industrial businesses with active capacity reports. Being home to 0.4% of all industrial businesses in Turkey, Ordu has a developing industry. According to active capacity reports in the TOBB industry database, the total number of personnel employed in industrial businesses in Ordu is 11,738. Only 6.8% of all industrial businesses in the Black Sea region are located in Ordu. In terms of area of activity, 15.4% of industrial businesses in Ordu engage in food manufacturing and 13% in hazelnut and hazelnut by-product manufacturing (Ordu Chamber of Commerce and Industry, 2017).

60-70% of the exports in the province are of hazelnut and hazelnut-based products. Hazelnut machines, bentonite, ceramic products, MDF, laminate flooring, cement, various mineral ores, crude oil and refined oil products are also exported. The products imported to most are coal used in houses and workplaces, sawlog, wood used in MDF and laminated flooring production, decorative paper, various spraying machines for hazelnut cultivation, and manual tools.

An important issue to point out is that the majority of the workers in hazelnut processing industry are employed on a seasonal basis, which limits the industry's employment opportunity and contribution to the economy.

A total of 13,236 companies operate in Ordu, 10,744 of which are micro businesses, 2,463 are medium-sized businesses and 29 are large-scale companies. Of these 13,236 businesses, 12,755 are in private sector and 1,772 of these businesses operate in the manufacturing sector. 11,484 businesses operate in the trade sector and sub-sectors supporting the trade sector. In Ordu, there are 4,802 companies operating with a single employee. Nearly all of these companies are real person businesses. There is only 1 company in Ordu that employs more than 1000 people.

According to these data, one issue to emphasize is workplace inflation, which is experienced in provinces such as Ordu that adopts a closed economy model where goods and services are

manufactured for their respective market. In provinces where not much income is generated from the outside, every new business means one more party to grab a share from a flat market; these businesses are destined to shut down in a flat or declining market.

2.3.2.3. Socio-Economic Status (SES)

The socio-economic index divides the population into groups based on various variables such as income, leisure time activities, and ownership of various goods. These groups are ranked from A+, which is the highest, to D, which is the lowest status. Table 9 shows the SES of districts in Bolaman Basin. According to the table, the percentage of people in the highest SES groups of A + and A is very low in all districts in the basin. Another striking feature is that in all districts except Fatsa (43.74%), more than half of the population is in Group D, which is the lowest group. In the region, the population in higher SES groups (A+ and A) (5.54%) is well below the country average (16.31%). Again, the population in Group D, which is the lowest SES, is much higher than the country average. To summarize, the majority of the population in the basin has the lowest SES.

Table 9 SES Groups by Districts in Bolaman Basin (%) (Comparison to the rest of Turkey) (Endeksa, 2020)

Region	A+	A	B	C	D
Fatsa	Fatsa	0.91	4.77	14.74	36.02
Gölköy	Gölköy	0	2.76	14.11	29.08
Aybastı	Aybastı	0	3.10	13.91	30.24
Korgan	Korgan	0	2.79	13.97	28.90
Kabataş	Kabataş	0	2.76	13.94	28.51
Çatalpınar	Çatalpınar	0	2.61	13.91	27.92
Gürgentepe	Gürgentepe	0	2.47	13.89	27.79
Çamaş	Çamaş	0	2.52	14.00	26.84
Turkey	Turkey	4.63	11.68	23.23	27.26

Since more than half of the settlements in Bolaman Basin are forest villages, it is worth adding

a few more words about poverty and forest villages. Findings of the survey on forest village households conducted as a part of a 2017 World Bank report on "Poverty, Forest Dependence and Migration in the Forest Communities of Turkey" strongly support the connection among poverty, forest dependence, frailty of income and migration. The study's findings suggest that the poor are more dependent on the forest due to lack of alternative income options, low levels of productive assets, social capital and high vulnerability. As a result, their capacity to diversify their sources of income and to move to higher-yielding economic activities such as agriculture and animal breeding is limited. To some extent, forest dependence is a poverty trap - because income opportunities it provides in the value chain are low. Today, forest-dependent villagers occupy the bottom 20% of the income structure (World Bank, 2017).

2.3.2.4. Employment

According to 2018 data of the Turkish Employment Agency (İSKUR), there are 32,593 people registered in ISKUR in Ordu between the ages of 15 and 35 looking for jobs. Of these, 17,640 are women and 15,953 are men. Since this data only consists of applications lodged in ISKUR, it is quite limited and most importantly, it does not cover the agricultural sector. In addition, 55% of women in employment work in part-time jobs (ISKUR, 2019).

Another striking aspect of ISKUR data is that unemployment rate among university students is 14.2% in Turkey while it is 25% in Ordu. This can explain why there is a lot of migration from Ordu. Ordu's inward-looking commercial and industrial structure and its low-yield agriculture are two other reasons behind this migration.

Turkey has some of the lowest female labor force participation rates among countries with similar income levels (World Bank, CPF Turkey). Women's participation in labor force varies by region. The rate of men and women employed in Ordu is as follows.

As clearly seen in Table 10, formal male employment is Ordu is very low, but this rate is much lower for women.

Table 10 Gender-Based Formal Employment Rates in Ordu (2018) (TEPAV, 2018)

	Rate (%)
Formal female employment	12,89
Formal male employment	30,45

2.3.3. Social and Cultural Characteristics

2.3.3.1. Quality of life

In Ordu, urbanization as we know it, was kicked off in the 19th century. Starting as a small

rural settlement, it turned into a small coastal village, then into a pier town, and then into a city. Therefore, Ordu's urbanization experience is quite new. According to Yüksel and Yeşil (2017:682), it is difficult to say that the city has become a center of attraction due to a number of chronic problems. Becoming a province in 1921 and acquiring the metropolitan municipality status in 2013, Ordu is physically expanding, but this is not the case socially and economically. Even though Ordu seems like a modern city at first glance, it has economic problems as the industry is not developed enough and it has important shortcomings in transport and infrastructure. Although it is a socially diverse province, people constantly migrate from Ordu. The lack of public land, the high price tag of private land and unsolved transport and infrastructure problems show that not enough attention is given. There are major problems in transport, infrastructure and recreational areas, which directly affect urban life.

According to a field study conducted by Yüksel and Yeşil in 2017 in the city center with wide participation, healthcare scored 12 out of 100, being the subject participants were least satisfied with. As shown below, healthcare indicators such as the number of beds and number of ambulances are close to country average, however the lack of satisfaction of people with this topic could be about access to these services and service quality. Considering the situation in the city center, it is safe to say that the satisfaction is probably not much different in isolated rural areas in Bolaman Basin. Satisfaction with the environment scored 21 out 100, while safety scored 24. These items are followed by infrastructure with 27 points and transport and recreation with 45 points. Another issue to underline here is that the satisfaction of the urban population in all areas mentioned above is below 50%.

In the same study, participants were asked about the top 3 problems in Ordu. We can see that infrastructure occupies an important space among these problems (please see Table 11 for the answers).

Table 11 Top 3 Problems in Ordu (2017) (Yüksel & Yeşil, 2017)

Problem	**N**	**%**
Traffic	201	50
Infrastructure	173	43
Transportation	97	24
Unplanned urbanization	82	21
Unemployment	75	19
Lack of recreational areas	55	14
Environmental pollution	50	13

Problem	N	%
Parking space	49	12
Shopping malls	39	10
Lack of social and cultural activity	35	9
Collection of trash	31	8
Cost of living	27	7
Drinking water	27	7
Landscaping	26	7
Insufficient industry	23	6
Low level of education	14	3
Job opportunities	13	3

According to 2015 TurkStat data on Urban Life Index in Turkey, the proportion of those satisfied with urban social life in Ordu was 45%. With regard to this, Ordu ranked 69 among 81 provinces in Turkey (TurkStat, 2015).

DOKAP's 2015 report notes that four drinking water plants were built in Ordu between 2003 and 2015 and that the province's water problem would be solved by 2040. However, the literature shows that drinking water problem is listed to be the main problem in all districts of the basin without exception.

2.3.3.2. Community health and safety

In Bolaman Basin, lower yield in crop and animal production, and natural disasters such as drought, flood and torrent are some of the push factors for migration.

Mountains rising starting from the coast cause the population to be concentrated in a narrow area. From the coast to inner parts, the population spreads over a wider area due to physical and economic conditions. Due to incorrect choices of settlement, natural events that occur in the normal course have started to be perceived as disasters (Dölek, 2008). According to Dölek, 33.17% of Bolaman Basin has a high or a very high risk of torrent. 17.08% of the area is also high risk or very high risk in terms of mass wasting. Again, 71.72% of the basin is high risk or very high risk in terms of erosion. 46.13% of the site is of high risk or very high risk of landslide. 0.71% of the site is of high or very high risk of flood. In the basin, there are 16,984 structures of high or very high risk. 15,824 of these structures are houses, 110 are schools and 50 are mosques (Dölek, 2008).

In order to better explain the risks mentioned above, it is necessary to emphasize that the changeable terrain in the basin coincides with the changeable risks of natural disasters. In Table 12, natural disasters are given a score between 1 and 5 based on their risk. The risk impacts are very low (1), low (2), medium (3), high (4) and very high (5). Based on these values, the risk of flood is high between 0 to 100 meters, while the risk of mass wasting is high between 100 to 450 meters. Natural disasters such as landslide and torrent are much more common between 450 and 700 meters. In other words, the whole basin is at risk of various natural disasters.

Table 12 Risk Impact Figures By Height and Disaster (Dölek, 2008)

Altitude	Landslide	Torrent	Flood	Mass wasting
0-50	1	1	5	2
50-100	1	1	5	5
100-150	2	1	3	5
150-200	2	2	3	5
200-450	3	3	2	4
450-700	5	4	2	3
700-950	5	4	1	3
950-1500	4	2	1	5
1500-1700	3	1	1	5
1700-	1	1	1	1

Erosion is not covered in this table as it is related to slope rather than altitude, but there is a risk of erosion for almost the entire basin, except for the coastline and highlands at very high altitudes. 92% of Bolaman Basin is sloped more than 5%. In that 5%, more than 40% of the land is sloped 20% and higher. In these areas, most of the rainwater falling to the surface starts flowing and leading to erosion where vegetation is thin or weak. For that, almost all areas used for agriculture are problematic.

2.3.3.3. Social Services

According to 2017 data, there are 328,086 people in Ordu who are illiterate, literate but does not have a degree and primary school graduates. Table 13 shows that people with little education mostly reside in rural areas and this population constitutes more than half of the rural

population. Based on this data, it is safe to say that people migrating from rural areas work in unqualified jobs in the labor market**.**

Table 13 Educational Background in Ordu by Various Settlements (2017) (TurkStat, 2017)

Education	**Total in province**	**Rural**	
		Figure	**%**
Illiterate	42,294	27,220	64.1
Literate but does not have a degree	84,718	39,450	46.6
Primary school graduate	200,874	91,892	45.7
Subtotal	328,086	158,562	48.3
Graduate of secondary school or an equivalent	151,540	54,753	36.1
Graduate of high school or an equivalent	12,326	30,132	24.4
Subtotal	274,806	84,885	30.9
Vocational school or faculty graduate	68,939	12,392	18.0
Post graduate	4,449	573	12.8
Doctoral graduate	1,000	144	14.4
Subtotal	74,433	13,109	17.6
Population 6 years and under	60,841	15,622	25.7
N/A	4,175	1,406	33.7
Total	742,341	273,584	36.9

There is a clear distinction between urban and rural areas in terms of level of education. The fact that people living in rural areas in Ordu and in Turkey in general have little education can make it difficult for rural incentives to achieve their goal.

In Ordu, there are 1,072 doctors, 248 dentists, 298 pharmacists, 1,804 nurses, 703 midwives and 1,803 other healthcare workers. The number of beds, family physicians, ambulances, doctor and dentists visits in Ordu are close to national averages (for detailed information, please see tables 14, 15 and 16).

Table 14 Some Healthcare Indicators (Comparison Between Ordu and Rest of Turkey) (2018) (General Directorate of Healthcare Services, 2018)

	Number of hospitals	Number of beds per 10,000 people	Rate of equipped beds (exc. intensive care)	Number of intensive care beds per 10,000 people
Ordu	17	27.8	67.2	3.8
Turkey	1534	28.3	71.9	4.6

Table 15 Some Healthcare Indicators (Comparison Between Ordu and Rest of Turkey) (2018) (General Directorate of Healthcare Services, 2018)

	Number of family physicians	Population per family physician	Number of 112 emergency call centers	Population per 112 emergency call center	Number of 112 emergency ambulances	Population per 112 emergency ambulance
Ordu	226	3416	41	18818	58	13309
Turkey	26252	3124	2735	29983	4910	16701

Table 16 Some Healthcare Indicators (Comparison Between Ordu and Rest of Turkey) (2018) (General Directorate of Healthcare Services, 2018)

	Doctor visits per capita	Dental visits per capita
Ordu	9.4	0.62
Turkey	9.5	0.65

However, there is no detailed information as to whether these statistics are different in urban areas than in rural areas and on the situation in Bolaman Basin, which is considered a rural area with scattered population.

2.3.3.4. Leisure time activities

The data provided here is collected by a survey of 400 participants performed in Ordu in 2015 on leisure time activities (Yüksel & Yeşil, 2017). As shown in Table 17, 41% of the respondents spend their leisure time shopping, 47% reading books or the newspaper, 55% listening to music and 67% surfing the Internet. Since the above-mentioned activities are usually performed indoors, it it safe to say that the province has limited opportunities outdoors and in terms of outdoor activities. On the other hand, the survey shows that 47% rarely went or never went to vacation, 57% to cafes, 62% to the movies, 67% to various courses, 72% to the theatre and 77% to concerts. Almost one third of the respondents do not participate in leisure time activities such as going to the movies, theatre and concert and attending courses, which can be due to the lack of opportunities offered in the province. This can also explain why only 24% of the respondents

engage in physical activity. When all activities are considered, it is evident that the province has considerable shortcomings in terms of social life.

Table 17 Leisure Time Activities in Ordu (2015) (Yüksel & Yeşil, 2017)

Activities	Always		Often		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%	N	%
Watching TV	29	7.3	81	20.2	206	51.5	76	19.0	8	2.0
Reading books and the newspaper	58	14.5	128	32.0	143	35.8	64	16.0	7	1.8
Going to the movies	4	1.0	19	4.8	130	32.5	196	49.0	51	12.8
Going to the theatre	6	1.5	14	3.5	82	20.5	190	47.5	108	27.0
Going to a concert	4	1.0	10	2.5	79	19.8	196	49.0	111	27.8
Going on a vacation	11	2.8	46	11.5	158	39.5	134	33.5	51	12.8
Listening to music	85	21.2	135	33.8	116	29.0	51	12.8	13	3.2
Exercising	26	6.5	69	17.2	165	41.2	104	26.0	36	9.0
Meeting with friends	40	10.0	112	28.0	168	42.0	71	17.8	9	2.2
Picnic with family members	18	4.5	69	17.2	191	47.8	105	26.2	17	4.2
Shopping	36	9.0	128	32.0	163	40.8	64	16.0	9	2.2
Visiting relatives	35	8.7	102	25.5	174	43.5	77	19.2	12	3.0
Attending courses	7	1.7	24	6.0	99	24.8	157	39.2	113	28.2
Going to the cafe	17	1.5	30	7.5	127	31.8	131	32.8	95	23.8
Using the Internet (news, information, social media, etc.)	117	29.3	152	38.0	67	16.8	32	8.0	32	8.0

In this context, the findings of the survey are in parallel with the results of the Life Index survey conducted by TurkStat in 2015. The fact that the number of movie and theatre goers is 29.8 (for every 100 people), the surface area of shopping mall per thousand people is 10.8 (square meters), the rate of those satisfied with social life is 45% and that Ordu ranks 69 in social life (TurkStat, 2015) clearly demonstrates the lack of recreational areas and activities in the province. The fact that 61% of the respondents do not use recreational areas regularly, 86% spend their leisure time at home, little time (16) spent in sports facilities and culture-art centers and problems about recreational areas and facilities rank third (32%) is in parallel with TurkStat (2015) results.

2.3.3.5. Opportunities for socialization

Due to the lack of road networks, access to services such as education and healthcare is another problem for some remote villages. Also, geographical conditions in the basin make any kind of access difficult. It is safe to say that locals of the basin are excluded socially, economically and culturally. Main social activities in the basin are going to the mosque, and traditional coffee houses and visiting neighbors to kill time and socialize. Climate conditions that affect agricultural activities are also expected to impact social life. According to the General Directorate of Meteorology data, there are 22.6 frost days in Fatsa, 117.6 in Korgan and 157.9 in Aybastı in average every year. In contrast, the number of frost days in the city center is less than 10.

2.3.3.6. Intercultural communication

Bolaman Basin is home to cultural wealth. As a result of the Russo-Turkish War of 1877–1878, Turkish and Muslim populations migrated to Ottoman Anatolia from the Balkans and Caucasus, which were lost to Russia. Same goes for the migration of Muslim Georgians from Batumi to Anatolia. The majority of the Georgian immigrants settled in the central Black Sea region between Ordu and Samsun. Migrants arrived at Anatolia every five years from land and sea. Initially, they were transferred to temporary locations, and over time, migrant villages started to form in rural areas. Third-generation Georgian immigrants say that their grandparents came to Fatsa and Unye in the years following the war in 1877 (Özel, 2010). Today, there are many Georgian villages and neighborhoods in Bolaman Basin. Gölköy, Cihadiye, Fatsa and Kabakdağ. Alacalar neighborhood in Aybastı and Alankent neighborhood in Kabataş are a few examples. According to locals, there are also 37 Alawite villages in Ordu, some of which are in the Basin and Işıktepe in Fatsa is one of them. It is also known that quite a small number of Armenian and Greek minorities live in some settlements in the Bolaman Basin, but there are no known conflicts among these cultural groups.

2.3.5. Vulnerable Groups

2.3.5.1. Seasonal agricultural workers:

Pikolo Association with Adil Emek Association conducted a study in 2018 in Düzce, Sakarya and Ordu titled "Study on the Profiles of Agricultural Middlemen." For the purpose of this document, we are only focusing on findings about Ordu. The study is about seasonal migrant workers in hazelnut production. The findings of the study are based on interviews held with 163 agriculture middlemen in Ordu (309 interviews in 3 provinces). These interviews focused on accommodation and working conditions of seasonal agricultural workers. In 2017, 12,741 workers were employed in Ordu. 56% of these workers were women and 44% were men. More than 75% of were between the ages of 16 and 30 and a little more than 12% were 15 and older.

Nearly all of these children worked in the harvest; 51% carried sacks, 21% collected sprouts and 7% engaged in other works. Data shows that there is no significant difference between adult and young workers in terms of what work they perform. It should also be noted that children and young people engaging in challenging work are much more likely to encounter health problems in the future, especially musculoskeletal disorders.

62% of the workers also harvest other products (tomato in Antalya, apple in Amasya and strawberry in Bursa, etc.). These workers came mainly from Diyarbakir, Mardin, Şanlıurfa, Şırnak and Batman. While almost half of the middlemen receive their wages from seasonal workers, almost all workers receive their wages directly from middlemen at the end of the harvest. 73% of workers cover their own travel costs. During harvest, they usually go to the fields via tractors. Workers' shelters provided by employers in Ordu have significant shortcomings and lack amenities and hygiene. In Ordu, more than 96% of seasonal agricultural workers work at least 9 hours a day while 36% work 12 hours.

2.3.5.2 . Child Labor in the Agricultural Sector

Child labor continues to be a problem in seasonal agricultural labor. During periods of intensive work, children cannot attend school regularly, fall behind in classes, and cannot make up for it when they return to school. Due to the nature of seasonal agricultural work, families are exposed to all kinds of risk where children are the most vulnerable. Due to economic and social reasons, children of adult seasonal workers usually accompany their parents as they travel from one place to another. As a result, together with their parents and other adults, children work in jobs unfitting their age to make money to support their families.

Child labor in the agricultural sector falls under two groups (Gülçubuk, 2012). The first group are children working in a family company or in another job paid or unpaid. If they find work, they work during the day and spend the evening at home. The working and housing conditions change constantly in line with where they accommodate. The second group are children going to another region to work seasonally for 3 to 7 months with their families and relatives. These children live and accommodate under unfavorable conditions without access to any services. As they do not have a profession or any skills, child labor in agriculture is one of the "Worst Forms of Child Labor."

In the last quarter of 2019 (October, November, December) TurkStat performed a research on child labor involving children age 5 to 17 years. According to research data, the number of children age 5 to 17 years engaged in an economic activity was 720,000.70.6%of these children were boys and 29.4% were girls. 34.3% were not attending school.

According to the research data, most children were working in service (45.5%) and agricultural (30.8%) sectors. By age, 64.1% of children age 5 to 14 years were working in the agricultural sector.

2.3.5.3. Asylum-Seekers

A study was conducted with an aim to provide information about the social profiles of asylum-seeking and refugee children in Altınordu, Ordu (Bulut, 2018). The study population and sample were made up of 58 children who were attending high school in Altınordu. 67% of the children in the study were girls, 33% were boys. The majority of them were 16 (37.9%) years old. 69% were living with their families (with parents and siblings). 26% of mothers and 38% of fathers had received graduate education. 81% of the children left their countries due to war and terrorism, 5% due to economic reasons, 2% due to oppression and 2% due to other reasons. 82.8% were from Iraq, 3.4% from Iran, 6.9% from Afghanistan, and 6.9% from other countries. The study revealed that 48.3% of the children had been living in Ordu for more than 3 years, 44.8% did not find themselves successful enough academically, and 34.5% had difficulty reading and writing.

The majority of refugees and refugee children in Ordu are from Iraq and left their country due to war and terrorism. Social profiles and socio-economic status of children attending school were similar. Aside from this similarity, language was shown to be the biggest problem. As emphasized above, the majority of the refugees are highly-skilled in terms of education and professional experience, however they do not have the opportunity to reach their full potential in Ordu.

According to 2018 data of Ordu Provincial Migration Authority, there are approximately 4,000 refugees living in Ordu. These refugees are from Iraq, Afghanistan, Iran and Syria (659 Syrian refugees).

2.3.6. Social impacts of investments on the region

Investments to be made under Bolaman Stream Basin Rehabilitation Project will mostly have positive impacts on the socio-economic vulnerabilities of the region. To summarize these impacts, soil quality and agricultural productivity will be positively impacted by erosion and sedimentation containment efforts. In turn, increased agricultural productivity will improve the socio-economic status of local communities.

Pasture rehabilitation and climate-responsive pasture projects can have positive impacts on animal breeding activities, however they also come with a risk of increasing settlement in highlands. This, in turn, can create a population pressure on pastures and highlands and negatively impact income-generating activities.

High-level water retention and storage works should be performed by eliminating possible risks on public health and safety. Such investments can enable the containment of natural disasters that make economic and social activities risky such as flood and torrents, which are quite common in the basin.

While projects on maintenance and sustainable management of secondary forests have impacts on the environment and forests, they do not have direct social impacts. On the other hand, activities on income-generation and livelihood diversification for forest communities such as

beekeeping, production of non-timber forest products, and eco-tourism have the potential of creating socio-economic impacts. As improvements in livelihoods will slow down migration and accelerate reverse migration in the long run, the positive impacts of some project components such as beekeeping, forest products and eco-tourism will become much more visible.

Forest preservation activities such as insulating houses and installing photovoltaic systems also have positive impacts on forests and on the wildlife. Socially, they will have an impact on the quality of life of local communities. The elimination of the population pressure on forests affects air and water, and indirectly affects human and animal health.

Sustainable and climate-smart agricultural production activities such as terracing hazelnut fields to preserve the topsoil, and diversification of agricultural production should be put into action carefully. Such projects, which can offer socio-economic advantages in the long run, can lead to disruption to agricultural (horticulture) activities in the short run.

Sustainable pasture management and rehabilitation projects have a positive impact on animal breeding. They can also diversify income-generating activities and reduce the risks arising from the monocultural structure of agriculture. Indirectly, pasture rehabilitation can increase settlements in the highlands. This, in turn, can create a population pressure on pastures and highlands and negatively impact income-generating activities. Projects on improving livestock productivity help to improve animal breeding activities.

Climate-resistant and energy-efficient agri-food value chain projects have the potential to create jobs as they also include the industry. Building flood control structures for rivers will contain river overflows, have positive impacts on the safety of life and property, and lower maintenance and repair costs by reducing infrastructure damage.

It is important to eliminate drinking water scarcity since drinking water reservoirs and water treatment plants are some of the most important problems in the region. That is why the project is expected to have positive impacts on public health.

There is a risk of preventing or altering the roads traditionally used by the local community while building climate-resistant rural roads. Safety for women, children and stray animals and accessibility for vulnerable groups are two things to take into consideration.

Improving roads by means of tunnels and access road projects will facilitate access to social services such as healthcare and education above all else. Ensuring traffic safety has a positive impact on public health and reduces the risk of accidents for seasonal workers coming to the area.

Preventing the local community from using access roads and not taking safety measures during construction works are expected to create human and animal health risks. Such risks should be minimized by taking public health and safety measures that also take into account vulnerable groups. The infrastructure and cultural heritage are also under risk during construction works.

During all construction works, it should be kept in mind that the area is very susceptible to torrents and landslides.

All projects are expected to reduce migration from the basin in the long run. Higher number of businesses can increase economic opportunities and formal female employment, improve women's skills and knowledge and enable women to make better use of forest resources. The projects are expected to have a positive impact on the quality of life of poor forest villagers, which are a priority disadvantaged group. Aside from these positive impacts, the projects are also expected to offer job potentials for seasonal agricultural workers.

Bolaman Basin Rehabilitation Project will directly and indirectly meet the social, economic and cultural needs of local communities especially due to the low socio-economic status of the Basin.

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. Waste Management

Solid waste in Ordu is managed in three categories, namely uncontrolled organic waste, refuse-derived fuel (RDF) raw materials and recyclable waste. While recyclable waste is recycled, RDF raw materials are used as alternative fuel at the cement factory in Unye. The majority of collected solid waste is organic waste (Turkish Ministry of Environment and Urbanization, 2019).

Field visits revealed that transfer centers were established in the province to facilitate the transfer of solid waste. Some of these transfer centers are in Fatsa, Mesudiye, Kabataş, Aybastı and Gölköy. Solid waste collected by district municipalities and dispatched to transfer centers is then forwarded to the solid waste disposal plant of the metropolitan municipality.

There is no waste collection center established by a municipality, institution or organization based on the Waste Collection Center Communique published on the Official Gazette no. 29222 on December 31, 2014 (Turkish Ministry of Environment and Urbanization, 2019).

During field visits, nitrate, nitrite and urea analyses performed on water in wells in areas where animal waste is used as manure did not reveal any problems. In addition, some of the wells in the region, where mineral deposits are located, were closed down due to arsenic contamination. It has been reported that animal waste from the slaughterhouse creates problems. In this regard, the Department of Environmental Protection and Control of the Metropolitan Municipality of Ordu has the power to conduct audits and impose penalties. The fact that animal waste is discharged into the stream Aybastı creates a major problem.

It was reported during interviews that there were no hazardous waste plants in the province. Hazardous industrial waste is collected by private licensed companies. There is also a medical waste plant in the region and the waste is transported to the medical waste sterilization plant in Unye by private licensed companies. This plant will be modernized to become zero-touch.

Tokat's Başçiftlik, Reşadiye and Niksar districts, which are covered by the project, do not have landfills. In Başçiftlik and Reşadiye, solid waste is collected by private licensed companies

authorized by municipalities and in Niksar, by Niksar municipality. The transfer station in Niksar is in project phase. There are no transfer stations in Başçiftlik and Reşadiye. Medical waste collected in these districts is transported to the medical waste sterilization plant in Tokat by private licensed companies (Turkish Ministry of Environment and Urbanization, 2019).

2.4.2. Wastewater Treatment

In Ordu, there are23 wastewater treatment plants, 13 being pre-manufactured package wastewater treatment plants, 1 advanced biological treatment plant and 2 physical treatment plants. In the survey site, there are only 2 physical treatment plants, where only preliminary treatment is performed, in eastern and western Fatsa. These plants, make use of a deep-sea discharge system, which discharges treated water 2 km into the open sea. There is also a biological treatment plant in Çatalpınar, and package wastewater treatment plants in Gölköy, Gürgentepe, Korgan and Mesudiye. Organized industrial zones in the region do not have wastewater treatment plants (Turkish Ministry of Environment and Urbanization, 2019).

Studies carried out by Kabataş district municipality revealed that sewer lines and wastewater treatment plants could not be built for highly-populated settlements located in the higher regions of the district due to sloped terrain. This leads to bad smell and problems with regard to wastewater.

In Başçiftlik, Tokat, which is a province covered by the project, wastewater is treated biologically. However, the system is not fully operational. There is a project in mind for the district of Reşadiye and the wastewater treatment plant (as secondary treatment) to be built in Niksar is in the bidding phase. In addition, the organized industrial zone in the district of Niksar does not have a wastewater treatment facility due to which wastewater is directly discharged into receiving water (Turkish Ministry of Environment and Urbanization, 2019).

2.4.3. Biodiversity

Flora

In general terms, northern part of Turkey as a whole is in the Euro-Siberian Flora Region. In the north, starting from the east of Ordu Province, Eastern Black Sea region is in Colshic, while the western parts are in Auxin sub-flora or sections in the same flora realm.

The aforementioned project is located in the Euro-Siberia phytogeographical region and this phytogeographical region contains areas in which the Black Sea climate is influential like the Black Sea region and Marmara region except for Gelibolu and Biga peninsulas. Generally, in the region, except for Ergene basin and depressions beyond the Black Sea, humid and very humid climate conditions prevail. A large part of the plants has hygrophyte (hygrophilous) and hydrophile (hydrophilic) properties. In the areas of up to 1000 meters in the region where the

average annual temperature is around 10-14 ˚C there are humid, temperate and deciduous forests (beech, chestnut, redwood, oak) along with cold, humid, coniferous forest belts (spruce, firs, scots pine) in the areas between 1000 meters to 2000 meters, where the annual temperature is around 6-10 ˚C.

A study was carried out in order to identify the flora in the project area and its immediate surroundings within the boundaries of the districts of Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Kumru, Mesudiye, Perşembe and Ulubey of Ordu province, and it was supported by a literature review. In the studies carried out, existing and possibly existing 31 plant species were identified in the region. No endemic species were identified amongst the species identified in the region as a result of the studies or assessments. (Akman, 1995) (Atalay, 1994) (Baytop, 1994) (Davis P. H., 1965-1985) (Davis P., 1988) (Ekim, Koyuncu, & Mecit, 2000) (Güner, et al. 2000) (TUBİVES, 2020)

Tokat province, on the other hand, is very rich in terms of flora and fauna with its forest lands, pastures, summer pastures and qishlaqs. In addition to many naturally growing forage crops, there are many plant species like rose hip, blackberry, wild pear, linden, cornelian cherry, hawthorn, terebinth, thyme, sahlep, Indian knotgrass, dead-nettles, wild mint, caper, mahaleb cherry.

A study was conducted in order to identify the flora in the project area and its immediate surroundings within the boundaries of the districts of Başçiftlik, Niksar and Reşadiye of Tokat province and it was supported by a literature review. Existing and possibly existing 51 species of plant were found as a result of all these studies. No endemic species were identified amongst the species identified in the region as a result of the studies and assessments (Akman, 1995) (Atalay, 1994) (Baytop, 1994) (Davis P. H., 1965-1985) (Davis P., 1988) (Ekim, Koyuncu, & Mecit, 2000) (Güner, et al. 2000) (TUBİVES, 2020)

Forests

When province-wide extension of the forests in Ordu province is considered, while no particular ecological changes are observed, some ecological changes that can be deemed as exemptions can occur. Besides, the forest ecology created by the mountainous and plateau areas in the vicinity of Tokat and Sivas provinces has different ecological structure than that of the shoreline. The majority of the forest areas situated in Ordu province and the whole of the forest areas in Tokat province is owned by the State and the personal ownership of forest areas in Ordu province is scarcely any. (Ministry of Environment and Urbanisation of the Republic of Turkey, 2019).

Fauna

The area of the aforementioned project and Ordu and Tokat provinces in its influence area are quite rich in terms of fauna. To identify protected/endemic species detected in the

aforementioned area and species that has the chance to exist in the area because of the habitat properties, Turkish Environment legislation, Berne Convention on the Conservation of European Wildlife and Natural Habitats and its annexes, 'Species List in Red Data' created by Kiziroğlu (2008), Demirsoy's 'General Zoogeography and Turkey's Zoogeography', A.Demirsoy's Turkey's vertebrate 'Mammalians', 'Reptiles' and 'Amphibians' and İbrahim Baran's 'Turkey's Amphibians and Reptiles' resources were examined. Threat levels and related conservation statuses were determined by the Annex Lists in the context of the Bern Convention (Annex II – Strictly protected fauna species, Annex III – Protected fauna species) and Red Data Book laid out by the IUCN (International Union for Conservation of Nature).

Information about the fauna elements that are possible to exist according to the general studies conducted on the project area and its immediate surroundings situated in the boundaries of Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Kumru, Mesudiye, Perşembe and Ulubey districts of Ordu Province is presented below.

- Amphibians: Amphibian species only live in freshwater and do not exist in sea water. 5 amphibian species were identified who exist in the project area and its influence area and who has the possibility to exist based on its habitat property within the scope of the general study carried out for this purpose. 3 of the identified species are included in the Annex II (Strictly protected fauna species), while 2 of them are included in the Annex III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. (Demirsoy, 2007) (Demirsoy, 2002) (Yiğit, et al. 2002) (Baran, 2005) (Amphibians, 2020) (AdaMerOs Herptil Türkiye, 2020)

- Reptiles (Reptilia): 6 reptilian species who exist or who has the possibility to exist based on habitat property were identified in the project area and its influence area in the overall study. 3 of the identified species are included in the Annex II (Strictly protected fauna species), while the other 3 of the species are included in Annex III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, the Testudograeca contained in the Annex II of the Berne Convention is also considered to be in the VU (vulnerable) category according to the IUCN (International Union for Conservation of Nature). (Demirsoy, 1996) (Demirsoy, 2002) (Yiğit, et al. 2002) (Baran, 2005) (AdaMerOs Herptil Türkiye, 2020)

- Birds (Aves): 18 species of birds who exist or who has the possibility to exist based on its habitat property were identified in the aforementioned project area and its influence area in the overall study. Amongst the identified species, 11 of them are included in the Annex-II (Strictly protected fauna species), and 7 of them are included in the Annex-III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, Common Wood Pigeon (Columbapalumbus) and Common Starling (Sturnusvulgaris) that are included in the Annex-III of the Bern Convention were determined, according to the 2019-2020 Central Hunting Commission resolutions (MAK), as prey animals

under the protection of the Central Hunting Commission amongst prey animals determined by the Ministry of Forestry and Water Affairs. (Demirsoy, 2003) (Demirsoy, 2007) (Demirsoy, 1996) (Demirsoy, 2002) (Boyla, 1995) (Kirizoğlu, 2008) (Trakus, 2020) (IUCN, 2020)

- Mammalians (Mammalia): 12 species of mammalians who exist or who has the possibility to exist based on its habitat property were identified in the aforementioned project area and its influence area in the overall study. Amongst the identified species, 1 of them is included in the Annex-II (Strictly protected fauna species), and 2 of them are included in the Annex-III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, Weasel (Mustelanivalis) that is contained in the Annex-III of the Bern Convention was determined, according to the 2019-2020 Central Hunting Commission Resolutions (MAK), as prey animals under the protection of the Central Hunting Commission amongst prey animals determined by the Ministry of Forestry and Water Affairs. (Demirsoy, 2003) (Demirsoy, 2002) (Yiğit, et al. 2002) (Tramem, 2020) (IUCN, 2020)

- Fish: The freshwater fish constitute the wetland fish population near the project area. 15 species of the fish who exist or who has the possibility to exist based on its habitat property were identified in the aforementioned project area and its influence area in the overall study. Amongst the identified species, 3 of the species are included in the Annex-III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, Barbustauricus is considered to be under VU (Vulnerable) category according to the IUCN (International Union for Conservation of Nature). (IUCN, 2020) (Demirsoy, 2001) (Geldiay & S., 1988)

Information about the fauna elements that are possible to exist according to the general studies conducted on the project area and its immediate surroundings situated in the boundaries of Başçiftlik, Niksar and Reşadiye districts of Tokat Province is presented below.

- Amphibians: Amphibian species only live in freshwater and do not exist in sea water. 5 amphibian species were identified who exist in the project area and its influence area and who has the possibility to exist based on its habitat property in the general study carried out for this purpose. 3 of the identified species are included in the Annex II (Strictly protected fauna species), while the 2 of them are included in the Annex III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. (Demirsoy, 2007) (Demirsoy, 2002) (Yiğit, et al. 2002) (Baran, 2005) (Amphibians, 2020) (AdaMerOs Herptil Türkiye, 2020)

- Reptiles (Reptilia): 8 reptilian species who exist or who has the possibility to exist based on habitat property were identified in the project area and its influence area in the overall study. 5 of the identified species are included in the Annex II (Strictly protected fauna species), while 2 of the species are included in Annex III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, the Testudograeca

contained in the Annex II of the Berne Convention is also considered to be in the VU (vulnerable) category according to the IUCN (International Union for Conservation of Nature). (Demirsoy, 1996) (Demirsoy, 2002) (Yiğit, et al., 2002) (Baran, 2005) (AdaMerOs Herptil Türkiye, 2020)

- Birds (Aves): 17 species of birds who exist or who has the possibility to exist based on its habitat property were identified in the aforementioned project area and its influence area in the overall study. Amongst the identified species, 4 of them are included in the Annex-II (Strictly protected fauna species), and 12 of them are included in the Annex-III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, Grey Heron (Ardea cinerea), Common Starling (Sturnusvulgaris), European Goldfinch (Carduelis Carduelis), Syrian Woodpecker (Dendrocopossyriacus), Eastern Olivaceous Warbler (Hippolaispallida) and Red-backed Shrike (Laniuscollurio) that are included in the Annex-III of the Bern Convention were determined, according to the 2019-2020 Central Hunting Commission Resolutions (MAK), as prey animals that are under the protection of the Central Hunting Commission amongst prey animals determined by the Ministry of Forestry and Water Affairs. (Demirsoy, 2003) (Demirsoy, 2007) (Demirsoy, 1996) (Demirsoy, 2002) (Boyla, 1995) (Kirizoğlu, 2008) (Trakus, 2020) (IUCN, 2020)

- Mammalians (Mammalia): 10 species of mammalians who exist or who has the possibility to exist based on its habitat property were identified in the aforementioned project area and its influence area in the overall study. Amongst the identified species, 1 of them is included in the Annex-II (Strictly protected fauna species), and 3 of them are included in the Annex-III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, Weasel (Mustelanivalis) that is contained in the Annex-III of the Bern Convention was determined, according to the 2019-2020 Central Hunting Commission Resolutions (MAK), as prey animals under the protection of the Central Hunting Commission amongst prey animals determined by the Ministry of Forestry and Water Affairs of Republic of Turkey. (Demirsoy, 2003) (Demirsoy, 2002) (Yiğit, et al. 2002) (Tramem, 2020) (IUCN, 2020)

- Fish: The freshwater fish constitute the wetland fish population near the project area. 9 species of fish who exist or who has the possibility to exist based on its habitat property were identified in the aforementioned project area and its influence area in the overall study. Amongst the identified species, 3 of the species are included in the Annex-III (Protected fauna species) of the Berne Convention on the Conservation of European Wildlife and Natural Habitats. Moreover, Barbustauricus and Common Carp (Cyprinuscarpio) are considered to be under VU (Vulnerable) category according to the IUCN (International Union for Conservation of Nature). (IUCN, 2020) (Demirsoy, 2001) (Geldiay & S., 1988)

Susceptible Areas

When the project area and its immediate surroundings are taken into consideration, there is not

any area that is determined and announced to be ‘Specially protected environment area’ by the Council of Ministers in accordance with the Article 9 of the Environment Law or taken under protection in accordance with the Bosphorus Law in the provincial boundaries of Ordu and Tokat. However, when areas described as 'Cultural Property', 'Natural Property', 'Archeological Site' and 'Protected Area' in accordance with the Article 3 of the Law on the Conservation of Cultural and Natural Property, and when areas that are identified and registered in accordance with the relevant articles of the same law dated 17/6/1987 and numbered 3386 are analysed, Gaga Lake and it surroundings that are located inside the borders of Sefaköy and Yassıtaş villages situated in Fatsa district of Ordu Province were found to be declared grade 1 and grade 3 natural site areas. (Ministry of Culture and Tourism of the Republic of Turkey, 2020). Furthermore, when 'National Parks', 'Natural Parks', 'Natural Monuments' and 'Natural Conservation Areas' identified by the second article of the Law on National Parks and determined by the third article of the same law are examined, the presence of 'Ulugöl Natural Park' in Gölköy district of Ordu Province is seen. Gaga Lake and Ulugöl Wetlands which are inside the borders of Ordu province are declared as wetlands and also Çiğ Lake Local Wetland, which is inside the borders of Ordu province, is within the scope of ‘Regulation on the Protection of Wetlands’ which was effectuated after having been published on the Official Gazette dated 17/05/2005 and numbered 25818. There are no Wildlife Protection Areas, Wildlife Improvement Areas and Wild Animal Placement Sites defined in accordance with the Hunting Law, in the project Area and its immediate surrounding that are situated inside the provincial boundaries of Ordu and Tokat provinces. In addition to this, there are no biogenetical reserve areas and biosphere reserve areas which are determined in order to protect endangered species or a species with a low genetic variability inside the provincial boundaries of Tokat and Ordu provinces. But, in accordance with the Berne Convention on the Conservation of European Wildlife and Natural Habitats, all of the members of the Amphibians and Reptiles in Turkey are under protection. Relevant articles of the Bern Convention will be implemented and all the necessary measures will be taken.

Furthermore, if any species that are put under protection in the project area or its surroundings are identified, necessary measures will be taken in accordance with national legislation and provisions of the international agreements that our country is a party to and the species in question will be protected. If any protected species are encountered in the project area and its surroundings, actions will be taken in accordance with the provisions of Article 6 and Article 7 of the Berne Convention and resolutions of the Central Hunting Commission.

2.4.4. 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).

According to the studies conducted in the Central Black Sea Region, it is observed that the temperatures of the shoreline provinces generally has an upward trend. When the global climate change is considered, the increase in temperatures is seen to affect the precipitations and thereby flows and evaporation. While the impact of the climate change in the agriculture field occurs as drought and has outcomes like decreasing yields because of insufficient irrigation as a result of low precipitation and decreasing crop varieties. This situation will cause the region's economy to be affected (Ülke & Özkoca, 2018). Furthermore, increasing temperatures can cause increases in extreme weather conditions like storms, hails and tornadoes. General Directorate of Water Management (SYGM) concluded in their assessment that increases in the probability of excessive precipitations and floods can be seen in the period of 2015-2100 in the Black Sea Region (Demircan, Türkoğlu, & Çiçek, 2017).

Climate Change Action Plan that is run in cooperation with Provincial Directorate of Environment and Urbanisation, Ordu Metropolitan Municipality, District Municipalities, Regional Directorate of Forestry and General Directorate of Highways is comprised of two chapters. These two chapters and their sub-chapters are as follows: 1. The Action Plan for the Control of Greenhouse Gas Emissions: Energy, Transportation, Industry, Waste, Agriculture, Land Use and Forestry, 2. Action Plan for the Adaptation to the Climate Change: Water Resources, Management of Water Resources, Agriculture Sector and Food Security, Ecosystem Services, Biological Diversity and Forestry, Natural Disaster Risk Management and Human Health. In line with the actions taken under these chapters, it is planned to carry out work in the short, medium and long terms. According to these planning, short term plans are the protection of urban forests and green spaces, inclusion of ecological elements in the stream remediations, promotion of restoration of streams with vegetational elements while preventing funneling, activating the polluter pays principle, and allowing the heavy-duty vehicles to enter into the cities in specific times in the context of city logistics. Medium term plans are as follows: operating sanitary landfills according to the regulation, assessment of feasibility study by calculating the landfill gases in the field, integrating the transit systems with each other and urban transportation types, designating pedestrian ways and squares in the city centers that are free from automobiles, designating bike path networks across the city. Long term plans of solid waste collection, optimization of the disposal transport system to cover the least amount of distance, effective usage of the Integrated Waste Management System (EAYP), training, presentation and raising awareness on source-separated collection rehabilitation of unsanitary landfills, setting up filling stations in the cities for electric vehicles, setting up systems for smart transportation system centers, separating the collection systems of rainwater and sewage water, provision of running water that is of potable water quality to the consumers are present

(Ministry of Environment and Urbanization of the Republic of Turkey, 2012).

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 & CAPACITY SELECTION

3.1. Assumptions

- Bolaman Basin was subject to natural disaster several times. For this reason, possible natural disaster preventing rehabilitation projects are one of the important needs of the public in the region as well as being a request by them;
- 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;
- The production capacity of the region will increase by supporting revenue increasing activities. With increasing production capacity and roads built and improved, product exports to outside of the region is also expected to increase;
- With the construction of recreation areas, it is envisaged that Bolaman Basin will be potentially utilized in terms of the tourism sector;
- Migration to outside of the region is expected to decrease with the increasing economic activities in the region;
- No increase in costs determined by the relevant administrations is expected;
- 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. 10.000-20.000 TRY was envisaged annually per household. Moreover, this figure increases incrementally in products like mushrooms which have a high added-value;
- 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. For example, through discussions with large retailers and cooperatives, it was determined that hazelnut, kiwi and persimmon have no marketing problems. Similar methods can be followed in other commercial items related to the project;
- 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 Bolaman 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 10.000-20.000 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 18, 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 18 Fixed Capital Investment Cost

No	Fixed Investment	Sum (TRY)	Sum (ABD $)
1	Survey Costs		0
2	Engineering and Project Costs	48.563.600	6.330.062
3	License-Patent-Know How etc. Technology Payments	0	0
4	Land Cost		0
5	Land Arrangement	41.600.000	5.422.386
6	Preparation Structures		0
7	Cost of Construction Works	348.720.000	45.454.190

No	Fixed Investment	Sum (TRY)	Sum (ABD $)
8	Expenditures relating to the Transportation Operations		0
9	Machinery and Equipment Costs of Main Operation	2.650.000	345.416
10	Machinery and Equipment Costs of Auxiliary Operation		0
11	Transportation and Insurance Costs		0
12	Import and Customs Clearance Costs		0
13	Cost of Assembly		0
14	Vehicles		0
15	General Costs		0
16	Commissioning Costs	75.650.000	9.860.660
17	Unexpected Costs		0
18	Investment Period Interests		
	Fixed Capital Investment Cost	**517.183.600**	**67.412.714**

Operation capital sub-projects are shown under 'Commissioning Costs' item. Details of Table 18 are given in Annex-6 on the basis of sub-projects.

Percentage weights of the investment items are seen in Figure 9.

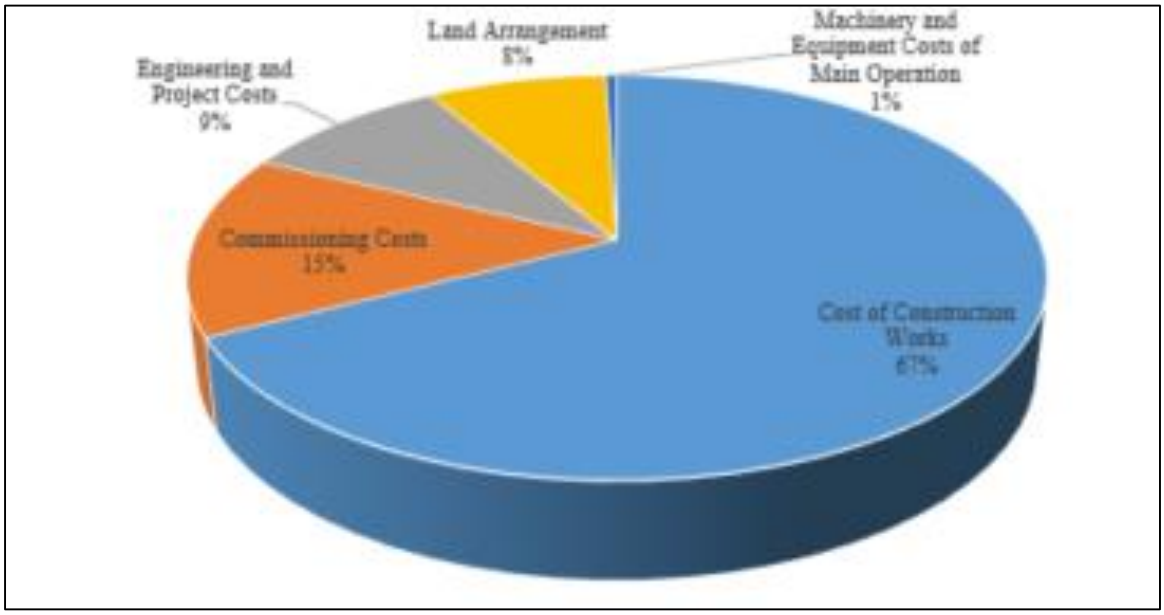

Figure 9 Fixed-Capital Investment Cost (%)

'Cost of Construction Works' constitutes the biggest share with 67% in fixed capital investments. In the second place, there are the commercial investments 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 Bolaman Basin composed of 77 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 19 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		7.284.540		9.712.720		12.140.900		12.140.900		4.856.360		2.428.180			48.563.600
2.Techincal Assistance and Licence		0		0		0		0		0		0		0	0
3.Construction Works		7.806.400		23.419.200		97.580.000		156.128.000		78.064.000		15.612.800		11.709.600	390.320.000
4.Machinery and Equipment		132.500		662.500		662.500		530.000		397.500		212.000		53.000	2.650.000
5.Transportation and Insurance		0		0		0		0		0		0		0	0
6.Import and Customs Clearance															
7.Assembly Costs															
8.General Costs															
9.Vehicles and Fittings															
10.Commissioning Costs		7.565.000		18.912.500		18.912.500		18.912.500		7.565.000		1.891.250		1.891.250	75.650.000
11.Unexpected Costs		0		0		0		0		0		0		0	0
Fixed Investment Cost (A+B)		**22.788.440**	**0**	**52.706.920**	**0**	**129.295.900**	**0**	**187.711.400**	**0**	**90.882.860**	**0**	**20.144.230**	**0**	**13.653.850**	**517.183.600**
C. Need of Operational Capital															
Total Investment Cost (A+B+C)		**22.788.440**	**0**	**52.706.920**	**0**	**129.295.900**	**0**	**187.711.400**	**0**	**90.882.860**	**0**	**20.144.230**	**0**	**13.653.850**	**517.183.600**

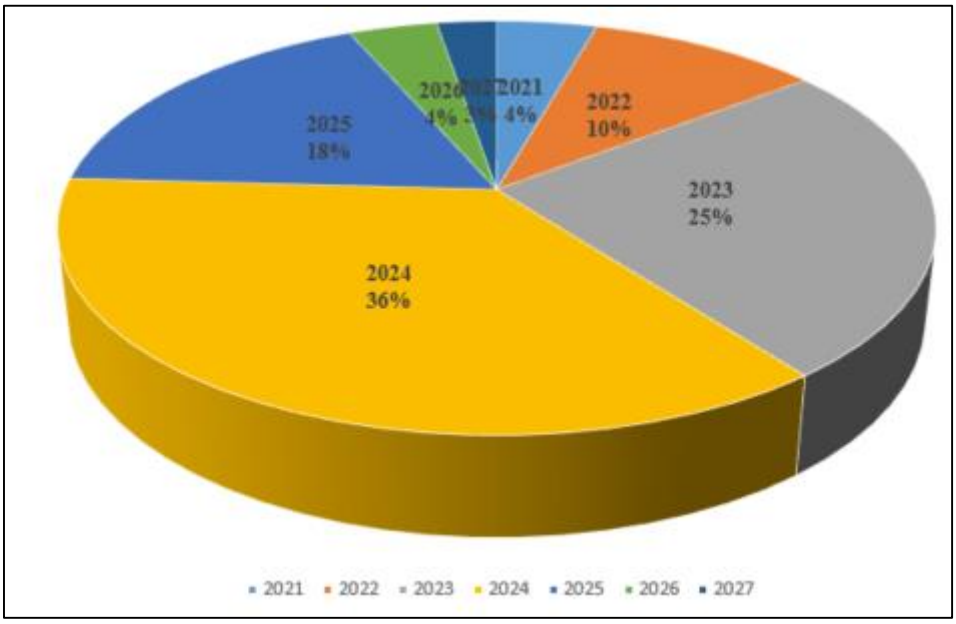

Figure 10 Investments by Years

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 67,412,714 USD excluding public and beneficiary contributions. Total budget was calculated to be 78,638,849 USD with a public contribution of 2,638,952 USD and beneficiary contribution of 8,587,181 USD. In conclusion, the total budget of the project is 603,309,379 TRY, 20,245, 779 TRY of this amount is government contribution and 65,880,000 TRY of this is beneficiary contribution, which amounts to 86,125,779 TRY of internal contribution while the remaining 517,183,600 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 20 Summarized Investment Cost by Components

	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	**158.320.000**	**65.880.000**	**4.200.000**	**228.400.000**	**20.779.630**	**8.646.804**	**55.125.350.641.061**	**29.977.687**	**26%**	**38%**
1.1.1. Erosion control, landslide and flood control works	29.000.000	0	0	29.000.000	3.806.274		1.000.222	3.806.274	5%	5%
1.1.2. Sustainable management of greenhouses in forests and next to forests	2.300.000	0	0	2.300.000	301.877		233.335	301.877	0%	0%
1.1.3. Rehabilitation, protection and sustainable management of forests	8.720.000	4.080.000	4.200.000	17.000.000	1.144.507	535.503	55.125.346.550.963	2.231.264	1%	3%
1.1.4. Income generation and diversification of livelihoods for forest villages	45.825.000	17.325.000	0	63.150.000	6.014.569	2.273.920	990.226	8.288.489	8%	10%
1.2.1. Sustainable and climate friendly agricultural practices	17.000.000	17.000.000	0	34.000.000	2.231.264	2.231.264	521.878	4.462.528	3%	6%
1.2.2. Income generation and diversification of livelihoods of countryside	22.975.000	19.975.000	0	42.950.000	3.015.488	2.621.735	383.987	5.637.223	4%	7%
1.2.3. Pasture rehabilitation and management	25.000.000	0	0	25.000.000	3.281.271	360.940	638.025	3.281.271	4%	4%
1.2.4. Sustainable agricultural value chains	7.500.000	7.500.000	0	15.000.000	984.381	984.381	320.900	1.968.762	1%	2%
Component 2: Climate resilient grey infrastructure	**343.800.000**	**0**	**0**	**343.800.000**	**45.124.032**		**29.405.523**	**45.124.032**	**57%**	**57%**
2.1.1 Multi-purpose reservoirs	120.000.000	0	0	120.000.000	15.750.098		5.683.466	15.750.098	20%	20%
2.1.2. Durable infrastructure for flood and sedimentation control	121.000.000	0	0	121.000.000	15.881.349		3.755.735	15.881.349	20%	20%
2.2.1. Climate resilient road rehabilitation in the countryside	102.800.000	0	0	102.800.000	13.492.584		9.595.555	13.492.584	17%	17%
Component 3: Institutional coordination, project management and sustainability	**15.063.600**	**0**	**16.045.779**	**31.109.379**	**1.977.110**		**2.106.022**	**4.083.132**	**2%**	**5%**
3.1. Technical assistance and institutional capacity building for Integrated Landscape Management	6.025.440	0	1.825.912	7.851.352	790.844	0	239.652	1.030.496	1%	1%
3.2. Project management, environmental and social management and monitoring and evaluation	9.038.160	0	14.219.867	23.258.027	1.186.266		1.866.369	3.052.635	1%	4%

	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**		
Grand Total	**517.183.600**	**65.880.000**	**20.245.779**	603.309.379	67.880.299	8.646.804	2.657.265	79.183.620	86%	100%

Table 21 Thematic Titles by Organizations Based on Sub-components: Total Estimated Cost (TRY)

Sub-Component\Thematic Title	DSI	DGH	GDF	TRGM	Grand Total	Total Base Costs (%)
Sub-Component 1.1: Upper basin landscape and rural livelihoods			**85.845.000**		**85.845.000**	**17%**
1.1.1. Erosion control, landslide and flood control works			29.000.000		29.000.000	6%
1.1.2. Sustainable management of greenhouses in forests and next to forests			2.300.000		2.300.000	0%
1.1.3. Rehabilitation, protection and sustainable management of forests			8.720.000		8.720.000	2%
1.1.4. Income generation and diversification of livelihoods for forest villages			45.825.000		45.825.000	9%
Sub-Component 1.2: Climate friendly agriculture and sustainable value chains				**72.475.000**	**72.475.000**	**14%**
1.2.1. Sustainable and climate friendly agricultural practices				17.000.000	17.000.000	3%
1.2.2. Income generation and diversification of livelihoods of countryside				22.975.000	22.975.000	4%
1.2.3. Pasture rehabilitation and management				25.000.000	25.000.000	5%
1.2.4. Sustainable agricultural value chains				7.500.000	7.500.000	1%
Sub-Component 2.1: Durable infrastructure for disaster risk and water security	**241.000.000**				**241.000.000**	**47%**
2.1.1 Multi-purpose reservoirs	120.000.000				120.000.000	23%
2.1.2. Durable infrastructure for flood and sedimentation control	121.000.000				121.000.000	23%
Sub-Component 2.2: Rural road system resilient to climate		**102.800.000**			**102.800.000**	**20%**
2.2.1. Climate resilient road rehabilitation in the countryside		102.800.000			102.800.000	20%
Sub-Component 3.1: Technical assistance and development of institutional capacity for integrated landscape management			**6.025.440**		**6.025.440**	**4%**

Sub-Component\Thematic Title	DSI	DGH	GDF	TRGM	Grand Total	Total Base Costs (%)
Sub-Component 3.2: Project management, environmental and social management, monitoring and assessment			**9.038.160**		**9.038.160**	**2%**
Grand Total	**241.000.000**	**102.800.000**	**100.908.600**	**72.475.000**	**517.183.600**	**100%**

As can be seen in Table 21, majority of the costs foreseen (approximately 67%) are reserved for infrastructure investments. Other costs are for investments aimed at increasing local community's agricultural production and increasing their income. While the total cost of the General Directorate of Highways (20%) and State Hydraulic Works (47%) forms the infrastructure investments in the project, total project costs of the General Directorate of Forestry and General Directorate of Agricultural Reform are for economic and commercial projects like upper basin landscaping and rural livelihoods, climate friendly agriculture and sustainable value chains.

5. PROJECT FUNDS AND FINANCIAL ANALYSİS

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. Bolaman River 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), General Directorate of Highways (GDH), a part that amounts to 517,83,600 TRY 67,412,714 USD) of the funding of the 'Bolaman River Basin Rehabilitation Project' is funded by the credit of the World Bank, which constitutes the majority of the credit funds. Beneficiary contributions (65,880,000 TRY – 8,587,182 USD) are also envisioned in specific sub-projects. Grant ratios for projects are given in Annex-9. As a result, internal and external funding will be used in conjunction with each other.

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 22 below.

Table 22 Need for Funds and Source of Funds

Need for Funds	DSI		GDH		GDF			TRGM		
	External Contribution	**Public Contribution**	**External Contribution**	**Public Contribution**	**External Contribution**	**Public Contribution**	**Beneficiary Contribution**	**External Contribution**	**Public Contribution**	**Beneficiary Contribution**
Permanent Facility Investment	241.000.000	102.800.000	100.908.600	20.245.779	0	72.475.000	0	517.183.600	20.245.779	0
Funding Costs	0	0	0	0	0	0	0	0	0	0
Fixed Investment Total	241.000.000	102.800.000	100.908.600	20.245.779	0	72.475.000	0	517.183.600	20.245.779	0
Operational Capital Investment	0	0	0	0	21.405.000	0	44.475.000	0	0	65.880.000
Total Need for Funds	241.000.000	102.800.000	100.908.600	20.245.779	21.405.000	72.475.000	44.475.000	517.183.600	20.245.779	65.880.000
Sources of Funds	0	0	0	0	0	0	0	0	0	0
Own Resources	0	0	0	20.245.779	21.405.000	0	44.475.000	0	20.245.779	65.880.000
External Resources	241.000.000	102.800.000	100.908.600	0	0	72.475.000	0	517.183.600	0	0
Total Funding Resources	241.000.000	102.800.000	100.908.600	20.245.779	21.405.000	72.475.000	44.475.000	517.183.600	20.245.779	65.880.000
Grand Total	**603.309.379**									

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 67.412.714 USD (517.183.600 TRY). 25 years of expected income from the investments in the context of the project was calculated to be 76.255.820 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, Bolaman River 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 233 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 23 Financial Statement

Need for Fund	**External Contribution (External Money)**	**Public Contribution (Internal Money)**	**Beneficiary Contribution (Internal Money)**
Permanent Facility Investment	517.183.600	20.245.779	
Funding Costs			
Fixed Investment Total	517.183.600	20.245.779	
Operational Capital Investment			65.880.000
Total Need for Funds	517.183.600	20.245.779	65.880.000
Sources of Funds			
Own Resources		20.245.779	65.880.000
External Resources	517.183.600		
Total Funding Resources	517.183.600	20.245.779	65.880.000
Grand Total	**603.309.379**		

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, 13 Thematic Titles and 77 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

Bolaman River 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) a more secure life with the control of natural disasters;

(5) positive contribution to environmental and social interaction;

(6) 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 'Bolaman River 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 24 Some Selected Sub-projects with Beneficiary Contribution and Their Purposes

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
Photovoltaic (PV) Systems Orköy Project	1.200.000	800.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	It will be installed in order to supply usable solar energy in homes. It will reduce the pressure on the forests.
Solar Water Heating Systems 200 Households	420.000	280.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	Solar water heating systems will be installed to heat the water that will be used in households in forest villages. Thus, forest products will not be used and the pressure on forests will be reduced.
Exterior Sheathing 377 Households	3.000.000	2.000.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	It will be done in order to prevent heat loss in households in forest villages. It will reduce the pressure on the forests.
Exterior Sheathing 75 Households	600.000	400.000	Tokat	Reşadiye, Niksar	It will be done in order to prevent heat loss in households in forest villages. It will reduce the pressure on the forests.
Roof Cover 366 Households	900.000	600.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	It covers the use of galvanized sheet metal on the roofs of households in forest villages. Thus, the use of wood and tile will decrease and the pressure on forests will be reduced.
Medicinal Aromatic Plant Cultivation 14 Households	250.000	250.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to encourage the cultivation of medicinal aromatic plants in forest villages and contribute to the rural development of forest villages, it will be made possible to grow medicinal aromatic plants in suitable areas that can be used in the forest.
Blueberry Cultivation 55 Households	250.000	250.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to encourage the cultivation of blueberries in forest villages and contribute to the rural development of forest villages, it will be made possible to grow blueberries in suitable areas that can be used in the forest.
Strawberry Cultivation 36 Households.	125.000	125.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to encourage the cultivation of strawberries in forest villages and contribute

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					to the rural development of forest villages, it will be made possible to grow strawberries in suitable areas that can be used in the forest.
Mushroom Cultivation 44 Households	500.000	500.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to encourage the cultivation of mushrooms in forest villages and contribute to the rural development of forest villages, it will be made possible to grow mushrooms in suitable areas that can be used in the forest.
Dairy Sheep Breeding 135 Households	2.250.000	2.250.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to improve sheep farming in forest villages and to provide alternative income sources for the villagers, the necessary maintenance and renovation of the existing stockyards of the loan holder will be made, and sheep with suitable characteristics will be given to the region.
Water Buffalo Breeding 115 Households	2.000.000	2.000.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Kabataş, Korgan, Ulubey	In order to improve buffalo breeding in forest villages and to provide alternative income sources, forest villagers will be given 2 stud buffaloes that are at least three months pregnant.
Dairy Cattle Breeding Development Project 24 Households	500.000	500.000	Tokat	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Perşembe, Ulubey	In order to improve dairy cattle breeding in forest villages and to provide alternative income sources, forest villagers will be given 2 stud cattle.
Dairy Sheep Breeding Development Project 41 Households	750.000	750.000	Tokat	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to improve sheep farming in forest villages and to provide alternative income sources for the villagers, the necessary maintenance and renovation of the existing stockyards of the loan holder will be made, and sheep with suitable characteristics will be given to the region.
Dairy Cattle Breeding 285 Households	5.000.000	5.000.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In order to improve dairy cattle breeding in forest villages and to provide alternative

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					income sources, forest villagers will be given 2 stud cattle.
Scientific Beekeeping 360 Households	4.000.000	4.000.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	Bee families will be given in order to improve honey production in forest villages and to provide alternative sources of income for forest villagers.
Queen Bee Production 88 Households	1.250.000	1.250.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In the apiary, the queen will be given to lay eggs, reproduce and ensure the future of the apiary.
Chainsaw 50 Households	250.000	250.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	In forest villages, it will be bought in order to gain high income by using a chainsaw. Thus, high-value logs will be produced per unit time and on-site income will be obtained in forest villages.
Occupational Safety Clothing 75 Households	300.000	200.000	Ordu	Aybastı, Çamaş, Çatalpınar, Fatsa, Gölköy, Gürgentepe, Kabataş, Korgan, Ulubey	Work safety clothing will be provided in order to prevent loss of life during activities carried out in forest villages.
Dissemination of Greenhouse Cultivation	3.500.000	3.500.000	Ordu	Havzadaki Tüm İlçeler	It is aimed to expand production activities such as greenhouse vegetable cultivation and strawberry cultivation together with the modern sample greenhouses planned to be established in the basin with ventilation, irrigation system and suitable for machining. Within the scope of this activity; at the areas having up to 10% slope that located in Altınordu, Fatsa, Camas, Çatalpınar, Kabataş, Kumru, Persembe, Ulubey and Gölköy districts, a total of 125 sample modern greenhouses, each of which is 240m² in size and 25 of them with a size of 500m², will be established.
Dissemination of Modern Kiwi Cultivation	2.000.000	2.000.000	Ordu	Havzadaki Tüm İlçeler	Within the scope of this activity, closed kiwi gardens will be established in the Bolaman

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					River Basin in areas with a slope between 10% and 30% (54,246 decares) in a total area of 200 decares with a water source and suitable soil characteristics. Sample farmers will be selected for the gardens to be established as modern enclosed areas of at least 1 decare. While establishing kiwi gardens, high-quality and high-yielding saplings will be planted in lands with a prepared soil structure, by determining the planting methods suitable for the land structure. Gazebos to be made using concrete poles and steel wires will be installed on the saplings, and the irrigation system will be installed so that each sapling will benefit. In addition to the sapling, kiwi post, kiwi wire, irrigation system required during the garden establishment, the charged pruning shears and a grass trimmer required for the maintenance of the garden will also be covered from the project budget. The project aims to diversify rural livelihoods.
Dissemination of Persimmon Cultivation	500.000	500.000	Ordu	Fatsa, Çamaş, Çatalpınar, Kabataş	Within the scope of the project, Persimmon gardens will be built in a total area of 80 decares. The project aims to diversify rural livelihoods.
Dissemination of Mushroom Cultivation	1.000.000	1.000.000	Ordu	Havzadaki Tüm İlçeler	Within the scope of the project, it is planned to establish 16 production facilities for mushroom cultivation, which are very suitable for the Bolaman Stream Basin. For this purpose; Ground concrete, tent, air conditioning system, automation unit, shelf and compost purchases will be supported

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					within the scope of the project. The project aims to diversify rural livelihoods.
Dissemination of Pocket Terrace Implementations in Hazelnut Gardens	5.000.000	5.000.000	Ordu	Havzadaki Tüm İlçeler	Within the scope of this activity, model gardens will be established by making pocket terracing work in a total of 1750 decares of hazelnut gardens in the Bolaman River Basin. Thus, fertilization, spraying and harvesting processes applied in hazelnut orchards will be more effective and easier. As a result, the yield and quality of hazelnuts will be increased in these sloping lands.
Dissemination of Good Agriculture Implementations in Hazelnut Gardens	5.000.000	5.000.000	Ordu	Havzadaki Tüm İlçeler	Good Agricultural Practices, which are extremely important in terms of reducing chemical pollution in the Bolaman Stream Basin, protecting the biological balance and the environment, ensuring quality increase in production and sustainable use of soil structure, will be implemented with 800 farmers engaged in hazelnut agriculture. Certification process is planned to be implemented for five years with 800 farmers.
Dairy Cattle Breeding Development Project 21 Households	500.000	500.000	Tokat	Başçiftlik Niksar, Reşadiye	Cattle will be given to the villagers in order to improve dairy cattle breeding and provide alternative sources of income to the villagers. A total of 84 dairy cattle procurement tenders will be held for 21 enterprises and will be implemented with their distribution.
Dairy Sheep Breeding Development Project 35 Households	500.000	500.000	Tokat	Başçiftlik Niksar, Reşadiye	Dairy sheep will be provided to the villagers in order to improve dairy sheep breeding and to provide alternative source of income for the villagers.
Dairy Cattle Breeding Development	5.000.000	5.000.000	Ordu	Havzadaki Tüm İlçeler	3 Simental dairy cattle, milking machine and milk cooling tank that the enterprises need

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					will be purchased within the scope of the project for 100 cattle enterprises whose current situation and land are more suitable for animal feeding. With the project, it is aimed to diversify the livelihoods.
Dissemination of Sheep Breeding	5.000.000	5.000.000	Ordu	Havzadaki Tüm İlçeler	Within the scope of the project, enterprises in the form of 50 broodstock sheep and 3 ram breeding heads will be established. By activating the sheep breeding potential in the Bolaman Stream Basin, high-yielding breeds of breeding sheep will be expanded and significant contributions will be made to the rural economy.
Animal Shepherds and Shepherd Houses Project 39 Households	2.000.000	2.000.000	Tokat	Başçiftlik, Niksar Reşadiye	It will be carried out in order to expand animal breeding and to improve the living standards of producers. In addition, animal welfare will be increased.
Dissemination of Free System Organic Egg Poultry	1.000.000	1.000.000	Ordu	Havzadaki Tüm İlçeler	Free System Organic Egg Poultry, which is extremely important in terms of the elimination and prevention of environmental pollution in the Bolaman Stream Basin and ensuring sustainable production, is a production method known by the public and has a high potential, especially in the Bolaman Stream Basin. For this purpose, a Free System Organic Egg Poultry Farm with a total capacity of 16 groups of 500 chickens will be established in the neighborhoods located in the Bolaman Stream Basin.
Dissemination of Goose Breeding	2.500.000	2.500.000	Ordu	Havzadaki Tüm İlçeler	The climate structure and vegetation of the Bolaman Stream Basin are extremely suitable for goose breeding. In this region, it is planned to expand goose breeding by

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					establishing 25 enterprises having a capacity of 100 (70 females, 30 males). For this purpose, expenses such as prefabricated poultry house and equipment, goose, grazing area, fencing, pond construction, bird net purchase will be covered within the scope of the project. With the project, it is aimed to diversify the sources of income.
Scientific Beekeeping and Diversification of Bee Products 33 Households	475.000	475.000	Tokat	Reşadiye, Başçiftlik, Niksar	In order to improve honey production in villages and provide alternative income sources to villagers, bee family, honey extractor, beekeeper clothes, honeycomb comb, beekeeper blower will be provided.
Water Buffalo Breeding Development Project	500.000	500.000	Tokat	Reşadiye	90 female buffaloes and 10 male buffaloes will be given to villagers in order to improve water buffalo breeding and provide alternative sources of income for the villagers.
Diversification of Bee Products	2.500.000	2.500.000	Ordu	Havzadaki Tüm İlçeler	Beekeeping has a socio-economic importance as an agricultural business line that contributes to the family economy of farmers with low income, no arable land or scarce, and generating income in a short time. Within the framework of the project, for 40 producers, 50 hives with bees, royal jelly production equipment, deep freezer and the container they will produce will be covered within the project budget. In addition, pollen traps will be distributed to 800 beekeepers.
Establishment of Portable Thresher and Portable Hazelnut Drying Stations	5.000.000	5.000.000	Ordu	Havzadaki Tüm İlçeler	When hazelnuts are harvested, the most important event is to dry the hazelnuts properly and correctly. Considering the climatic conditions of the region, heavy

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					rainfall in September and October when drying takes place is the biggest obstacle to drying works. For this purpose, portable threshing systems that do not come into contact with the ground, can breathe from all sides, can be covered when desired, and therefore provide faster and higher quality drying, will be set up as an example for farmers. In this context, portable blends of 250 square meters will be installed for 200 producers across the basin. In addition, a total of 20 hazelnut drying stations will be established. In these stations, the final drying of the grain hazelnuts separated from the grain will be done before the sale. Drying stations with a capacity of at least 5 tons are extremely important in terms of both maintaining the quality of hazelnuts and facilitating a process that requires long efforts.
Increasing Women Employment in Rural Areas	2.500.000	2.500.000	Ordu	Havzadaki Tüm İlçeler	Small business-based projects will be implemented in rural areas in order to improve women's employment in rural areas, to reveal their entrepreneurial skills, to enable them to live independently economically and to ensure that women living in rural areas are also included in the production economy. In the fields of handicrafts, local products, local delicacies, etc., women will be encouraged to produce economically profitable products in the ateliers or production facilities they will establish under or right next to their own homes. For this purpose, 50 small-scale

Sub-project Title	Foreseen Cost (TRY)	Beneficiary Contribution	Province	Location (District)	Purposes of the Project
					enterprises will be established for the employment of women in the basin.
TOTAL (TRY)	**68,020,000**	**65,880,000**			
TOTAL (USD)	**8,857,809**	**8,579,130**			

The added value to be provided directly to the basin people with the "Bolaman River Basin Rehabilitation Project" based on the income, expense, and profitability ratios of the "2019 Medical Projects" implemented in the region by the ORKÖY Department of the General Directorate of Forestry and the values in the feasibility reports made by the public has been calculated under separate headings below.

6.2.1.1. Dairy Cattle Breeding

In total, 22,000,000 TRY investment together with the beneficiary contribution was foreseen in the context of the project in the field of 'Dairy Cattle Breeding'. 309 households and 121 stock farming enterprises will benefit from this. A value chain will be created with this amount that includes getting Simmental cattle, milking units and milk cooling tanks needed by the enterprises.

Return on investment ratio[1] in dairy cattle breeding is 20.48% (Kalkınma Kütüphanesi, 2020). Within the framework of this ratio, the annual return on the investment at the amount of the 22,000,000 TRY will be 4,505,600 TRY.

6.2.1.2. Water Buffalo Breeding

In total, 5,000,000 TRY investment together with the beneficiary contribution was foreseen in the context of the project in the field of 'Water Buffalo Breeding'. 115+10=125 households will benefit from the 2 different sub-projects in the region.

The return on investment ratio of Water Buffalo Breeding is 20% (Batı Karadeniz Kalkınma Ajansı, 2020). Within the framework of this ratio, the annual return on the investment at the amount of 5,000,000 TRY to the region will be 1,000,000 TRY. With the water buffalo breeding support, an added value of 8,000 TRY will be created annually per household operating in this activity.

6.2.1.3. Strawberry Cultivation

In total, 250,000 TRY investment together with the beneficiary contribution was foreseen in the context of the project in the field of 'Strawberry Cultivation'. 36 households will benefit from the 2 different sub-projects in the region.

The return on investment ratio of Water Buffalo Breeding is 23,80% (Batı Karadeniz Kalkınma Ajansı, 2020). Within the framework of this ratio, the annual return on the investment at the amount of 250,500 TRY to the region will be 59,500 TRY.

6.2.1.4. Mushroom Cultivation

In total, 4,500,000 TRY investment together with the beneficiary contribution was foreseen in the context of the project in the field of 'Mushroom Cultivation'.

The return on investment ratio of Mushroom Cultivation is 26.0%[2].Within the framework of this ratio, the annual return on the investment at the amount of 4,500,000 TRY to the region will be 1,170,000 TRY.

[1] Return on Investment = (After-Tax Profit/Total Investment Amount) x 100
2 GDF Department of ORKÖY 2019 Typical Projects

6.2.1.5. Medicinal Aromatic Plant Cultivation

In total, 1,000,000 TRY investment together with the beneficiary contribution was foreseen in the context of the project in the field of 'Greenhouse Cultivation'. 14 households will benefit from the 2 different sub-projects in the region and 48.000 pieces of plant support will be given.

The return on investment ratio of Medicinal Aromatic Plant Cultivation is 145% (Kalkınma Kütüphanesi, 2020). Within the framework of this ratio, the annual return on the investment at the amount of 1,000,000 TRY to the region will be 1,450,000 TRY.

6.2.1.6. Scientific Beekeeping

In the context of sub-projects of Control of Bee Diseases and Pests, Diversification of Apicultural Products, Centre of Beekeeping Equipment Production, Scientific Beekeeping (360 households), Scientific Beekeeping and Diversification of Apicultural Products, in total 23,950,000 TRY investment together with the beneficiary contribution was foreseen.

The return on investment ratio of Medicinal Aromatic Plant Cultivation is 112% (Orman Genel Müdürlüğü, 2014). Within the framework of this ratio, the annual return on the investment at the amount of 23,950,000 TRY to the region will be 26,824,000 TRY.

6.2.1.7. Blueberry Cultivation

In total, 500,000 TRY investment together with the beneficiary contribution was foreseen in the context of the project in the field of 'Blueberry Cultivation'.

The return on investment ratio of Water Buffalo Breeding is 33.40%[1]. Within the framework of this ratio, the annual return on the investment at the amount of 500,000 TRY to the region will be 167,000 TRY. An added value of 3,036 TRY will be created annually per household and enterprise operating in the field of 'Blueberry Cultivation'.

6.2.2. Economic Costs

In Table 25, 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, 603,309,379 TRY investment (external, public and beneficiary contribution will be made in Bolaman 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

3 GDF Department of ORKÖY 2019 Typical Projects

calculating the direct benefit/added value to be created by an additional investment of 603,309,379 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 25 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	**19.909.210**	**20.566.213**	**21.244.898**	**21.945.980**	**22.670.197**	**23.418.314**	**24.191.118**
Indirect Benefits	**4.977.302**	**5.141.553**	**5.311.225**	**5.486.495**	**5.667.549**	**5.854.578**	**6.047.780**
Nonmonetizable Important Benefits	**5.972.763**	**6.169.864**	**6.373.470**	**6.583.794**	**6.801.059**	**7.025.494**	**7.257.336**
B. Project Costs							
Investment Expenditures	**25.691.282**	**59.420.845**	**145.765.900**	**211.622.497**	**102.459.721**	**22.710.247**	**15.393.108**
Operational Costs	**892.081**	**2.063.276**	**5.061.445**	**7.348.190**	**3.557.720**	**788.570**	**534.497**
Funding Costs	**12.624.452**	**12.624.452**	**12.624.452**	**12.624.452**	**12.624.452**	**12.624.452**	**12.624.452**
Negative Expenses	**128.456**	**297.104**	**728.830**	**1.058.112**	**512.299**	**113.551**	**76.966**

Percentile breakdown of Thematic Titles are shown in Figure 11.

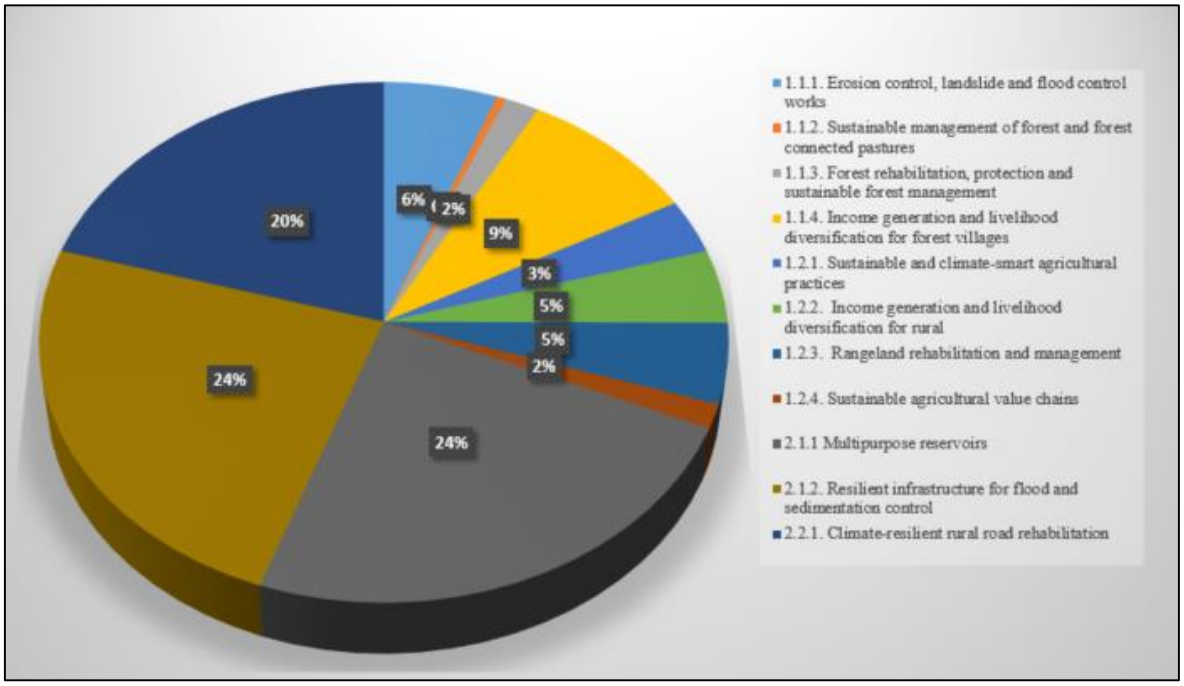

Figure 11 Percentile Breakdown of Thematic Titles

As can be seen here, more than half of the costs (67%) 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 33% mostly consists of investments aimed at increasing the agricultural production capacity of the local community.

6.2.2.1. (2.2.1) Climate-Resilient Road Rehabilitation in Rural Areas

(2.2.1) The foreseen cost of the thematic title of climate-resilient road rehabilitation in rural areas is 300,190,000 TRY and the details are shown in Table 26.

Table 26 (2.2.1) Sub-Projects for the Thematic Title of Climate-Resilient Road Rehabilitation in Rural Areas

2.2.1 Climate-Resilient Road Rehabilitation in Rural Areas	Total Foreseen Cost (TRY)	Total Beneficiary	Total Public Contribution
Aybastı - Gölköy Road	81.500.000	0	0
Kabataş - Aybastı Road	21.300.000	0	0
TOTAL	**102.800.000**	**0**	**0**

(2.2.1) There are 2 sub-projects in the thematic title of climate-resilient road rehabilitation in rural areas and percentile breakdown is shown in Figure 12.

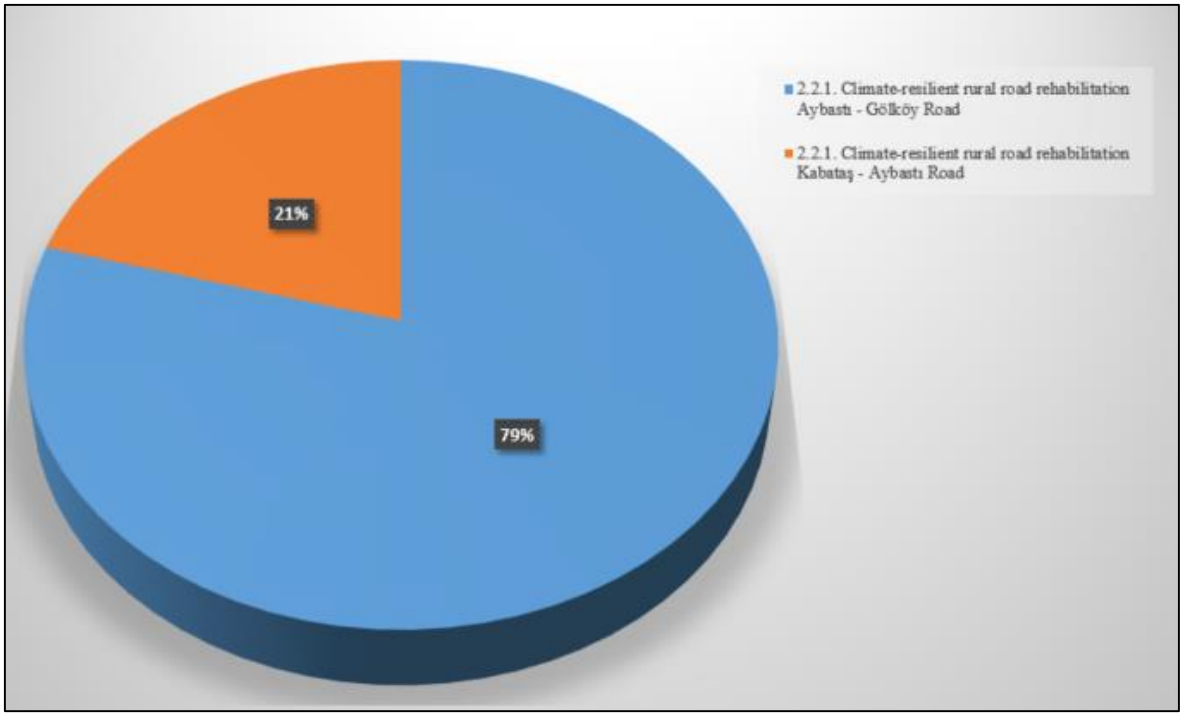

Figure 12 (2.2.1) Sub-Projects for the Thematic Title of Climate-Resilient Road Rehabilitation in Rural Areas

6.2.2.2. (2.1.1) Multi-purpose Reservoirs

(2.1.1) Total foreseen cost of the thematic title of multi-purpose reservoirs is 266,000,000 TRY and the details is shown in Table 27.

Table 27 (2.1.1) Sub-Projects for the Thematic Title of Multi-Purpose Reservoirs

2.1.1 Multi-purpose reservoirs	Total Foreseen Cost (TRY)	Total Beneficiary	Total Public Contribution
Construction of Çatalpınar Reservoir	65.500.000	0	0
Construction of Aybastı (Baydarlı) Reservoir	55.000.000	0	0
TOTAL	**120,000,000**	**0**	**0**

(2.1.1) There are 2 sub-projects in the thematic title of multi-purpose reservoirs and percentile breakdown is shown in Figure 13.

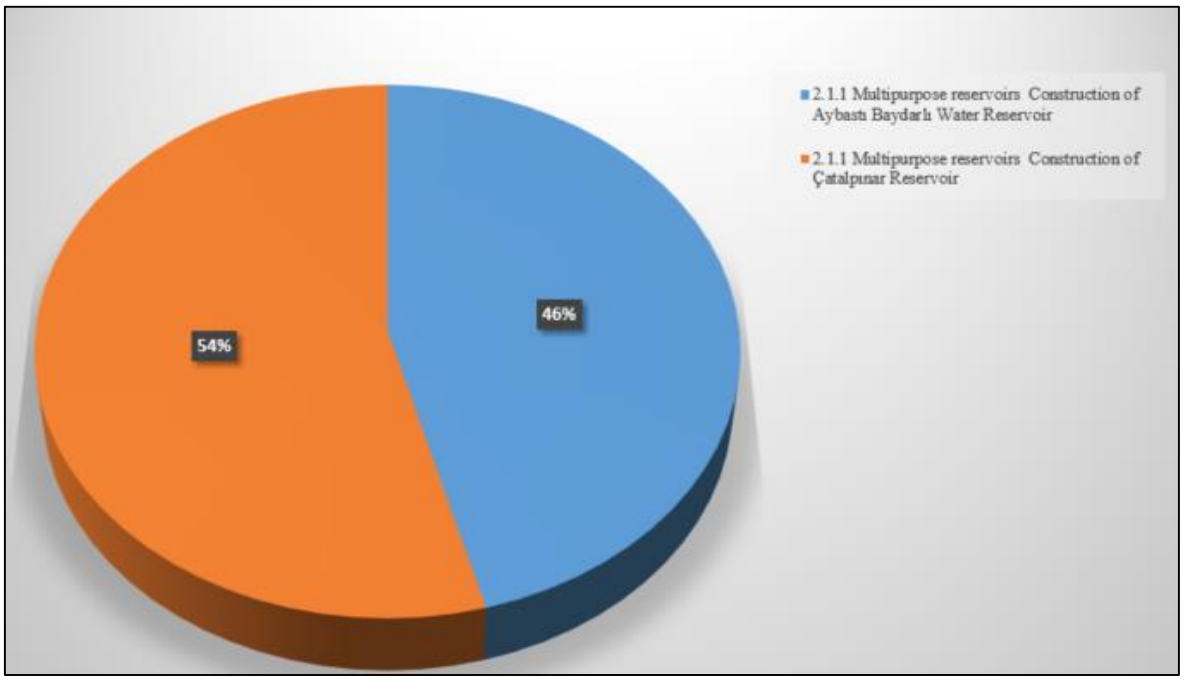

Figure 13 (2.1.1) Sub-Projects for the Thematic Title of Multi-Purpose Reservoirs

6.2.2.4. (2.1.2) Resilient Infrastructure for Flood and Sedimentation Control

(2.1.2) Total foreseen cost of the thematic title resilient infrastructure for flood and sedimentation control is 121,000,000 TRY and the details are shown in Table 29.

Table 28 (2.1.2) Sub-Projects for the Thematic Title of Resilient Infrastructure for Flood and Sedimentation Control

2.1.2. Resilient Infrastructure for Flood and Sedimentation Control	Total Foreseen Cost (TRY)	Total Beneficiary	Total Public Contribution
Construction and project design of Bolaman River flood control	58.000.000	0	0
Construction and Project Design of Bolaman River Levee	38.000.000	0	0
Construction of Fatsa Industrial Estate Flood and Sedimentation Control	9.000.000	0	0
Construction of Ordu-Çatalpınar County Town Keş Stream Flood and Sedimentation Control	5.000.000	0	0
Construction of Fatsa-Karadere Flood Control	3.000.000	0	0
Construction of Çatalpınar-Elmaköy Neighbourhood-Şifalısu Position Flood Control	1.000.000	0	0
Construction of Şahsene Stream Flood Control	2.500.000	0	0
Construction of Gölköy-Karahasan Neigbourhood-Karaağaç Stream Flood and Sedimentation Control	2.500.000	0	0
Construction of Korgan-Tepealan Neighbourhood Güllü Stream Flood and Sedimentation Control	500.000	0	0
TOTAL	**191.500.000**	**0**	**0**

(2.1.2) There are 12 sub-projects in the thematic title of resilient infrastructure for flood and sedimentation control and percentile breakdown is shown in Figure 15.

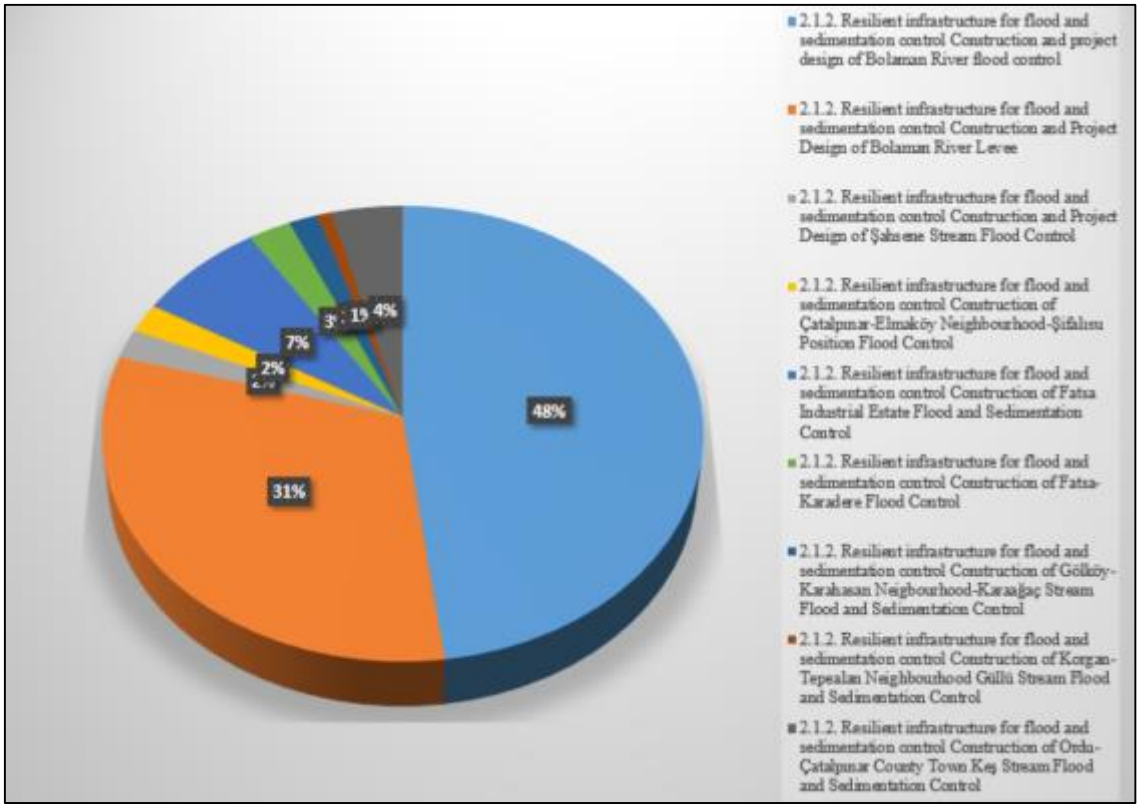

Figure 14 (2.1.2) Sub-Projects for the Thematic Title of Resilient Infrastructure for Flood and Sedimentation Control

6.2.2.5. (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 163,550,000 TRY (external resource) + 16,649,802 TRY (beneficiary contribution) = 180,199,802 TRY and the details are shown in Table 30.

Table 29 (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	External Resource + Beneficiary Contribution (₺)	Total Beneficiary	Total Public Contribution
Dairy Cattle Breeding (285 households)	5.000.000	5.000.000	0
Establishment of a B type Recreational Spot in Kabataş District Asartepesi 1 pcs.	5.000.000	0	0
Honey Forests Project 6 pcs.	4.500.000	0	0
Establishment of a B type Recreational Spot in Aybastı District Uzundere 1 pcs.	4.300.000	0	0
Scientific Beekeeping 360 Households	4.000.000	4.000.000	0
Income-generating Species Forestation 240 Ha.	4.000.000	0	0
Planting and Production of Truffle Infused Sapling 30,000 pcs. (10,000 Hazelnut + 10,000 Chestnut + 10,000 Oak)	3.000.000	0	0
Dairy Sheep Breeding 135 Households	2.250.000	2.250.000	0
Water Buffalo Breeding 115 Households	2.000.000	2.000.000	0
Truffle Cultivation Greenhouse 1 pcs.	1.500.000	0	0
Establishment of a B type Recreational Spot in Gölköy District 1 pcs.	1.300.000	0	0
Queen Bee Production 88 Households	1.250.000	1.250.000	0
Project of Village Bakeries Supporting Women 11 pcs.	1.100.000	0	0
Project of Recreational and Picnic Spots in Reşadiye District 1 pcs.	1.000.000	0	0
Capacity Increase in Aybastı City Forest	1.000.000	0	0
Capacity Increase in a B type Recreational Spot in Çatalpınar District Olukderesi 1 pcs.	1.000.000	0	0
Milk Sheep Breeding Development Project 40 Households	750.000	750.000	0
Dairy Cattle Breeding Development Project 24 Households	500.000	500.000	0
Medicinal Aromatic Plant Cultivation 48000 pcs.	500.000	0	0
Mushroom Cultivation 44 Households	500.000	500.000	0
Personal Protection Equipment 75 Households	300.000	200	0
Chainsaw 50 Households	250.000	250.000	0
Medicinal Aromatic Plant Cultivation 14 Households	250.000	250.000	0
Blueberry Cultivation 55 Households	250.000	250.000	
Truffle Infused Chestnut Sapling Production 10,000 pcs.	200.000	0	0

1.1.4. Income generation and livelihood diversification for forest villages	External Resource + Beneficiary Contribution (₺)	Total Beneficiary	Total Public Contribution
Strawberry Cultivation 36 Households	125.000	125.000	0
TOTAL	**45.825.000**	**17.325.000**	**0**

(1.1.4) There are 26 sub-projects in the thematic title of income generation and livelihood diversification for forest villages and percentile breakdown is shown in Figure 16.

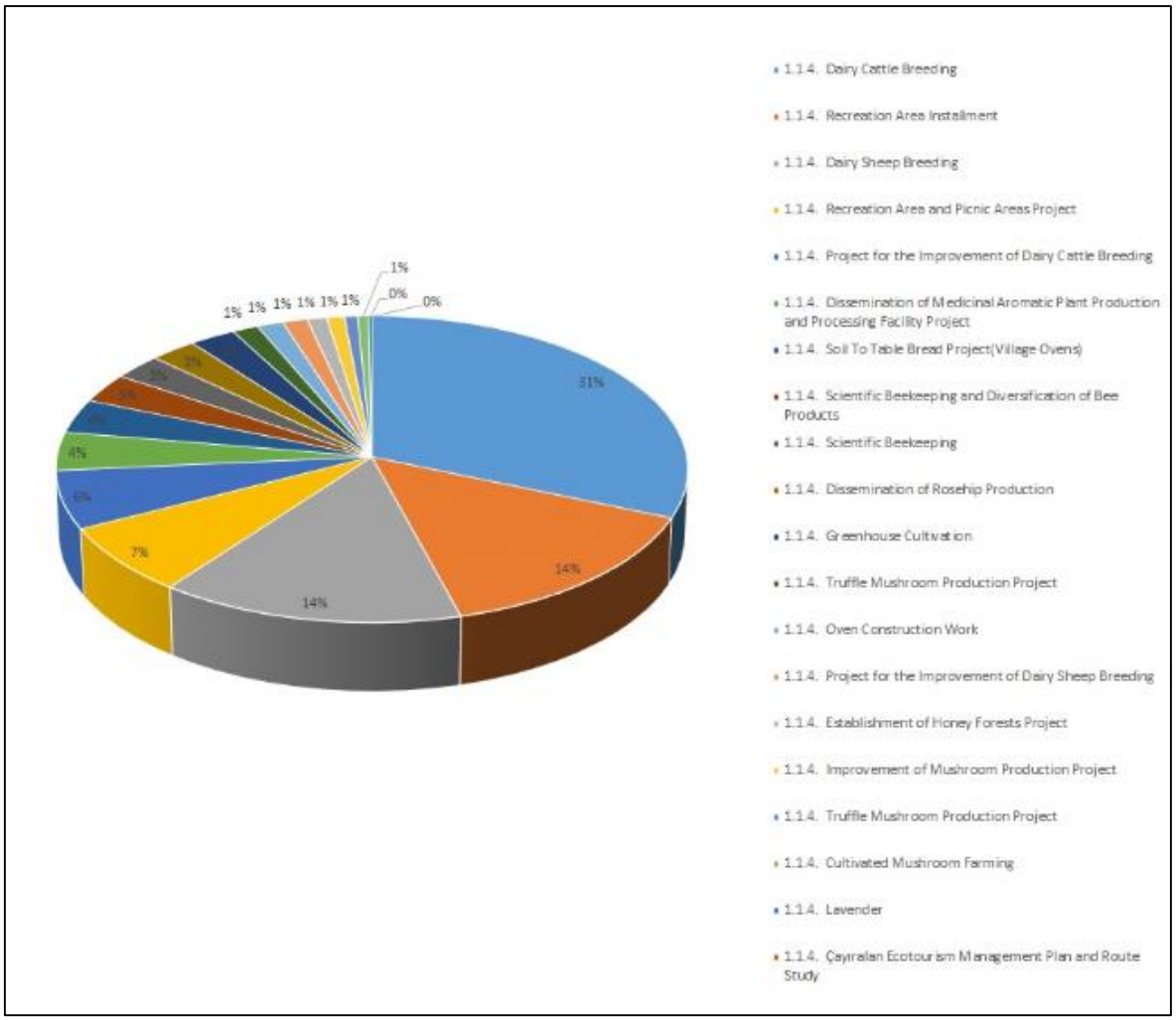

Figure 15 (1.1.4) Sub-Projects for the Thematic Title of Income Generation and Livelihood Diversification for Forest Villages

6.2.2.8. (1.1.3) Forest Rehabilitation, Protection and Sustainable Management

(1.1.3) Total foreseen cost of the thematic title forest rehabilitation, protection and sustainable management is 8,720,000 TRY external resource + 4,080,000 TRY (beneficiary contribution) + 4,200,000 TRY public contribution = 17,000,000 TRY and the details are shown in Table 33.

Table 30 (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 Cost (External Resource + Beneficiary Contribution (₺))	Total Beneficiary	Total Public Contribution
Exterior Thermal Sheathing 2180 Households	40.000.000	2.000.000	0
Making Production Plots of Tubular Saplings to be produced for the Bolaman project and equipment, soil sifting equipment (Tubular Sapling Production Plant, Soil Screening Plant, Pillow Making Machine, Scuba Sapling Pan, Cultivator, Rotator, Plow, Generator.)	2.100.000	0	0
Photovoltaic (PV) Systems Orköy Project 770 Households	1.200.000	800.000	0
Roof Coverings 366 Households	900.000	600.00	0
Exterior Thermal Sheathing 151 Households	600.000	400.000	0
Reporting and supporting the non-wood forest products and services sector	500.000	0	0
Solar Energy Water Heating Systems 595 Households	420.000	280.000	0
Maintenance of Young Forests 5730 ha	0	0	4.150.000
Areas reserved for Soil Protection, Nature Protection, Protection of Important Bird Areas function	0	0	50.000
TOTAL	**8.720.000**	**4.080.000**	**4.200.000**

(1.1.3) There are 9 sub-projects in the thematic title of forest rehabilitation, protection and sustainable management and percentile breakdown is shown in Figure 19.

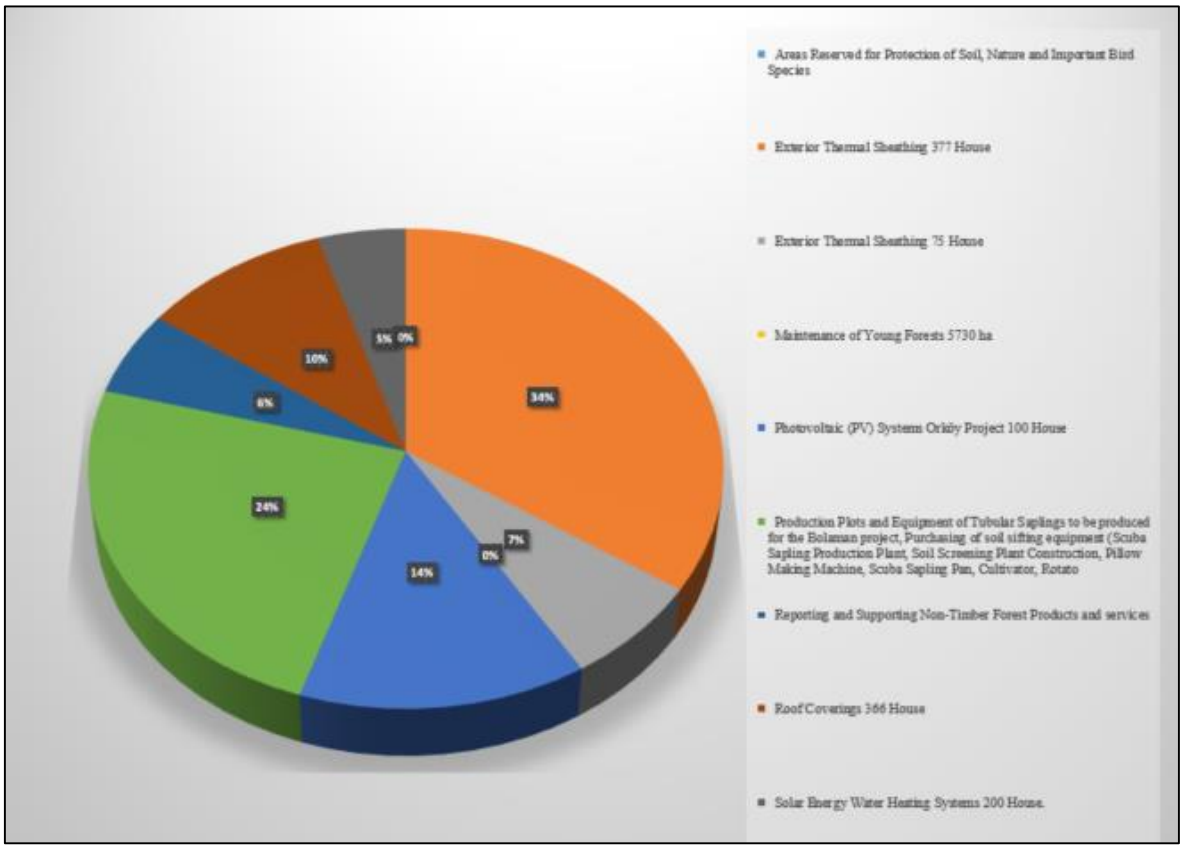

Figure 16 (1.1.3) Sub-Projects for the Thematic Title of Forest Rehabilitation, Protection and Sustainable Management

6.2.2.9. (1.2.1) Sustainable and Climate-Smart Agricultural Practices

(1.2.1) Total foreseen cost of the thematic title of Sustainable and Climate-Smart Agricultural Practices is 17,000,000 TRY external resource + 17,000,000 TRY (beneficiary contribution) = 34,000,000 TRY and the details are shown in Table 34.

Table 31 (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 Foreseen Cost (TRY)	Total Beneficiary	Total Public Contribution
Dissemination of Good Agricultural Practices in Hazelnut Groves	5.000.000	5.000.000	0
Dissemination of Use of Pocket Terraces in Hazelnut Groves	5.000.000	5.000.000	0
Dissemination of Greenhouse Production	3.500.000	2.000.000	0
Dissemination of Modern Kiwi Cultivation	2.000.000	1.000.000	0
Dissemination of Mushroom Production	1.000.000	5.000.000	0
Dissemination of Trabzon Persimmon Production	500.000	5.000.000	0
TOTAL	**17.000.000**	**17.000.000**	**0**

(1.2.1) There are 6 sub-projects in the thematic title of sustainable and climate-smart agricultural practices and percentile breakdown is shown in Figure 20.

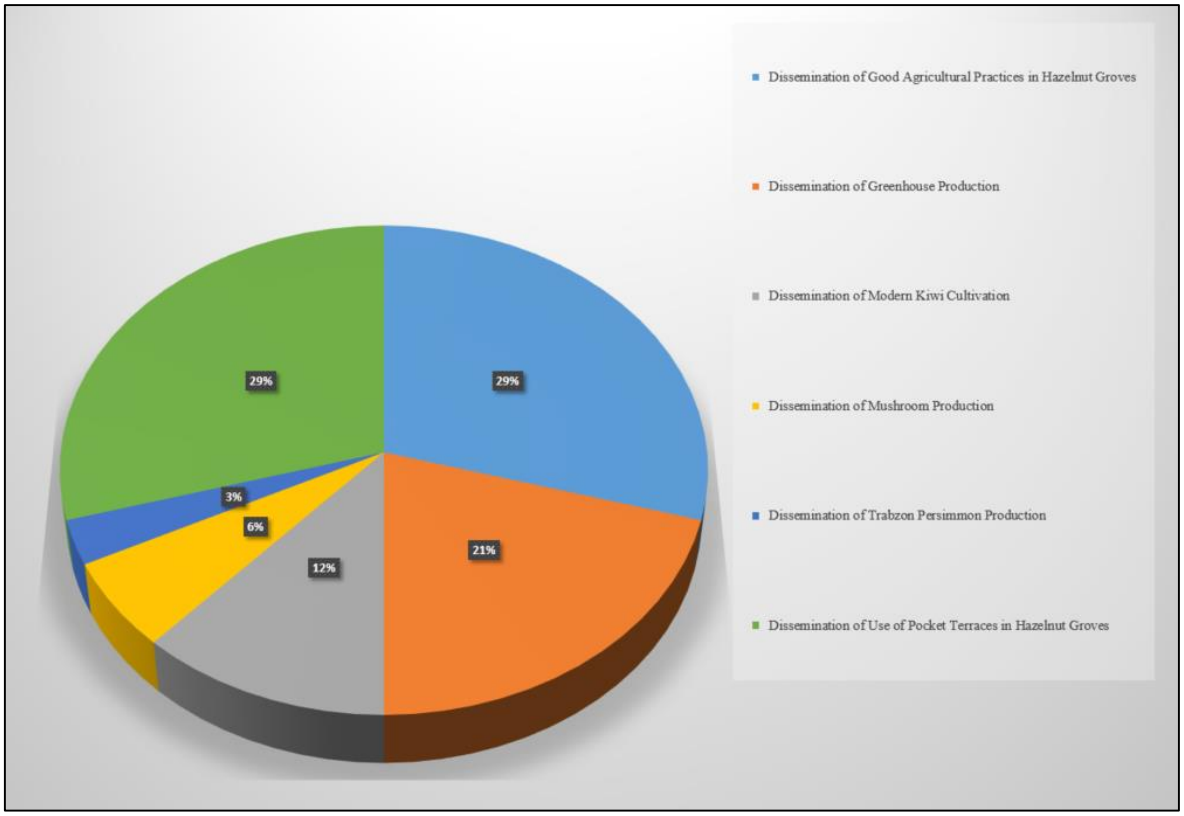

Figure 17 (1.2.1) Sub-Projects for the Thematic Title of Sustainable and Climate-Smart Agricultural Practices

6.2.2.10. (1.2.4) Sustainable Agricultural Value Chains

(1.2.4) Total foreseen cost of the thematic title of sustainable agricultural value chains is 7,500,000 TRY external resource with 7,500,000 TRY beneficiary contribution, in total 15,000,000 TRY, and the details are shown in Table 35.

Table 32 (1.2.4) Sub-Projects for the Thematic Title of Sustainable Agricultural Value Chains

1.2.4. Sustainable Agricultural Value Chains	Total Foreseen Cost (TRY)	Total Beneficiary	Total Public Contribution
Establishment of Portable Harvest and Hazelnut Drying Stations	5.000.000	5.000.000	0
Increase of Women Employment in Rural Areas	2.500.000	2.500.000	0
TOTAL	**7.500.000**	**7.500.000**	**0**

(1.2.4) There are 8 sub-projects in the thematic title of sustainable agricultural value chains and percentile breakdown is shown in Figure 21.

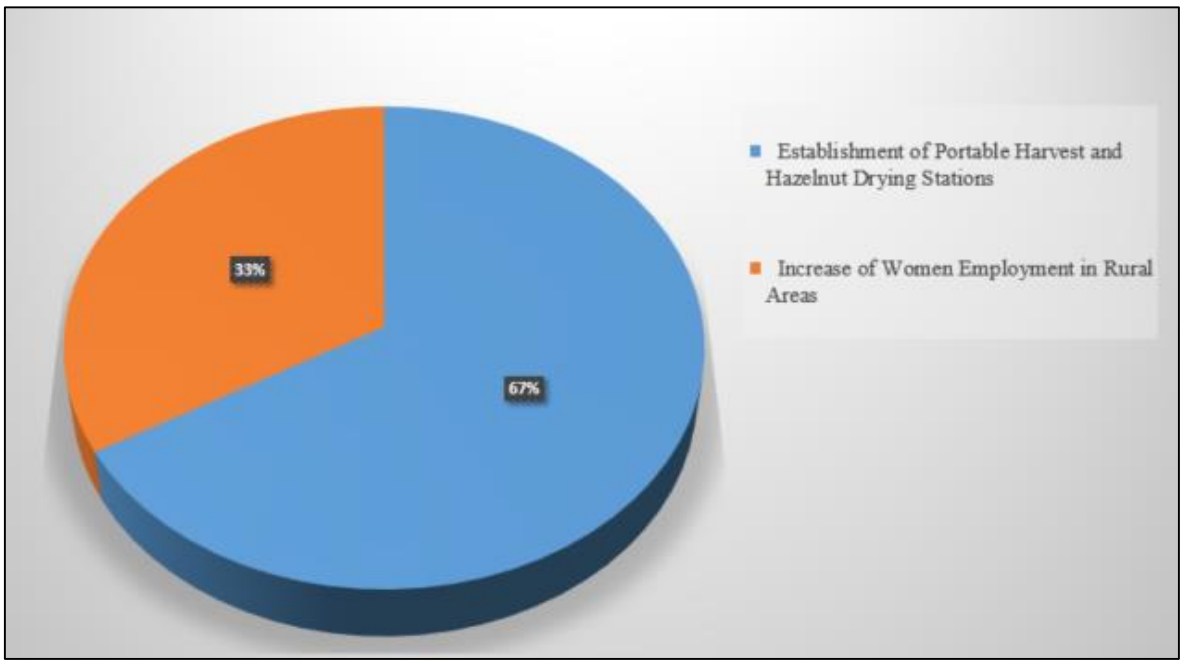

Figure 18 (1.2.4) Sub-Projects for the Thematic Title of Sustainable Agricultural Value Chains

6.2.2.11. (1.2.2) Income Generation and Livelihood Diversification for Rural Areas

(1.2.2) Total foreseen cost of the thematic title of income generation and livelihood diversification for rural areas is 22,975,000 TRY external resource + 19,975,000 TRY (beneficiary contribution) = 42,950,000 TRY and the details are shown in Table 36.

Table 33 (1.2.2) Sub-Projects for the Thematic Title of Income Generation and Livelihood Diversification for Rural Areas

1.2.2. Income Generation and Livelihood Diversification for Rural Areas	Total Cost (External Resource + Beneficiary Contribution (₺))	Total Beneficiary	Total Public Contribution
Dissemination of Sheep Breeding	5.000.000	5.000.000	0
Development of Dairy Cattle Breeding	5.000.000	5.000.000	0
Bee Disease and Pests Control Works	3.000.000	0	0
Diversification of Apicultural Products	2.500.000	2.500.000	0
Dissemination of Goose Breeding	2.500.000	2.500.000	0
Animal Pens and Shepherd Homes Project 39 Households	2.000.000	2.000.000	0
Dissemination of Free System Organic Egg Poultries	1.000.000	1.000.000	0
Dairy Cattle Breeding Development Project 21 Households	500.000	500.000	0
Water Buffalo Breeding Development Project	500.000	500.000	0

1.2.2. Income Generation and Livelihood Diversification for Rural Areas	Total Cost (External Resource + Beneficiary Contribution (₺))	Total Beneficiary	Total Public Contribution
Milk Sheep Breeding Development Project 35 Households	500.000	500.000	0
Scientific Beekeeping and Diversification of Apicultural Products 7 Households	475.000	475.000	0
	22.975.000	**19.975.000**	**0**

(1.2.2) There are 11 sub-projects in the thematic title of income generation and livelihood diversification for rural areas and percentile breakdown is shown in Figure 22.

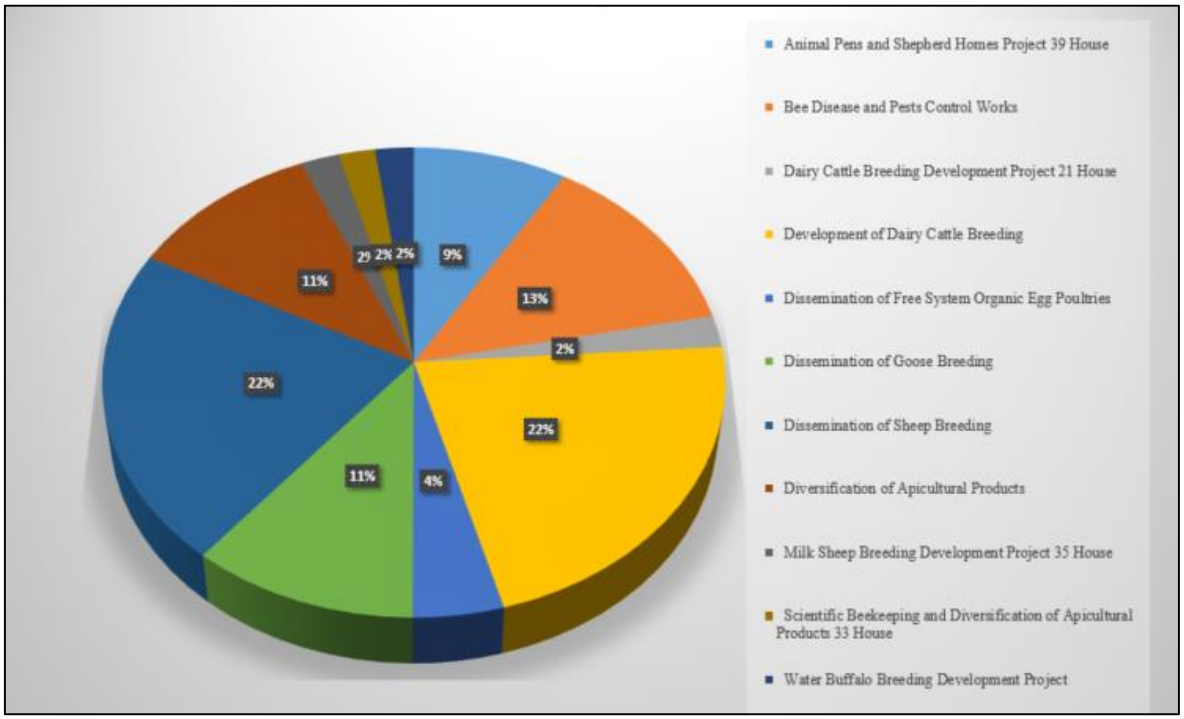

Figure 19 (1.2.2) Sub-Projects for the Thematic Title of Income Generation and Livelihood Diversification for Rural Areas

6.2.2.12. (1.1.1) Erosion, Landslide and Flood Control Works

(1.1.1) Total foreseen cost of the thematic title of erosion, landslide and flood control works is 29,000,000 TRY and the details are shown in Table 37.

Table 34 (1.1.1) Sub-Projects for the Thematic Title of Erosion, Landslide and Flood Control Works

1.1.1. Erosion, Landslide and Flood Control Works	Total Foreseen Cost (TRY)	Total Beneficiary	Total Public Contribution
Implementation of Flood Control Project for Bolaman Watershed	21.500.000	0	0
Landslide Risk Mitigation Projects	5.000.000	0	0
Implementation of Flood Control Project for Ilıca Creek	2.500.000	0	0
TOTAL	**29.000.000**	**0**	**0**

(1.1.1) There are 3 sub-projects in the thematic title of erosion, landslide and flood control works and percentile breakdown is shown in Figure 23.

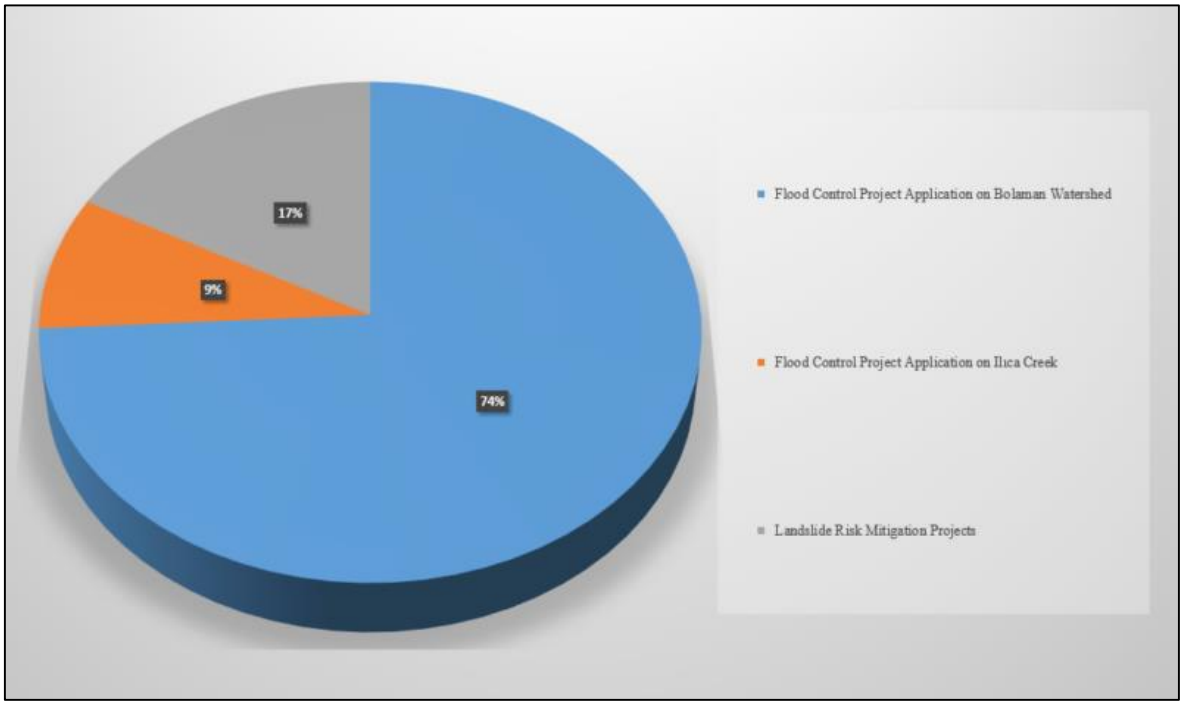

Figure 20 (1.1.1) Sub-Projects for the Thematic Title of Erosion, Landslide and Flood Control Works

6.2.2.13. (1.2.3) Rangeland Rehabilitation and Management

(1.2.3) Total foreseen cost of the thematic title of rangeland rehabilitation and management is 25,000,000 TRY and the details are shown in Table 38.

Table 35 (1.2.3) Sub-Projects for the Thematic Title of Rangeland Rehabilitation and Management

1.2.3. Rangeland Rehabilitation and Management	Total Foreseen Cost (TRY)	Total Beneficiary Contribution	Total Public Contribution
Rangeland/Plateau Rehabilitation and Management Work	15,000,000	0	0
Rangeland/Plateau Rehabilitation and Management Work 18 village rangelands	10,000,000	0	0
TOTAL	**25,000,000**	**0**	**0**

(1.2.3) There are 2 sub-projects in the thematic title of rangeland rehabilitation and management and percentile breakdown is shown in Figure 24.

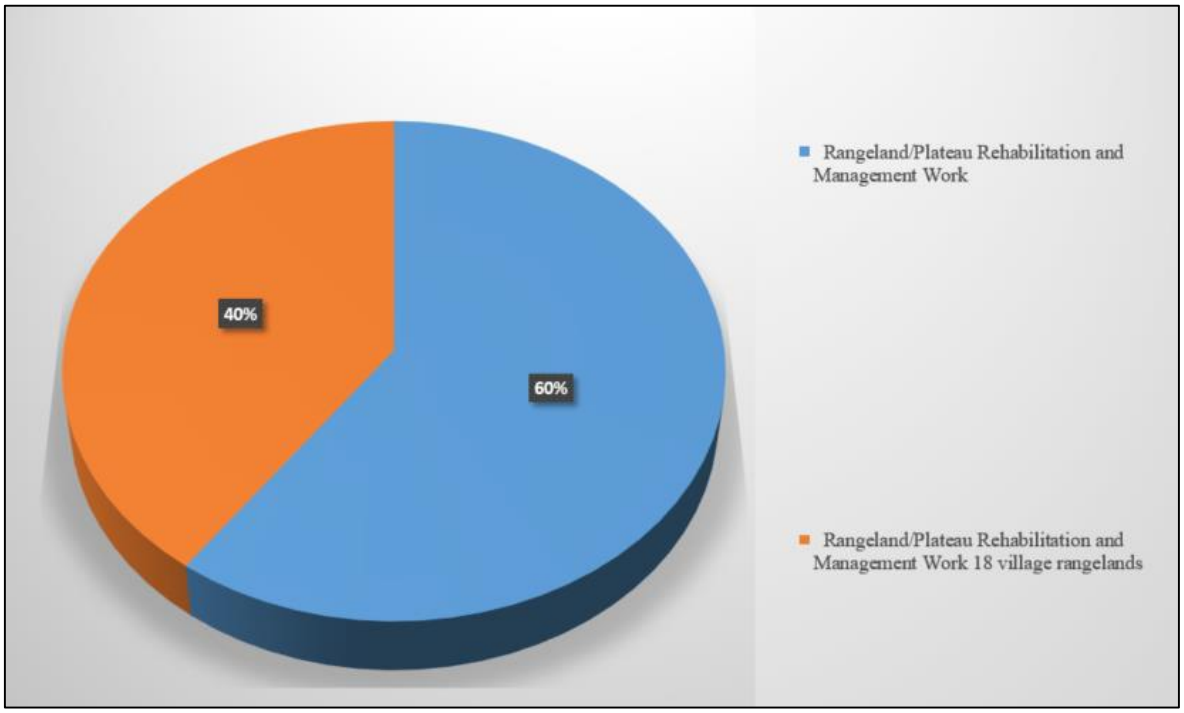

Figure 21 (1.2.3) Sub-Projects for the Thematic Title of Rangeland Rehabilitation and Management

6.2.2.14. (1.1.2) Sustainable Management of Forest and Forest Connected Pastures

(1.1.2) Total foreseen cost of the thematic title of sustainable management of forest and forest connected pastures is 2,300,000 TRY and the details are shown in Table 39.

Table 36 (1.1.2) Sub-Projects for the Thematic Title of Sustainable Management of Forest and Forest Connected Pastures

1.1.2. Sustainable Management of Forest and Forest Connected Pastures	Total Foreseen Cost (TRY)	Total Beneficiary Contribution	Total Public Contribution
Rehabilitation Project of Pastures inside Forests and Connected to Forests	2,300,000	0	0
TOTAL	**2,300,000**	**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 603,309,379 TRY is shown below:

Table 37 Consolidated Project Source of Funds

External Contribution (External Money) (₺)	Public Contribution (Internal Money) (₺)	Beneficiary Contribution (Internal Money) (₺)
517.183.600	20.245.779	65.880.000

85% of the funding of foreseen total investment cost of 603,309,379 TRY is credit (external money), 12% is public contribution and 3% is beneficiary contribution.

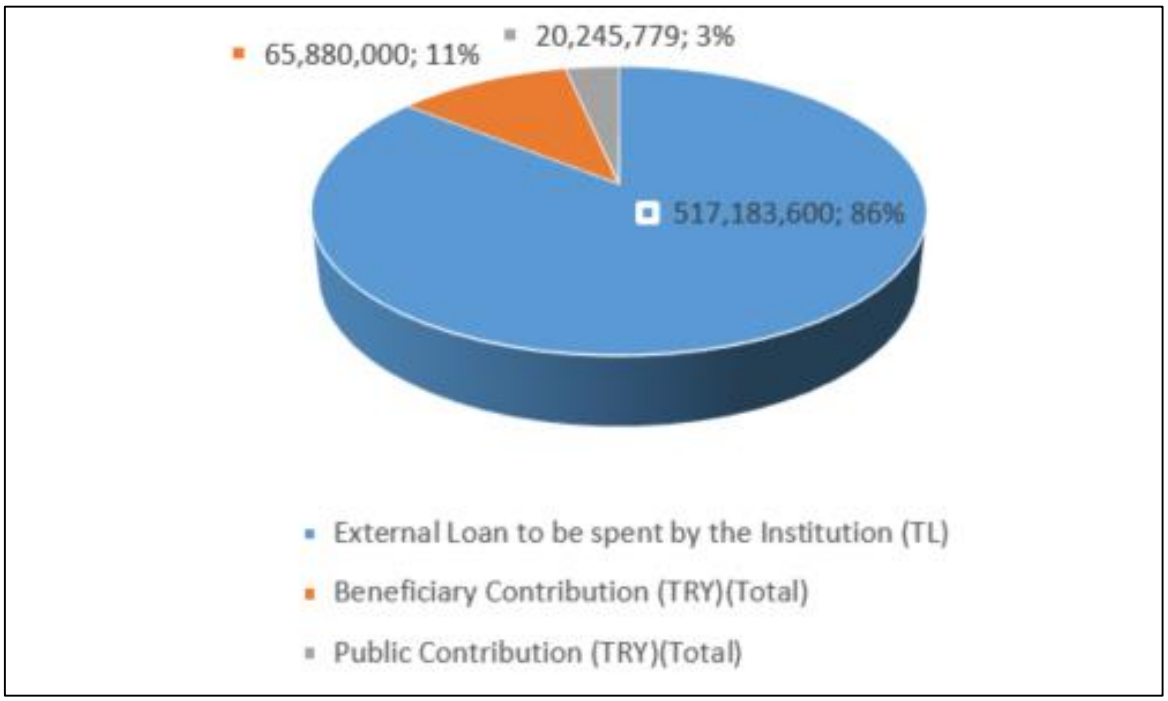

Figure 22 Percentile Breakdown of Consolidated Project Sources of Funds

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 38 Net Present Value

Period	Year	Credit	Income ($)	NPV Income ($)	Cash Flow
1	2021	0	0	0	0
2	2022	0	2.595.082	0	2.595.082
3	2023	0	2.680.719	0	2.680.719
4	2024	0	2.769.183	0	2.769.183
5	2025	0	2.860.566	0	2.860.566
6	2026	0	2.954.966	0	2.954.966
1	2027	4.423.167	3.052.479	0	-1.370.688
2	2028	4.423.167	3.153.210	0	-1.269.956
3	2029	4.423.167	3.257.267	0	-1.165.900
4	2030	4.423.167	3.364.757	0	-1.058.410
5	2031	4.423.167	3.475.794	0	-947.373
6	2032	4.423.167	3.590.494	0	-832.672
7	2033	4.423.167	3.708.982	0	-714.186
8	2034	4.423.167	3.831.377	0	-591.790
9	2035	4.423.167	3.957.813	0	-465.354
10	2036	4.423.167	4.088.420	0	-334.746
11	2037	4.423.167	4.223.339	0	-199.828
12	2038	4.423.167	4.362.709	0	-60.458
13	2039	4.423.167	4.506.679	0	83.511
14	2040	4.423.167	4.655.399	0	232.232
15	2041	4.423.167	4.809.027	0	385.860
16	2042	4.423.167	4.967.725	0	544.558
17	2043	4.423.167	5.131.659	0	708.492
18	2044	4.423.167	5.301.004	0	877.837
19	2045	4.423.167	5.475.937	0	1.052.770
TOTAL		**84,040,171**	**92.774.587**	**76.255.820**	**87.344.160**

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

Table 39 Breakdown of Sources of Funds

Institution\Source of Fund	External Money	Beneficiary Contribution	Public Contribution	TOTAL
DSI	241.000.000 ₺	0 ₺	0 ₺	**241.000.000 ₺**
GDF	102.800.000 ₺	0 ₺	0 ₺	**102.800.000 ₺**
GDH	100.908.600 ₺	21.405.000 ₺	20.245.779 ₺	**142.559.379 ₺**
TRGM	72.475.000 ₺	44.475.000 ₺	0 ₺	**116.950.000 ₺**
Grand Total ₺	**517.183.600 ₺**	**65.880.000 ₺**	**20.245.779 ₺**	**603.309.379 ₺**
Grand Total USD	**67.412.714 $**	**8.587.182 $**	**2.638.952 $**	**78.638.848 $**

1. When the public contribution is calculated as costs by capital in cash, total of External Money, Public Contribution and Beneficiary Contribution (6,412,714 USD + 2,638,952 USD + 8,587,181USD =) 78,638,849 is the NPV of the consolidated project cost.

In this case, present value of the cost, which is 78.638.849 USD, is higher than present value of the benefit, which is 76.255.820 USD. In other words, for this consolidated project:

NPV = 76.255.820 USD – 78.638.849 USD = - 2.383.029 USD. This shows that the net present value of the project is negative.

But as 2/3 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 (67.412.714 USD + 8.587.181 USD =) 75.999.895 USD is the NPV of the consolidated project.

In this case, 75.999.895 USD, which is the present value of the cost, is lower than present USD value of 76.255.820. In other words, for this consolidated project:

NPV = 76.255.820 USD – 75.999.895 USD = 255.925 USD. This shows the project is doable.

6.3.2. Economic IRR

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:

- 2/3 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-Benefit Analysis

Bolaman 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 Bolaman River 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	76.255.820	585.027.025	663.640.317	-78.613.292	-10.246.913
10% Decrease in Exchange Rate	76.255.820	585.027.025	542.978.441	42.048.584	5.480.857
20% Increase in Exchange Rate	76.255.820	585.027.025	723.971.255	-138.944.230	-18.110.798
20% Decrease in Exchange Rate	76.255.820	585.027.025	482.647.503	102.379.522	13.344.741

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	83.881.402	5.242.553
10% Decrese in Income	68.630.238	-10.008.610

7.2. Risks About the Project and Their Impacts

Most important priority for implementing Bolaman River 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 47.

7.3. Risk Mitigation Measures About Main 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 47.

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 Bolaman River 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 Bolaman 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 14 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 Bolaman River 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 to 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 44.

Table 40 Components, Sub-Components and Thematic Titles of the Project

1. Green and sustainable rural development	1.1. Upper basin landscape and rural livelihoods	1. Erosion control, landslide and flood control works
		2. Sustainable management of forest and forest connected pastures
		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. Rangeland rehabilitation and management
		8. Sustainable agricultural value chains
2. Grey infrastructure resilient to the climate	2.1. Disaster risk and resilient infrastructure for water safety	9. Multi-purpose reservoirs
		10. Resilient infrastructure for flood and sedimentation control
	2.2. Climate resilient rural road system	11. Climate-resilient road rehabilitation in rural areas

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 Bolaman 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 the that of construction period risks can also be seen in operation period. There are risks that can vary depending on scopes of the projects. All foreseen environmental risks of projects specified under thematic titles that can occur and all of the measures taken against these risks are presented in a detailed manner in Annex-10.

On the other hand, with forest rehabilitation, afforestation and pasture rehabilitation works that will be carried out by General Directorate of Forestry, fruit garden and pasture rehabilitation works that will be carried out by General Directorate of Agrarian Reform within the context of Bolaman River 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 4,157,008 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 142,1 tCO_2 per hectare or 8,9 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)**
Pasture rehabilitation studies (OGM+TRGM)	3476
Rehabilitation of young forests (GDF)	5730
Income generation afforestation studies (GDF)	240
Honey forests (TRGM)	346
Kiwi garden establishment (TRGM)	20
Trabzon persimmon garden establishment (TRGM)	8
Pasture rehabilitation studies (OGM+TRGM)	6750
Soil protection, nature protection	6956

8.1.3. Assessment of negative environmental effects that can cause economic and social outcomes

Within the context of Bolaman River 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.

Out of the 75 projects under 11 thematic titles suggested by institutions/organizations within the context of Bolaman River Basin Rehabilitation Project and examined within the framework of environmental analysis, 73 of them are exempt from EIA Regulation. Environmental impacts of the exempted projects are at negligible levels or non-existent. Amongst these projects, only for Construction of Çatalpınar Reservoir and Construction of Aybastı (Baydarlı) Reservoir projects that will be conducted by State Hydraulic Works, a Project Introduction Document will be prepared within the context of 'Environmental Impact Assessment Regulation' which was effectuated with Official Gazette dated 25.11.2014 and numbered 29186, and will be presented to the Ministry of Environment and Urbanization. In case that it is decided that no EIA is required for the project, construction activities will be commenced. But if it is decided that an EIA is required, again within the context of the same regulation, an EIA application document will be prepared and presented to the Ministry, and investment will commence after EIA process is completed and EIA positive decision is made. For projects under threshold values presented in Annex-I and Annex-II lists of the regulation in question and for projects that are not included in the Annex-I and Annex-II lists of the regulation, an application will be made to the Provincial Directorate of Environment and Urbanization and a formal letter stating that the project is outside the context of regulation will be received.

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

8.1.4. Environmental impact reducing measures and their 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. Amongst these projects, only for construction of Çatalpınar Reservoir and construction of Aybastı (Baydarlı) Reservoir projects that will be conducted by State Hydraulic Works, a Project Introduction Document will be prepared within the context of 'Environmental Impact Assessment Regulation' which was effectuated with Official Gazette dated 25.11.2014 and numbered 29186, and will be presented to the Ministry of Environment and Urbanization. Environmental analysis of all projects including projects that are subject to EIA Regulation are presented in the table in Annex-10. However, as a result of the environmental analysis, the aforementioned negative effects, which can be reflected in the cost-benefit and economic analysis, are the cleaning and disposal of the wastewater and solid waste that will occur in the recreation areas and all kinds of materials that will accumulate in front of the erosion prevention, landslide and flood control structures. Project owner institutions conduct these activities by including operational costs during the operation of these plants. In this feasibility study, as no benefit cost analyses were carried out based on sub-project, these costs in the operational period were not reflected on 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. Conclusion

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. Among the suggested projects, only 2 of them are projects that 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/Ordu or Tokat Provincial Directorate 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 45, regulations that were issued in line with these laws and presented in Table 46 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 41 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 42 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

A methodology based on primary and secondary sources was used in this section where the social sensitivities of the region and impacts of the project on them were analysed. Potential effects were presented with expert assessments conducted on the data acquired and by using occupational acceptances concerning the previous project impacts. Data sources of which the analysis is based upon are stated below:

Primary data sources

- Project Stakeholder Involvement Meeting (13-14 July 2020 – Ordu)
    - With public institution officials at Ordu Governorship;
    - With non-governmental organizations at Ordu Municipality;
    - With mayors and district governors at Ordu Municipality;
- Meetings, field visits and project area observations (15-16 July 2020 – Ordu)
    - Fatsa Organized Industrial Site;
    - Şahsene Reservoir;
    - Çamaş;
    - Çatalpınar;
    - Kabataş;
    - Çatalpınar-Elmaköy road;
    - Aybastı-Yağcılı road;
    - Sağlık neighbourhood (landslide area);
    - Ordu-Fatsa Ayazlı recreational spot;
    - Kılıçlı;
    - Konakbaşı;
    - Ilıca;
    - Çakırlı;
    - Uzundere Plateau;
    - Bolaman Castle;
    - Çatalpınar tunnel;
    - Kuyluş -Direkli road and bridge;
    - Belenköy peak;
- Stakeholder meetings with local community (15-16 July 2020 – Ordu)
    - Stakeholder meeting at Kabataş Municipality;
    - Stakeholder meeting at Aybastı Anatolian Vocational High School;
- Interviews with mukhtars and key informants (local community, landslide victim, farmers, beekeepers etc.) (15-16 July 2020 – Ordu)

Secondary data sources

- TurkStat statistics;
- Regional development plans;
- Reports of Chamber of Commerce and Industry;
- Academic works;

- Official institution publications (like Ministry of Environment and Urbanization, Ministry of Agriculture and Forestry);
- Master plans;
- Data from national registry of farmers;
- Immigration Authority data;
- İŞKUR data;
- Karadeniz Culture Inventory;
- World Bank publications;
- NGO research reports.

As presented in the second section, Bolaman Basin is a sensitive area in terms of its socio-economic features. There is a serious need for development of infrastructural, social and economic opportunities. Possible positive and negative socio-economic impacts of the projects to be implemented within the context of Bolaman River Basin Rehabilitation Project constitute the subject of this section. According to the types of planned projects, especially non-monetizable projects, the kinds of social and economic impacts created and the groups who will be affected by these impacts (elderly, young, women, forest villager, seasonal agricultural worker etc.) will be presented under the following headings:

- Erosion control, landslide and flood control works;
- Sustainable management of forest and forest connected pastures;
- Forest rehabilitation, protection and sustainable management;
- Income generation and diversification of livelihoods for forest villages;
- Sustainable and climate-smart agricultural practices,
- Income generation and livelihood diversification for rural areas,
- Pasture rehabilitation and management;
- Sustainable agricultural value chains,
- Multi-purpose reservoirs,
- Resilient infrastructure for flood and sedimentation control,
- Climate resilient road rehabilitation in rural areas;

9.1. Social Impacts of the Project

Bolaman River Basin Rehabilitation Project will create mostly positive impacts on the socio-economic sensitivities of the region. Project components are expected to have impact on the topics summarized below. These impacts will be analyzed in a project-based manner in Section 9.

- In recent years, population increase of Ordu province has been under Turkey's average, as a matter of fact, negative population increase was observed in many years;
- Ordu province, despite getting very limited number of immigrations, is the province with the highest rate of immigration to outside;
- Settlements in the province, especially settlements in Bolaman Basin have a very dispersed character because of the topography and agricultural land fragmentation;
- Apart from immigrations inside the area, immigrations outside the region also occur, especially from the rural areas. Primary reason for the immigration outside the area is economic. Fragmented agricultural lands and low numbers of hazelnut gardens do not feed the increasing population in the region where the means of livelihood are limited;
- It was observed that especially after 1985, rural areas have started to drastically lose population. Ordu province has lost one third of its rural population between 2000-2007. Rural population increase between 2000-2007 was -4.25;
- As a result of these developments, rate of elderly population is very high compared to average of Turkey while the young population is very low in the districts of Bolaman Basin. In other words, Basin is losing its economically active population through immigrations outside;
- Economy of Ordu province heavily relies on agriculture and 80% of the economically active population works in the agricultural sector. Arable lands in the Ordu province are limited, but in non-arable hill-side lands hazelnut production is conducted. 74% of these lands registered to Farmer Registration System (FRS) have sizes of 1-20 decares. This is a clear indicator of agricultural lands of Ordu being completely fragmented or small in size;
- As in places where the elevation surpasses one thousand meters lose economic importance for the production of hazelnuts, with the presence of important plateaus husbandry has become an important potential for these levels. But in rural areas, after hazelnut production, the most income generating activity field is beekeeping. But significant portion of the local community conducts mobile beekeeping. Furthermore, Ordu is the province with the highest amount of honey produced by mobile beekeeping. Current forest areas in Bolaman Basin are not utilised to the full economically;
- According to data from 2017, 21.1% of all industrial enterprises in Ordu province are micro-scale, 61.3% of them are small-scale enterprises. This data shows that medium and large-scale industrial enterprises were not developed in the city. Among

13,236 firms operating in the Ordu province, 4802 of them operate with an employment capacity of 1 person;

- When we look at the sectoral breakdown of the industrial enterprises in Ordu province, hazelnut and products based on hazelnuts are seen at the top. 60-70% of the exports are done with hazelnut and hazelnut-based products. An important subject that needs to be emphasized here is that the majority of the workers working in the hazelnut processing facilities are employed seasonally and this significantly limits employment opportunities and economic contribution of the industry;
- Every new enterprise established in Ordu province disconnected from production and without adequate income from outside of the sector mean the appearance of new players that want to take a share from the static market but in low markets and in shrinking market conditions it is not possible for these enterprises to survive. In this sense, the city has a rather closed economic structure;
- Another striking feature of Bolaman Basin is that apart from Fatsa (43.74%), SES status of more than half of the population are in the group D which is the lowest group. Furthermore, the representation of high SES groups constituted by groups A+ and A (5.54%) is far lower than the country's average (16.31%). Once again, the representation of the lowest SES status corresponding to Group D is far higher (between 52.75% and 56.75%) than Turkey's average (33.19%). In short, most of the people in the basin are impoverished people with the lowest SES status;
- According to 2019 İŞKUR data, unemployment rate across Turkey for graduates is 14.2% while in Ordu unemployment rate of graduates is 25%. While registered employment rate of women is 12.89% in Ordu, 55% of the women employed works part-time. This data shows us the young unemployment and women unemployment rates and ratio of women working part time are very high in Ordu;
- According to the studies carried out, for the people living in the center of Ordu, the least satisfied subject is health with 12 points. Another issue that needs to be considered is that if the situation is like this in the center of Ordu, the satisfaction situation will not be any different in isolated rural areas of Bolaman Basin. While the environmental satisfaction has 21 points out of 100, this is 24 points for security. These are followed by infrastructure with 27 points, transportation with 45 points and recreation again with the same points. Another point that needs to be emphasized here is that in all of the subjects mentioned the city's satisfaction is below 50%;
- According to the research results of 2015 TurkStat Turkey Urban Life Index, the amount of people satisfied with the social life in Ordu was 45%. In this context, Ordu is placed in 69th place amongst 81 provinces in Turkey;
- Reduction in plant and animal production, lack of water, flood and overflows and other similar natural disasters show up as factors triggering especially rural immigration in Bolaman Basin. In almost all areas of the basin, exposure to various types of natural disasters is very likely. 92% of the Bolaman Basin has a degree of slope higher than 5. 40% of lands have a slope degree of 20 and higher. In these lands, most of the rainwater starts flowing and starts erosion activities in places

where vegetation is low or weak. In this context, almost all of the areas used for farming are problematic fields for agriculture;

- According to 2017 data, total number of people who are illiterate, who are literate but have not finished a school and people who are primary school graduates are 328,086. According to this data, we can say that people with low educational level mostly reside in rural areas, and that the ratio of this population is more than half of the rural population;
- Considering these data, it means that rural population who migrate and go outside of the city work in rather unskilled labours in the labour market. As a matter of fact, predominantly male population migrating from villages were observed to work in the construction sector in the metropolises;
- According to the TurkStat 2015 data, ranking of Ordu in the 69th place in the rankings of social life show the inadequacy of the city's recreational areas and activities;
- As the basin is lack of developed road networks, access to services like education and healthcare is a problem for some distant villages and geographical conditions in the basin make all kinds of access harder. In this context, it can be said that the basin community is socially excluded by sociological, economic and cultural means;
- It is known that seasonal agricultural workers and child workers are employed during especially hazelnut harvesting periods in Bolaman Basin.

As summarized above, as low agricultural yield, rural socio-economic level and education levels, high ratio of elderly population, emigration and women unemployment, limited social life and infrastructure opportunities with economic and social activities become risky due to topographical features, Bolaman Basin is an area that needs investments. Because of this, implementation of projects that have the potential of creating a drastic improvement impact will affect Bolaman Basin community in a positive way economically and socially. What kind of improvement potentials that the planned projects possess are examined in the Section 9 separately.

9.2. Impact of the Project on Communities

9.2.1. Erosion control, landslide and flood control works

It is expected that these kinds of investments will have a positive effect on soil quality and agricultural productivity. Increasing agricultural productivity will have positive effects on the socio-economic levels of the local community. As a result of these developments, a decrease in the immigration outside of the basin can be expected. Apart from the positive effects it will have on the local community, erosion control, landslide and flood control works can be expected to increase job potentials for the seasonal agricultural workers.

9.2.2. Sustainable management of forest and forest connected pastures

These kinds of investments can be expected to create positive impacts on the husbandry activities, these impacts will also affect the diversification of income generation activities. Women's integration to the economic life will also be ensured especially when the barriers before them participating in these kinds of activities are lifted. Sustainable management of pastures may have an effect that causes settlement increase in the plateaus and this may have a negative effect on the income generation activities caused by creating population pressure on pastures and plateaus. Like in all of the income generating projects, sustainable management of forest and forest connected pastures projects may create a cumulative effect in reversing the immigration.

9.2.3. Multi-purpose reservoirs

Multi-purpose reservoirs can only serve a limited amount of numbers because of the scale of the basin and may have negative effects like causing loss of life and property if safety legislation is not adhered during operation. But these kinds of investments will also provide an opportunity to control natural disasters like flood and overflows which make economic and social activities in the basin risky. In turn, this may cause increases in the quality of life of the local community. Positive effects on quality of life will be able to create impacts that make the lives of sensitive groups' easier and prevent immigration.

9.2.4. Forest rehabilitation, protection and sustainable management

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.

9.2.5. Income generation and diversification of livelihoods 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.

9.2.6. 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.

Loss of trees during terracing activities comes into question. In this case, annual income sources of households will be harmed greatly. Establishing of new hazelnut gardens and bringing them to their previous level will take time. It is not possible to implement the project before these income losses are reimbursed. For this reason, an income restoration plan is needed. Otherwise, households depending on hazelnut production for their livelihoods may have economic losses over the years.

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.

9.2.7. Pasture rehabilitation and management

These projects may have a positive impact on the husbandry activities. This situation may decrease risks of a monocultural structure in agriculture by impacting diversification of income generating activities. Especially when obstacles before women participating in these kinds of activities are lifted, integration of women to economic life will be achieved. Pasture rehabilitation and management may have an effect that increases settlement in the plateaus indirectly. This may have a negative effect on the income generation activities caused by creating population pressure on pastures and plateaus. Like in all of the income generating projects, pasture rehabilitation projects may create a cumulative effect in reversing immigration.

9.2.8. Income generation and diversification of livelihoods of 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.

9.2.9. 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 Bolaman River 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.

9.2.10. 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.

9.2.11. Climate resilient road rehabilitation in rural areas

Development of highways has first and foremost facilitating effects on access to social services like education and healthcare. It creates a positive effect on public health by providing traffic safety and reduces the risks of accidents by the agricultural workers coming to the area.

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. In addition, paying attention to the protection of cultural heritage in construction works is expected.

9.3. Regional Impact

As underlined before, Socio-Economic Status (SES) of the local community in Bolaman 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 basin population is concentrated in group D which represents the lowest SES. There are generally unemployed people, agricultural workers, small business owners or people dealing with marginalized jobs in this group. Income and education levels of these people are quite low. The majority is primary school graduate. Generally, they do not have a bank account, they do not go to cinema and theatre, they do not read a book but they watch television. Men usually go to a coffeehouse. Ordu province and especially local community of the basin included in this SES group representing these general characteristics strongly need improving economic, social and cultural actions. The projects planned under Bolaman River Basin Rehabilitation Project have direct impacts in most cases and indirect impacts in some cases to meet social, economic and cultural needs of the local community of Bolaman Basin.

The objectives of Bolaman River 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 Bolaman River Basin Rehabilitation Project.

2014-2023 Eastern Black Sea Development Plan, which is one of the regional development plans, has put forth a development vision on welfare and quality of life, innovative and competitive economics, rural-oriented welfare and happiness and liveable areas and sustainable environment vision. The Regional Plan points out the following aspects:

- rural migration prevention plan;
- rural development and income generation objectives for rural communities;
- sustainable new and diversified agricultural practices;
- increasing the efficiency of livestock;
- increasing sustainability in forestry and increasing income generated from forestry with participation.

All these objectives of the Eastern Black Sea Development Plan are in comply with Bolaman River Basin Rehabilitation Project.

9.4. Cumulative Impact of the Project on the Basin

When the projects under all of the sub-components of Bolaman River 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. Bolaman River 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. As a result of increase in SES, it is expected that intraregional demand will enliven. The fact that agricultural efficiency of the soil increases with the good agricultural practices and income of the local community increases may create upward pressure on prices of lands suitable for agricultural activities. In this context, when socio-economic impacts created in the project in the region together with the other private and public investments, land acquisition is an important issue. When lands owned by the local community or public lands are purchased for different reasons and in small pieces for construction works, big land purchases occur in total. This situation leads to a decrease in private lands where the local community engages in agricultural activities and public lands that the local community benefits from in time. Therefore, land acquisitions should be planned by observing cumulative impacts.

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. Bolaman River 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, rehabilitation projects and natural disaster preventive activities to be carried out with the implementation of the project will prevent floods and overflows. These works mean that economic damages resulted from natural disasters in certain times will not be encountered anymore. For example, it was declared that the cost of the flood occurred in Ordu on 5 July 2016 was 150 million TRY. In the region where similar natural disasters frequently occur, social results of this cost will also be prevented with the infrastructure projects that are put into implementation.

It is expected that the local community who cannot benefit from rains although the region receives much rain as well as suffer from negative aspects like floods and overflows benefit from reservoirs to be created in the agriculture. It is planned that the rain which leads to

floods and overflows will contribute to agricultural irrigation with the reservoirs to be created. Thereby, agricultural production capacity of the region will be increased. Besides, means of transportation to the out regions will increase thanks to road construction and rehabilitation projects. It means that products to be produced in this region will easily get into external markets. Production costs decreased with the projects supported show that products to be produced in the region will have competitive prices. All of this economic transportation, production and distribution ecosystem will increase income of the local community as well as increase their quality of live with infrastructure projects. This situation will stop migration to the other provinces as there are not sufficient employment opportunities in the region. Besides, it is expected that recreation areas to be constructed will contribute to the domestic tourism. One of the most important contributions of prevention of natural disasters in the region, rehabilitation of recreation areas and the other economic activities is the development of rural tourism. Each component to be put into implementation in the project will trigger each other in this regard and includes economic impacts which can increase the added-value impact.

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 GDM are the project partners and part of the project implementing unit. 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.

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 chairpersonship of the 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. Project Implementation Plan and Critical Stages of the Project

Bolaman River 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 Bolaman 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 Çekerek 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. Bolaman River 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. Outcomes of the Project About 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. Bolaman River 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 About the 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 47.

POSSIBILITY	**High**	**Medium risk**	**High risk**	**Extraordinary risk**
	Medium	Low risk	Medium risk	High risk
	Low	Insignificant risk	Low risk	Medium risk
		Mild	**Medium**	**Serious**
	IMPACT			

Table 43 Project Risk Assessment

Risk category	Sub-category	Risk description	Possibility	Impact	Risk Score	Risk prevention/mitigation measures
External, unanticipated, uncontrolled	Legislation-based	Legislative amendment with an unanticipated state intervention	Low	Serious	Medium risk	-
	Natural disasters	Flood, earthquake	Medium	Medium	Medium risk	-
	Assumable incidents	Anarchy, sabotage	Low	Medium	Low risk	-
	Noncompletion deficiencies	Failure of design	Low	Medium	Low risk	-
External, anticipated, uncontrolled	Market risks	Embargo, competition	Low	Medium	Low risk	As international embargos do not affect products to be presented to the internal market, risk prevention measure is not recommended.
	Operation	Not carrying out maintenance services which appear after commissioning	Medium	Medium	Medium risk	Within the scope of Component 3 defined under the project, the projects will be monitored and their sustainability will be ensured.
	Social effects	Migration	Low	Mild	Insignificant risk	-
	Monetary changes	Parity changes	Medium	Mild	Low risk	-
	Inflation, taxation	High inflation, new taxes	Medium	Medium	Medium risk	-
	Global pandemic	-	High	Mild	Medium risk	Due to the features of the projects, it is not expected that they will be affected by the pandemic.
	Management	Change of management,	Medium	Medium	Medium risk	It will be ensured that the project will not be affected by

Risk category	Sub-category	Risk description	Possibility	Impact	Risk Score	Risk prevention/mitigation measures
Internal, non-technical, generally controllable		insufficient project management				these changes with an effective project management practice.
	Cost	Inadequate estimation	Low	Medium	Low risk	In case that costs are inadequately calculated, it will be ensured that the state will contribute.
	Money flow	Need, deduction, not being able to solve	Low	Serious	Medium risk	It will be ensured that payment plan determined in advance is adhered to.
Technical, generally controllable	Technological changes	Not being able to adapt to new technologies, technological obsolescence	Low	Mild	Insignificant risk	-
	Design	Inadequate data, design mistake	Low	Serious	Medium risk	Each institution has determined their projects by the experts in these institutions according to their area of duty, power and responsibility.
	Magnitude or complexity of project	-	Medium	Serious	High risk	Within the scope of Component 3 defined under the project, effective management of the sub-projects will be ensured. Besides, the fact that GDF which is the implementing institution of the project has implemented similar projects

Risk category	Sub-category	Risk description	Possibility	Impact	Risk Score	Risk prevention/mitigation measures
						as an institution will yield advantages.

12. ANNEXES

Annex-1	Project Classification and Project Characteristics List
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