

## Socio-Economic Monitoring and Evaluation of Çoruh River Watershed Rehabilitation Project in Türkiye

Atakan ÖZTÜRK , Ufuk DEMİRCİ\* , İnci Zeynep YILMAZ 

Artvin Çoruh University, Faculty of Forestry, Department of Forest Engineering,  
Artvin, TÜRKİYE

\*Corresponding Author: [udemirci08@artvin.edu.tr](mailto:udemirci08@artvin.edu.tr)

Received Date: 04.11.2024

Accepted Date: 30.05.2025

### Abstract

**Aim of study:** It is aimed to monitor and evaluate the effects of activities such as afforestation, erosion control, and income generating supports within the scope of Çoruh River Watershed Rehabilitation Project.

**Area of study:** The study was carried out in 12 micro-catchments selected from Artvin, Erzurum and Bayburt Provinces located in the Çoruh River Watershed in Türkiye.

**Material and method:** Two surveys were conducted. In the first stage, a survey was conducted with 1075 household representatives in a total of 61 villages. In the second stage, 11 socio-economic monitoring and evaluation indicators were determined under four monitoring aspects, and the final survey was conducted with a total of 455 people.

**Main results:** The expected effect with the ÇRWRP has occurred in a total of 6 indicators, three from the socio-economic status aspect, one of each aspect as wood consumption, marketing of products, and awareness of rehabilitation project. There is a statistical difference between the initial and the final monitoring values due to the effect of the ÇRWRP.

**Research highlights:** The percentage of households considering migration out of the village in the next five years decreased from 17.1% to 11.9% across the study area. It is important to repeat such studies in the following years to reveal the impact of this project in the medium and long term in a more realistic way.

**Keywords:** Sustainable Rural Development, Watershed Management, Monitoring and Evaluation Indicators, Natural Resource Management

## Çoruh Nehri Havzası Rehabilitasyon Projesinin Sosyo-Ekonomik İzleme ve Değerlendirmesi, Türkiye

### Öz

**Çalışmanın amacı:** Çoruh Nehri Havzası Rehabilitasyon Projesi kapsamında ağaçlandırma, erozyon kontrolü ve gelir getirici destekler gibi faaliyetlerin etkilerinin izlenmesi ve değerlendirilmesi amaçlanmaktadır.

**Çalışma alanı:** Çalışma, Türkiye'de Çoruh Nehri Havzasında yer alan Artvin, Erzurum ve Bayburt illerinden seçilen 12 mikro havzada gerçekleştirilmiştir.

**Materyal ve yöntem:** Biri projenin başında diğeri sonunda olmak üzere iki anket çalışması gerçekleştirilmiştir. İlk aşamada, toplam 61 köyde 1075 hane halkı temsilcisi ile bir anket gerçekleştirilmiştir. İkinci aşamada, dört izleme boyutu altında 11 sosyo-ekonomik izleme ve değerlendirme göstergesi belirlenmiş ve son anket toplam 455 kişi ile gerçekleştirilmiştir.

**Temel sonuçlar:** ÇRWRP ile beklenen etki, sosyo-ekonomik durum boyutundan üç, odun tüketimi, ürünlerin pazarlanması ve rehabilitasyon projesine ilişkin farkındalık boyutlarından birer olmak üzere toplam 6 göstergede gerçekleşmiştir. İlk ve son izleme değerleri arasında ÇRWRP'nin etkisiyle istatistiksel bir fark meydana gelmiştir.

**Araştırma vurguları:** Önümüzdeki beş yıl içinde köy dışına göç etmeyi düşünen hanelerin oranı çalışma alanı genelinde %17,1'den %11,9'a düşmüştür. Bu projenin orta ve uzun vadede etkisini ortaya koymak için böyle çalışmalarının ilerleyen yıllarda da tekrarlanması önem arz etmektedir.

**Anahtar kelimeler:** Sürdürülebilir Kırsal Kalkınma, Havza Yönetimi, İzleme ve Değerlendirme Göstergeleri, Doğal Kaynak Yönetimi



## Introduction

The rapid population growth and industrialization around the world lead to the unsustainable use of natural resources. Managing natural resources without considering the protection-utilization balance, causes various ecological and economic problems, such as pollution of soil and water resources, erosion, destruction of forests, deterioration of rural people's living conditions. The development policies and strategies of countries have changed over time due to the needs of societies and changing economic, social and environmental concerns.

In the 1970s, it was realized that economic growth alone would not be sufficient or desirable for development, and that environmental values should also be protected. It was understood that the economic growth process, which irreversibly destroys natural resources, cannot be sustainable in the long run. For this reason, by adopting an approach based on human and environmental dimensions in economic development, the concept of sustainable development began to come to the fore (Kaynak, 2009).

The development efforts of the countries aim to eliminate the imbalances between and within the regions, as well as to increase the general welfare level of the country. For this reason, various approaches to rural development are adopted and implemented. Prior to the 1980s, political priorities based on growth gradually gave way to the search for integrated development that covers the entire society, and concepts such as free market, sustainable development, participation, and governance began to shape rural development policies (Gülçubuk et al., 2010).

In this context, in the natural resource management process, the watershed stands out as the most appropriate unit for planning in natural resources management. A watershed is defined as the collecting area of water, where the climate, geology, topography, soil, flora and fauna interact with the water within its natural boundaries, and it is the total area above some point on a stream or river that drains past that point (OSİB, 2014a; Wang et al., 2016). The positive and negative effects of interventions or policy implementations regarding natural resources

management in the relevant area can be monitored. It also provides a practical analytical framework for decision makers by presenting information and process-oriented scientific assessment (Montgomery et al., 1995; Narenda et al., 2021). A watershed is not simply the hydrological unit for physical analyses, but also a suitable socioeconomic, political and ecological unit for the management, planning and implementation of food, social, economic security and sustainable rural development policies (Wani et al., 2008; Wang et al., 2016; Tesfaye et al., 2018).

For a sustainable rural development, it is necessary to manage watersheds not only by stabilizing soil, water and vegetation, but also by increasing the productivity of resources that are ecologically and institutionally sustainable (Farrington et al., 1999). Water resources are natural resources that are very difficult to replenish. Watershed degradation first affects the downstream, then the neighbour watersheds, and then the whole country. In addition, water resources are resources that affect and connect natural, socio-cultural and economic life. That's why, for successful water management, "watershed management", which concerns all the inputs affecting water resources, is needed (ÇEMGM, 2016).

By adopting a holistic approach, watershed management integrates forestry, agriculture, pasture, water management and rural development. The watershed program became more popular since the mid1990s by emerging of new initiatives and institutional structures emphasizing participation, sustainability and program impacts (Tesfaye et al., 2018). Watershed management is the process of planning and management of natural resources, sustainable development and strategies on a river basin level by involving socio-economic, human-institutional, and biophysical inter-relationships among soil, water, and land use and the connection between upland and downstream areas (Ffolliott et al., 2002; Bandaragoda & Babel, 2010).

Studies in watersheds necessitated "integrated watershed management" (IWM) due to the need for coordination of related institutions, on-site development of the local

people, and the understanding of the importance of the participation of local people and non-governmental organizations for a sustainable natural resource management (ÇEMGM, 2016). As a result of progress in the watershed management approach, now IWM has become more prominent (Wang et al., 2016). IWM is different from traditional resource management approaches as it addresses a broader set of issues and includes physical, biological and socioeconomic variables. It can be defined as an integrated and coordinated approach in planning and management of natural resources on a river basin level by promoting shareholders to consider various social, economic and environmental interconnections. (Hooper, 2005).

IWM addresses the integration and balancing of multiple objectives such as the conservation of environmental resources, protection of water quality, providing safety, transport capacity, opportunities for recreation and development of local people (Rijke et al., 2012; Thapa et al., 2022). It aims to provide goods, services and benefits to local people living in the watershed boundary (Wang et al., 2016). Also, local people play an important role in decision making process in IWM by offering site-specific solutions (Thapa et al., 2022). Through an effective IWM application, a balance between economic growth and protection of natural resources can be maintained, the sustainability of watershed can be ensured and needs of shareholders can be satisfied equitably (Karpuzcu & Delipinar, 2011).

Due to natural and human related factors such as climate change, pollution, erosion, agricultural practices, overgrazing and deforestation, in addition to ecological effects such as the decrease in the quantity and quality of water resources in a basin, a decrease in soil fertility, damage to biological diversity, the basic livelihood conditions of the local people are also negatively affected. For this reason, watershed rehabilitation projects are carried out to ensure the social, cultural and economic development of the people living in the basin by taking technical, cultural and administrative measures to ensure the natural balance between soil, water and vegetation in the relevant basin in order to

ensure integrated watershed management. Although watershed rehabilitation projects are not rural development projects per se, they aim at the on-site development of disadvantaged people, families and villages living in rural mountain areas. Watershed rehabilitation projects aim at improving the forest, pasture and agricultural lands in the basin, together with the economic development of the people living in the basin, and thus restoring the disturbed natural balance (ÇEMGM, 2016).

In Türkiye, the first watershed-based studies started in the 1950s. These studies aimed to reduce soil erosion, prevent water damage, and make afforestation. Since the 1970s, the local people living in the basin have been included in the watershed improvement projects, and to reduce the pressure on natural resources, various rural development supports have been provided for the local people. Since the 1990s, multi-dimensional "Integrated Watershed Rehabilitation Plans and Projects" started to be realized with the participation of all sectors and interest groups in the basin. The main objectives of these projects have been determined as follows :

- To prevent improper land use,
- To rehabilitate degraded ecosystems,
- To prevent erosion, flood and flood disasters,
- To protect and improve forests,
- To develop good agricultural practices,
- To increase the quality and quantity of water,
- To manage and improve rangelands,
- To increase the income level of the people living in the basin,
- To increase the living standards of the people,
- To achieve global benefits through local activities,
- To achieve positive results against desertification and climate change,
- To conduct training activities and demonstrations,
- To raise awareness.

Various integrated watershed rehabilitation projects have been implemented and continue to be implemented in Türkiye in order to achieve the above-mentioned goals.

While some of these projects are financed by national resources, some comprehensive projects, on the other hand, are supported and financed by some international organizations as well as national resources. These projects are called outsourced integrated watershed rehabilitation projects. These projects are (Çağlar, 2010):

Eastern Anatolia Watersheds Rehabilitation Project (1993-2001)

Anatolian Watersheds Rehabilitation Project (2005-2011)

Murat River Watershed Rehabilitation Project (2012-2018)

Çoruh River Watershed Rehabilitation Project (2012-2019)

Sustainable Land Management and Climate Friendly Agriculture Project (2015-2018)

In addition to the protection, rehabilitation and management of natural resources, participation, sustainability and supporting local people with income generating activities are the main policies adopted in these projects. In other words, along with other dimensions, especially social and economic dimensions are among the common features of all these projects.

As one of these projects, Çoruh River Watershed Rehabilitation Project (ÇRWRP), was carried out in a total of 12 micro-catchments (MCs) selected from Artvin, Erzurum and Bayburt Provinces located in the Çoruh River Watershed. The main objectives of the project are (OSİB, 2014b):

Conservation, rehabilitation and sustainable management of natural resources,  
Livelihood improvement of village residents,

Capacity development,

Consulting services.

Within the scope of the project, the following activities were targeted to be realized (OSİB, 2014b):

26000 ha soil conservation facilities,

14300 ha of degraded forest rehabilitation,

16000 ha pasture rehabilitation,

Development of animal shelters for 893 households,

Establishment and operation of orchards in 302 ha area,

207 family greenhouses created and operated by households,

Providing beekeeping kits to 806 families,  
Providing 400 solar water heating systems and 800 heat-efficient stoves to forest villagers,

Conducting market analysis and providing marketing assistance to villagers,

Conducting feasibility studies for potential livelihood improvement investments.

The rehabilitation project, which is planned to extend the economic life of the completed, under construction and planned dams on the Çoruh River and to reduce the unsustainable use of natural resources by forest villagers, was initiated in 2002 by the Japan International Cooperation Agency (JICA) and the Ministry of Environment and Forestry of Türkiye. The project was implemented between 2012 and 2019 under the coordination of General Directorate of Forestry and with the help of related state institutions and organizations in three target provinces.

The total planned budget of the project is approximately 7 billion Japanese yen, of which approximately 21% (1.4 billion Japanese yen) is allocated to activities (such as solar water heating system, beekeeping, greenhouses, etc.) to livelihood improvements of forest villagers (MoAF, 2022)

To achieve these listed outputs, beside planning and implementation processes, there is also a monitoring and evaluation (M&E) process in which the success of the project is followed. In this study, it is aimed to monitor the effects of all activities (afforestation, erosion control, income generating supports, etc.) within the scope of ÇRWRP on the local people with the help of socio-economic indicators and to make evaluations based on these indicators.

Although there are some studies (Gürbüz & Karabulut, 2008; Aydın, 2010; Önal & Bekiroğlu, 2011; Daşdemir & Köse, 2021) aiming to reveal the success of the similar watershed rehabilitation projects, there is no study in Türkiye that deals with the success of an integrated watershed rehabilitation project with a wide application area and longer-term socio-economic monitoring and evaluation. Therefore, this study can be considered as a pioneering and original study.

## Material and Methods

### Study Area

Çoruh River Watershed, which locates at the northeastern part of Türkiye and includes three provinces (Artvin, Erzurum and Bayburt) is selected as study area. The

research area covers a total of 152 villages within 12 MCs, 3 from Artvin (Bıçakçılar, Veliköy and Yusufeli), 7 from Erzurum (İspir, İspir North, Oltu, Olur, Şenkaya, Tortum North and Uzundere) and 2 from Bayburt (Masat and Taht) (Figure 1).

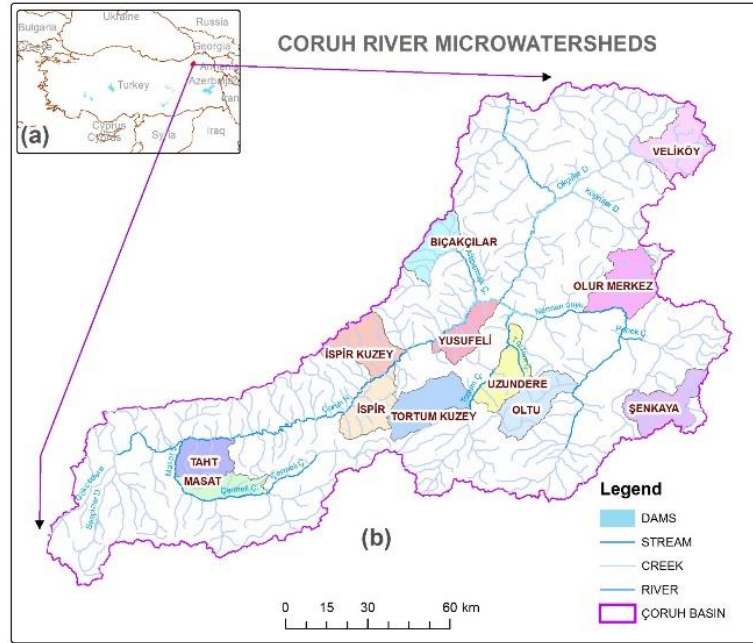


Figure 1. Study area (a-Location in Türkiye, b-Distribution of 12 MCs in the Çoruh River Watershed)

The main reason behind the rehabilitation project in the Çoruh River Watershed is that the natural resources in the watershed have been degraded due to natural conditions such as disorder of topography, arid land, low rainfall, and the length of the winter months. In addition, the poor socio-economic conditions in the watershed have made the local people more dependent on natural resources and the pressure on natural resources has begun to increase gradually.

Some prominent information on the demographic and socio-economic situation in the study area at the beginning of the project are as follows (Öztürk, 2019):

The population in the villages decreased by approximately 1/5 in the period 2011-2015. Across the 12 MCs, the population density of 7.1 persons/km<sup>2</sup> in 2015 was well below the average of Türkiye (102

persons/km<sup>2</sup>). These changes in population are due to migration out of the village.

The average household size is 3.7 for 12 MCs, which is below the average of 3.9 for Türkiye.

In villages, one out of every five households (22%) is vacant due to migration.

The ratio of households' average income to expenditure is calculated as 1.07.

While 76.1% of households define themselves as middling, 19.6% define themselves as poor, 2.2% as very poor and only 1.6% as rich.

Their primary sources of income are pensions and agricultural income.

Interpolated climate data of the micro-catchments are given in Table 1 (Tüfekçioglu et al., 2019). When the climate data are analysed, it is seen that the highest rainfall is in Bıçakçılar MC and the lowest rainfall is in Uzundere and Taht MCs.

Table 1. Interpolated climate data for micro -catchments

| Province | Micro-Catchment | Average Highest Temperature (°C ) | Average Temperature (°C ) | Average Rainfall (mm) | Average Altitude (m) |
|----------|-----------------|-----------------------------------|---------------------------|-----------------------|----------------------|
| Artvin   | Bıçakçılar      | 22.04                             | 5.43                      | 1180                  | 2257                 |
|          | Veliköy         | 25.13                             | 6.35                      | 961                   | 1770                 |
|          | Yusufeli        | 25.49                             | 8.88                      | 808                   | 1568                 |
| Erzurum  | İspir           | 24.44                             | 6.65                      | 867                   | 2038                 |
|          | İspir North     | 10.87                             | 4.69                      | 1085                  | 2354                 |
|          | Oltu            | 23.73                             | 6.22                      | 783                   | 1954                 |
|          | Olur            | 13.25                             | 7.00                      | 784                   | 1940                 |
|          | Şenkaya         | 22.10                             | 5.49                      | 1174                  | 2245                 |
|          | Tortum North    | 11.76                             | 4.87                      | 843                   | 2254                 |
|          | Uzundere        | 14.76                             | 8.32                      | 512                   | 1679                 |
| Bayburt  | Masat           | 22.08                             | 4.56                      | 689                   | 2043                 |
|          | Taht            | 23.21                             | 5.68                      | 568                   | 1813                 |

### Material

Within the scope of the study, primary and secondary data sources were used as material. The primary data was collected through face-to-face surveys conducted with a member of households in the selected villages. Secondary data were gathered from various documents of related governmental and nongovernmental organizations. In this context, firstly “Çoruh River Participatory Watershed Rehabilitation Master Plan Study” and “Çoruh River Watershed Rehabilitation Project Feasibility Study” were discussed. Then similar watershed rehabilitation projects in Türkiye that have been completed before were examined.

### Method

In order to determine the success of the implemented rehabilitation project, socio-economic M&E system was used as the basic method in the study. The aim of M&E studies is to determine the success of the natural resource management project, and these studies are valuable tools to provide information on watershed management achievements (Mbiha & Senkondo, 2001; Narenda et al., 2021). The M&E plan is like a roadmap to guide the entire process. It is crucial to put a standard set of steps in place, including all elements in the process, design M&E plan for use in decision-making (Bennett et al., 2021).

The stages of the socio-economic M&E process were determined as the determination of socio-economic status, monitoring and

evaluation studies and making final analysis and evaluations. Before starting data collection and analysis studies, a literature review was carried out to obtain secondary data from existing studies related to the project topic. Then, the stakeholders to be included in the scope of the research were determined. The main stakeholders are; primarily the local people living in the villages affected by the project, the local people who will benefit from the project, women and young farmers, forest and agricultural provincial organizations and other relevant institutions.

On the other hand, in the study, quantitative techniques were preferred in order to collect data on the indicators that form the basis of monitoring activities showing the current situation of the households. In this context, it is planned to apply a "household survey study based on face-to-face interviews" to the household head or representatives in the villages taken as examples in each micro-catchment. Two different surveys were conducted, one at the beginning of the project (in 2013 and 2014) and the other at the end of the project (in 2018). In order to see the effects of the activities carried out within the scope of the project, the initial survey included questions to determine the current situation of the villages and villagers in the project area before the said activities were started. To carry out socio-economic monitoring and evaluation, the final survey study, which

included socio-economic indicators, was conducted out when the project ended.

The population of the research consists of the rural population living in 152 villages in 12 MCs in Artvin, Erzurum and Bayburt provinces. According to the data from the Turkish Statistical Institute, a total of 33831 people lived in the mentioned villages in the initial year of the project, and considering the average household size of 4.4, the average number of households is 7689.

According to sample size calculation formula (Baş, 2001), the sample size was calculated as 310. Considering the scope of the research area and its spread to 12 MCs and 152 villages<sup>1</sup>, it was thought that it would be more appropriate to work with a sample size of approximately 3.5 times the calculated size in order to avoid problems in sample distribution. In this way, the total sample size to be applied in 12 MCs was determined as 1075. In the distribution of the determined household sample size to micro-catchments and villages, proportional stratified sampling was used depending on the number of households. In the selection of the villages where the household surveys will be applied at the micro-catchment level, the basic criteria are determined as the "altitude level of the village" and "the relationship of the village with the forest", which can affect the socio-economic life of the villagers and their dependence on natural resources. In addition, in the selection of villages on the basis of micro-catchment, attention was paid to determine one of the selected villages, if any, as a control village (not included in the project).

With the first survey, the aim was to determine the initial reference values of the indicators to be used in monitoring the changes expected to be brought about by the project on various socio-economic characteristics of the household. In the survey form, there were 38 open and closed-ended questions collected under the headings of demographic and social structure, economic structure, agriculture and livestock, energy

and forests, and general awareness and opinions.

A pilot survey study was planned in order to eliminate the deficiencies in the survey and to increase the clarity of the questions. This study was carried out in Köprügören Village located in Yusufeli MC. In the study, 20 household surveys were applied, and the necessary changes were made accordingly resulting in the survey form given its final form.

In the selection of the villages where household surveys will be conducted at the MH level, "the elevation level of the village" and "the relationship of the village with the forest", which may affect the socioeconomic life of the villagers and their dependence on natural resources, were determined as the main criteria. Three elevation levels, namely lower, middle and upper elevation levels, were defined for each MC village. On the other hand, villages were classified as "forest villages" and "non-forest villages" taking into account their relationship with the forest. In the selection of villages to be surveyed, it was planned to select at least 36 and at most 72 villages in total, with a minimum of 3 and a maximum of 6 villages from each MH. In addition, in the selection of villages on the basis of MC, care was taken to determine one of the selected villages, if any, as a control village that was not planned (not included in the project).

In the first stage of the study, a survey was conducted with 1075 household representatives (916 from project villages and 159 from control villages) in a total of 61 villages, 52 of which were project villages and 9 were control villages, in 2013 and 2014.

In the second stage of the method, M&E studies were carried out in order to monitor the effects of the activities within the scope of the project on the local people with socio-economic indicators and to make evaluations based on these. In this context, 11 socio-economic M&E indicators were determined under four monitoring aspects, such as the determination of socio-economic status, wood

<sup>1</sup> The villages of Tortum, Uzundere, Şenkaya, Oltu, Olur and İspir districts of Erzurum province were converted into settlements with neighborhood status under Erzurum Metropolitan Municipality as of 2014 in accordance with the relevant articles of the Law No. 6360 adopted on 12/11/2012.

Since this administrative change did not directly affect the project process and monitoring and evaluation activities, the settlements that were later transformed into neighborhoods continued to be called villages for the sake of unity in this research.

consumption, marketing of products, and awareness on rehabilitation project (Table 2). These aspects were determined based on the main indicators defined for the different stages of the project in the report titled “Feasibility Study of the Çoruh River Watershed Rehabilitation Project” completed in 2008 (Anonim). The indicators developed

to take into account the objectives and scope of the ÇRWRP were presented at the “Participatory Integrated Watershed Management Training and Workshop” held in Antalya on February 2-6, 2015 and were deemed appropriate for use in the monitoring process.

Table 2. Socio-economic monitoring and evaluation indicators

| Monitoring Aspects                     | Indicators                                                                                 |
|----------------------------------------|--------------------------------------------------------------------------------------------|
| Socio-Economic Status                  | A1. Average number of people living in the household                                       |
|                                        | A2. Percentage of households with members temporarily outside the village (%)              |
|                                        | A3. Ratio of households that migrated out of their villages in the last 5 years (%)        |
|                                        | A4. Percentage of households considering migration out of villages in the next 5 years (%) |
|                                        | A5. Average income/expense ratio                                                           |
|                                        | A6. Average age of inhabitants in the village                                              |
| B. Wood Consumption                    | B1. Annual average firewood needs (stere)                                                  |
|                                        | B2. Rate of getting firewood from forest enterprise (%)                                    |
|                                        | B3. Amount of firewood received from forest enterprise (stere)                             |
| C. Marketing of Products               | C1. Training needs in marketing (%)                                                        |
| D. Awareness of Rehabilitation Project | D1. The ratio of those who have knowledge about the ÇRWRP (%)                              |

Then, a final survey consisting of 18 questions was developed for final monitoring. Twelve of these questions were the same as the first stage survey questions which are used for monitor and evaluation, and the other questions were asked to determine whether the respondents benefited from the supports provided under the project. At this stage, to consider the socio-economic changes expected to be brought about by the project, the people who took part in the first stage survey were attempted to be reached again, and the final survey was conducted with a total of 513 household representatives (455 people from project villages and 58 from control villages).

In order to determine whether there is a statistical difference in the initial and final values of the indicators during the monitoring process, the indicators were calculated and statistically compared based on the initial

survey findings of the 455 participants to whom the final survey was applied.

This survey was conducted in all 12 MCs in 2018, and statistical analysis of the data was performed using the IBM SPSS Statistics 19 software.

The statistical significance of the changes was determined by Wilcoxon Signed Ranks and McNemar Tests at the 0.05 significance level.

## Results

The distribution of the surveys applied in the first and second stages of the study according to the micro-catchments is shown in Table 3. In order to evaluate the socio-economic impacts of the project, the evaluations were made on 455 people from project villages who took part in the study in both stages.

Table 3. Distribution of conducted surveys on the basis of micro-catchment

| Province | Micro-Catchment | Villages<br>Project | Control | Total<br>Population | Number of<br>Households | Number of<br>Initial Surveys | Number of<br>Second Surveys |
|----------|-----------------|---------------------|---------|---------------------|-------------------------|------------------------------|-----------------------------|
| Artvin   | Bıçakçılar      | 4                   | 1       | 1560                | 355                     | 55                           | 21                          |
|          | Veliköy         | 7                   | 1       | 4766                | 1083                    | 158                          | 67                          |
|          | Yusufeli        | 3                   | -       | 2518                | 572                     | 66                           | 25                          |
| Erzurum  | İspir           | 5                   | 1       | 2056                | 467                     | 70                           | 27                          |
|          | İspir North     | 4                   | -       | 1662                | 378                     | 53                           | 24                          |
|          | Oltu            | 5                   | 1       | 2826                | 642                     | 97                           | 41                          |
|          | Olur            | 4                   | 1       | 2471                | 562                     | 79                           | 38                          |
|          | Şenkaya         | 3                   | 1       | 1703                | 387                     | 54                           | 17                          |
|          | Tortum North    | 4                   | -       | 7176                | 1631                    | 207                          | 83                          |
|          | Uzundere        | 4                   | 1       | 2256                | 513                     | 79                           | 31                          |
| Bayburt  | Masat           | 3                   | 1       | 1847                | 420                     | 66                           | 36                          |
|          | Taht            | 6                   | 1       | 2990                | 680                     | 91                           | 45                          |
| Total    |                 | 52                  | 9       | 33831               | 7689                    | 1075                         | 455                         |

#### Monitoring Aspects Results

Under this section results regarding four monitoring aspects - determination of socio-economic status, wood consumption, marketing of products, and awareness of rehabilitation project - were examined.

#### Determination of Socio-Economic Status

6 indicators were used to determine the changes in the socio-economic conditions of the local people by the ÇRWRP, and the changes between the periods were monitored depending on the answers given in both survey periods. As the first indicator, the values of “average number of people living in

the household” were taken into account. Accordingly, in terms of project villages in the relevant period, while the average number of people living in the household in Tortum MC did not change, the average number of people living in the household in each of the remaining 11 MCs decreased (Table 4). When the average number of people living in the household is considered collectively for the 12 MCs, it is seen that it decreased from 3.9 to 3.5 in the project villages and from 3.9 to 3.7 in the control villages. When the periodic changes are analysed, it is seen that there is a similar decreasing trend in both village groups, with a slight difference.

Table 4. Change in the average number of people living in the households

| MC          | Period  | N   | Min | Max | Aver. | MC           | Period  | N  | Min | Max | Aver. |
|-------------|---------|-----|-----|-----|-------|--------------|---------|----|-----|-----|-------|
| Bıçakçılar  | Initial | 21  | 2   | 12  | 5.0   | Olur         | Initial | 38 | 1   | 7   | 3.2   |
|             | Final   | 21  | 2   | 10  | 4.5   |              | Final   | 38 | 1   | 7   | 3.1   |
| Veliköy     | Initial | 67  | 1   | 7   | 2.9   | Şenkaya      | Initial | 17 | 2   | 6   | 3.4   |
|             | Final   | 67  | 1   | 7   | 2.8   |              | Final   | 17 | 1   | 6   | 2.8   |
| Yusufeli    | Initial | 25  | 1   | 7   | 2.9   | Tortum North | Initial | 83 | 1   | 10  | 3.9   |
|             | Final   | 25  | 1   | 7   | 2.8   |              | Final   | 83 | 1   | 9   | 3.9   |
| İspir       | Initial | 27  | 1   | 8   | 3.7   | Uzundere     | Initial | 31 | 1   | 11  | 4.1   |
|             | Final   | 27  | 2   | 9   | 3.6   |              | Final   | 31 | 1   | 9   | 3.9   |
| İspir North | Initial | 24  | 2   | 7   | 3.7   | Masat        | Initial | 36 | 2   | 12  | 5.9   |
|             | Final   | 24  | 2   | 6   | 3.3   |              | Final   | 36 | 2   | 9   | 4.4   |
| Oltu        | Initial | 41  | 1   | 12  | 4.0   | Taht         | Initial | 45 | 2   | 11  | 4.4   |
|             | Final   | 41  | 1   | 12  | 3.8   |              | Final   | 45 | 1   | 7   | 3.6   |
| Total       | Initial | 455 | 1   | 12  | 3.9   |              |         |    |     |     |       |
|             | Final   | 455 | 1   | 12  | 3.5   |              |         |    |     |     |       |

The provinces of Artvin, Bayburt and Erzurum, where the ÇRWRP is carried out, are the provinces where population decline is experienced intensively, especially due to migration from rural areas. As a matter of fact,

in the 2011-2017 period, which includes the project period, the total population of 12 MCs decreased by an average of 21.6%, while this rate was 13.7% in Artvin, 15.7% in Bayburt and 26.4% in Erzurum. In other words,

migration in the region continued during the project period.

The second indicator is “the percentage of households with members temporarily outside the village”. The ratio of households with members temporarily outside the village, taken collectively for the 12 MCs, decreased from 31.4% to 15.7% in the project villages, while it increased from 12.1% to 17.2% in the control villages. Bearing in mind that the

indicator regarding the ratio of households with members outside the village is expected to show a decreasing trend with the project activities, it is seen that the change observed in the project villages in the context of the related indicator is in line with the expectations in the other 11 MCs, except for Olur MC (Figure 2). However, longer-term monitoring is needed to say that this change is permanent.

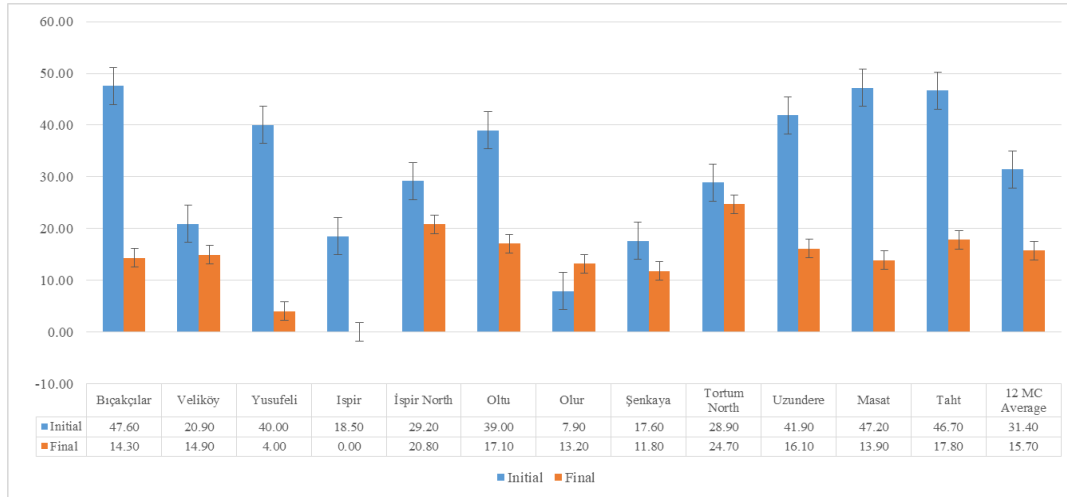


Figure 2. Percentage of households with temporary members outside the village (%)

The findings regarding the indicator of “the ratio of households that migrated out of the village in the last five years” in the project villages for the initial and final monitoring periods on the basis of MCs are presented in Figure 3. Accordingly, there is an increase in MCs, except for Bıçakçılar, Oltu and

Uzundere MCs. When the 12 MCs are considered collectively, the ratio of households with at least one individual who migrated out of the village has increased from 15.4% to 21.3% in the project villages and from 10.23% to 15.5 in the control villages.

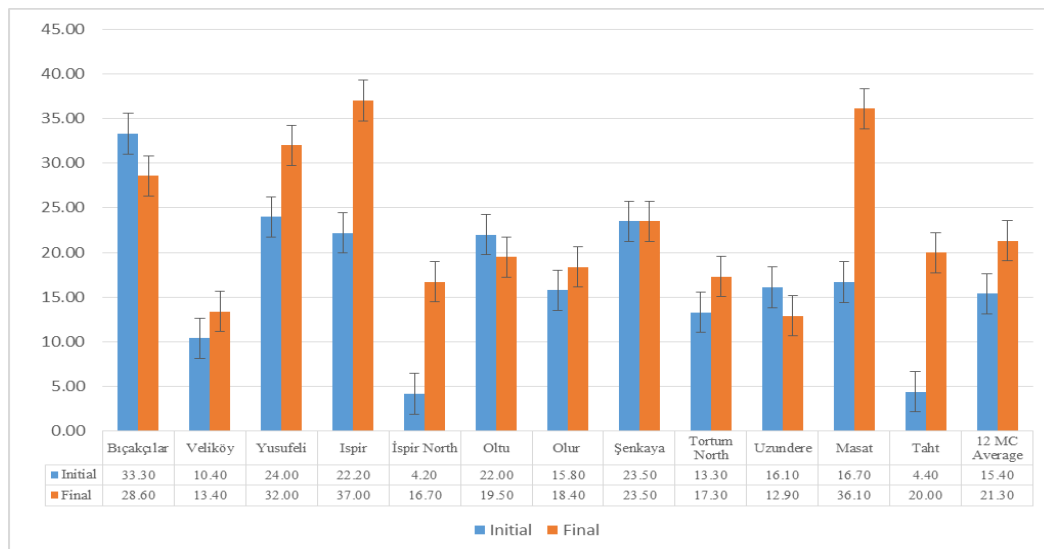


Figure 3. The ratio of households that migrated out of their villages in the last 5 years (%)

Although the indicator regarding this ratio is expected to show a decreasing trend due to project activities, only in Bıçakçılar, Oltu and Uzundere MCs did it decrease in line with the expectations. In other words, the change in the project villages is not in line with expectations. There is a need for longer-term monitoring of the effects of the project activities aimed at improving the living conditions of the households.

The findings of “the percentage of households considering migration out of the village in the next five years” indicator for the initial and final monitoring periods by MCs are presented in Figure 4. During this period, there is a decrease in all MCs except for Bıçakçılar and Olur. This ratio decreased from 17.1% to 11.9% across 12 MCs in the project villages. On the other hand, the ratio in control villages increased from 13.8% to 15.5%.

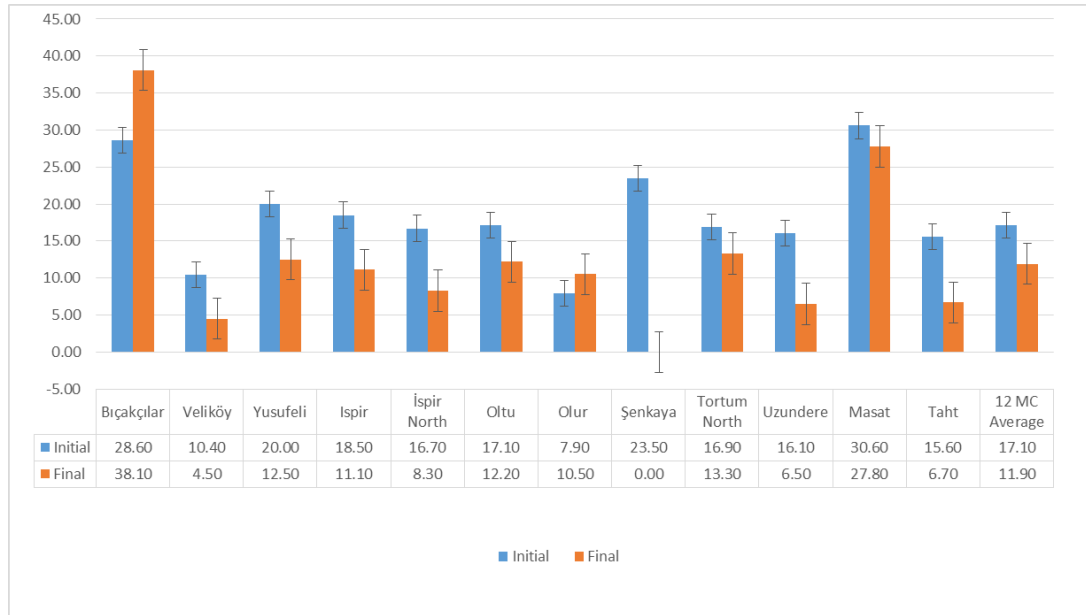


Figure 4. Percentage of households considering migration out of villages in the next 5 years (%)

Considering that this indicator is expected to show a decreasing trend based on project activities, it is evident that the change observed in the project villages aligns with the expectations in other MCs, except for Bıçakçılar and Olur MC. In order to evaluate the impact of the project in the medium and long term more realistically, it will be more beneficial to confirm the current result with the follow-ups to be done in the following years

Another socio-economic indicator is the monthly "average income/expense ratio" values of the households. Accordingly, from the perspective of the project villages in the relevant period; the average income/expense ratio tends to increase steadily or slightly in other MCs, except for a very slight decrease in Veliköy, İspir, Olur and Şenkaya MCs.

When the 12 MCs are considered collectively, the average income/expense ratio per household increased from 1.10 to 1.15 in the project villages (Table 5). In the same period, this ratio increase from 0.98 to 1.05. It is seen that the change observed in the project villages is generally in line with expectations. However, it would not be right to expect a direct reflection of the activities carried out within the scope of the ÇRWRP on the income-expense balance of the households in a short time. It will be possible with the acquisition and continuity of income-generating activities such as beekeeping, fruit growing, etc. Moreover, the fact that the beneficiaries of these activities have not yet earned or have just started to earn income makes it difficult for the beneficiaries to see them as a recurring revenue source.

Table 5. Average income/expense ratio

| MC          | Period  | N   | Min  | Max   | Aver. | MC           | Period  | N  | Min  | Max   | Aver. |
|-------------|---------|-----|------|-------|-------|--------------|---------|----|------|-------|-------|
| Bıçakçılar  | Initial | 20  | 0.53 | 2.5   | 1.17  | Olur         | Initial | 31 | 1.00 | 4.50  | 1.15  |
|             | Final   | 20  | 0.67 | 3.67  | 1.33  |              | Final   | 38 | 0.10 | 1.87  | 0.99  |
| Veliköy     | Initial | 66  | 0.10 | 15.00 | 1.25  | Şenkaya      | Initial | 17 | 0.63 | 2.00  | 1.07  |
|             | Final   | 65  | 0.10 | 7.00  | 1.24  |              | Final   | 16 | 0.30 | 1.17  | 0.91  |
| Yusufeli    | Initial | 23  | 0.67 | 2.29  | 1.07  | Tortum North | Initial | 75 | 0.50 | 3.00  | 1.08  |
|             | Final   | 24  | 0.60 | 3.00  | 1.13  |              | Final   | 79 | 0.50 | 3.94  | 1.16  |
| İspir       | Initial | 25  | 0.67 | 3.75  | 1.36  | Uzundere     | Initial | 29 | 0.40 | 1.53  | 0.98  |
|             | Final   | 27  | 0.10 | 3.00  | 1.16  |              | Final   | 29 | 0.33 | 1.50  | 0.98  |
| İspir North | Initial | 22  | 0.67 | 2.00  | 1.03  | Masat        | Initial | 27 | 0.3  | 1.5   | 0.84  |
|             | Final   | 23  | 0.20 | 2.33  | 1.18  |              | Final   | 34 | 0.55 | 15.00 | 1.50  |
| Oltu        | Initial | 38  | 0.20 | 2.00  | 1.04  | Taht         | Initial | 44 | 0.50 | 1.50  | 1.00  |
|             | Final   | 39  | 0.25 | 3.00  | 1.04  |              | Final   | 43 | 0.36 | 2.00  | 1.09  |
| Total       | Initial | 417 | 0.10 | 15.00 | 1.10  |              |         |    |      |       |       |
|             | Final   | 437 | 0.10 | 15.00 | 1.15  |              |         |    |      |       |       |

The last indicator under this heading is the “average age of the inhabitants in the village”. Considering that there is a time period of approximately 4-5 years between the two surveys, the average age is expected to increase by 4.5. When the 12 MCs are considered as a whole, the average age of households has increased from 48.2 to 51.9. It is expected that the increase in the average age of village residents on a household basis will slow down with project activities or show a decreasing trend in the long run. For the 12 MCs in general, the average age increase in the project villages (3.7) was lower than in the control villages (5.2). As a result, contrary to the expectations, despite the increase in the average age of the residents in the project villages on a household basis, the fact that this increase is below the increase in the control

villages strengthens the possibility that the change is change is partially because of the project activities.

#### Wood Consumption

Under this heading, three indicators were used to address the change in the forest villagers' need for firewood. In the first of the indicators, the "annual average firewood need" of the households is discussed. The annual average firewood need on a household basis in the relevant period; decreased in Bıçakçılar, Masat, Oltu, Tortum North and Uzundere MCs, and it increased in other MCs (Figure 5). When the 12 MCs are considered, the annual average firewood need on a household basis increased from 7.7 steres to 8.5 steres in the project villages and from 6.1 to 7.0 in control villages.

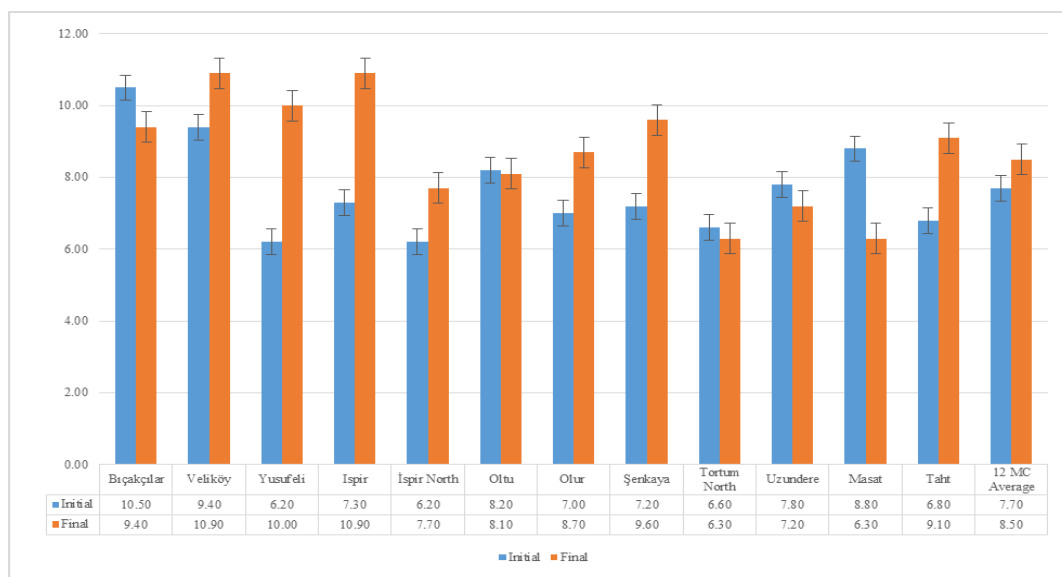


Figure 5. Annual average firewood needs (stere)

Although the annual average firewood need on a household basis is expected to decrease or show a decreasing trend as a result of the project activities, it is seen that the change is partially consistent with the expectations in the 5 MCs listed above, while it exhibits an increasing trend in the other 7 MCs. The fact that project supports, such as heat insulation and solar water heating systems aiming to reduce the need for firewood, have been offered to the use of households mainly in the last 2 years of the project period, it is more likely that the impact of these supports will emerge in the coming years.

Forest villagers generally meet their firewood needs from forest enterprises. For this reason, "the amount of firewood taken from forest enterprise" and "the rate of getting firewood from the forest enterprise" of the local people were the other indicators used in the study. The amount of firewood taken from the forest enterprise in 12 MCs has increased from 6.8 steres to 7.8 steres in the project villages and from 4.9 steres to 5.1 steres in the control villages. Although the annual amount of firewood taken from the forest enterprise is expected to slow down or show a decreasing trend with the project activities, it can be said that the change is not in line with the expectations.

In addition, the rate of households getting firewood from forest enterprises decreased in

8 MCs except Bıçakçılar, Taht, İspir North and Olur MCs. This ratio for the total of 12 MCs decreased from 35.4% to 22.7% in the project villages and from 26.3% to 25.9% in the control villages. In other words, there was a decrease (12.7%) in project villages across the 12 MCs in line with expectations, while there was a slight decrease (0.4%) in control villages.

#### Marketing of Products

Within the scope of the study, the question of whether they need training in marketing the products they produce in their villages was asked to the household representatives. While the existence of the need for training in marketing was 78.7% in the first stage survey, this rate decreased to 58.7% in the second stage in the project villages. It is possible to state that this rate increased only in İspir MCs, remained unchanged in Bıçakçılar and Yusufeli MCs, and decreased in parallel with the output of the project in other MCs (Figure 6). On the other hand, this ratio decreased slightly from 57.9% to 49.1% in the control villages. Consistent with expectations, the decrease in the need for training on marketing in the project villages was higher than the decrease observed in the control villages, indicating that expectations were partially met.

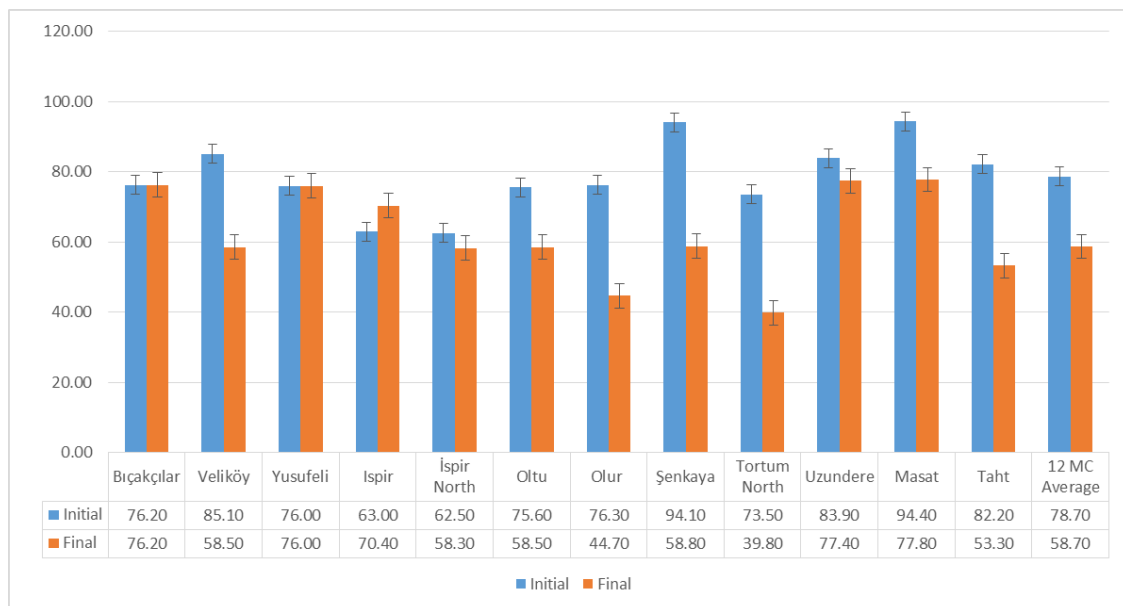


Figure 6. Training needs in marketing (%)

### Awareness of Rehabilitation Project

In the study, the awareness level of the related rehabilitation project was tried to be determined. In this context, at the beginning and end of the project, household representatives were asked, "Have you heard of the Çoruh River Watershed Rehabilitation Project?". While in the project villages, the ratio of households who have information about the ÇRWRP increased from 21.5% to 61.1%, this ratio also increased from 3.7% to 28.9% in the control villages. We can say that the increase in the ratio is an expected situation and an aim of the project. While the rate of households with knowledge in the project villages increased by 39.6% for the 12 MCs in general, the rate of those who did not know about the project decreased to 11.3%. Therefore, it is possible to say that there was a significant increase in awareness level in the project villages during the monitoring period.

### Statistical Analysis of Changes in Indicators

For statistical comparison of changes in indicators in project and control villages, results of 455 surveys from project villages and 58 surveys from control villages are analyzed. The direction of the expected and actual effects and whether they are statistically significant or not in the 11 indicators used to monitor the impact of the

project activities are presented in Table 6. Evaluation was made comparatively in the project and control villages.

When 11 indicators in the project villages are examined; it is seen that the expected effect with the ÇRWRP has occurred in a total of 6 indicators, three from the socio-economic status aspect (A2, A4, A5), one of each aspects as wood consumption (B2), marketing of products (C1), and awareness on rehabilitation project (D1). In other words, in the project villages there is an expected situation in at least one indicator in each of the four different aspects. Also, there is a statistically significant difference between the initial and the final monitoring values of these 6 indicators and it is possible to say that these changes were realized with the effect of the ÇRWRP.

On the other hand, there was no effect in the expected direction in 5 indicators, 3 of which are about socio-economic status (A1, A3, A6) and 2 in the wood consumption (B1, B3) aspects. The dominant effect of migration that continues intensively in the region between beginning and end of the monitoring period and the fact that a sufficient time has not passed since the start of the activities can be considered as reason of absence of expected change.

Table 6. Changes of indicators and statistically significant differences

| Indicators                                                                                 | Project Villages |       |                 |          | Control Villages |       |                 |          |
|--------------------------------------------------------------------------------------------|------------------|-------|-----------------|----------|------------------|-------|-----------------|----------|
|                                                                                            | Expec.           | Real. | Sta. sig. diff. | P-value* | Expec.           | Real. | Sta. sig. diff. | P-Value* |
| <b>Socio-Economic Status</b>                                                               |                  |       |                 |          |                  |       |                 |          |
| A1. Average number of people living in the household                                       | ↑                | ↓     | Yes             | 0.000    | ↓                | ↓     | No              | 0.213    |
| A2. Percentage of households with temporary members outside the village (%)                | ↓                | ↓     | Yes             | 0.000    | ↑                | ↑     | No              | 0.581    |
| A3. Ratio of households that migrated out of their villages in the last 5 years (%)        | ↓                | ↑     | Yes             | 0.014    | ↑                | ↑     | No              | 0.607    |
| A4. Percentage of households considering migration out of villages in the next 5 years (%) | ↓                | ↓     | Yes             | 0.020    | ↑                | -     | No              | 1.000    |
| A5. Average income/expense ratio                                                           | ↑                | ↑     | Yes             | 0.020    | -                | ↑     | No              | 0.513    |
| A6. Average age of inhabitants in the village                                              | ↓                | ↑     | Yes             | 0.000    | ↑                | ↑     | Yes             | 0.000    |
| <b>B. Wood Consumption</b>                                                                 |                  |       |                 |          |                  |       |                 |          |
| B1. Annual average firewood needs (stere)                                                  | ↓                | ↑     | Yes             | 0.001    | -                | ↑     | No              | 0.117    |
| B2. Rate of getting firewood from forest enterprise (%)                                    | ↓                | ↓     | Yes             | 0.000    | -                | ↓     | No              | 1.000    |
| B3. Amount of firewood received from forest enterprise (stere)                             | ↓                | ↑     | No              | 0.112    | -                | ↑     | No              | 0.588    |
| <b>C. Marketing of Products</b>                                                            |                  |       |                 |          |                  |       |                 |          |
| C1. Training needs in marketing (%)                                                        | ↓                | ↓     | Yes             | 0.000    | -                | ↓     | No              | 0.157    |
| <b>D. Awareness of Rehabilitation Project</b>                                              |                  |       |                 |          |                  |       |                 |          |
| D1. The ratio of those who have knowledge about the ÇRWRP (%)                              | ↑                | ↑     | Yes             | 0.000    | -                | ↑     | Yes             | 0.000    |

\*P-value less than 0.05 means a statistical difference between the initial and the final monitoring values.

In the project villages there is a statistical difference (expected or unexpected change) between the initial and the final monitoring values except B3 indicator. On the contrary, in the control villages only A6 and D1 indicators showed a statistical difference between the initial and the final monitoring. The positive effect of the ÇRWRP on the project villages can be said as the reason for this situation.

### Discussion and Conclusions

In the initial socio-economic status determination studies, which constitute the first stage of the socio-economic monitoring and evaluation process within the scope of the project, it has been seen that the interests and expectations of the income-generating supports of the project are more prominent than the works related to the rehabilitation of natural resources in particular for the households. At the first stage, while some of the local people thought that the project would fail due to their prejudice against the project, the existing prejudices and hesitations were gradually reduced by adopting a participatory approach with its efforts to inform the public. This situation reveals the importance of participatory approach in integrated watershed projects.

Especially at the beginning of the project various criticisms have been made such as the lack of cooperation culture, the lack of corporate responsibility, the lack of an administrative structure that will ensure the participation of the public, the lack of integration with similar projects, and the fact that the activities to improve the economic situation in the project are aimed at increasing the income level rather than being a solution to economic problems (Çağlar, 2010). When respondents were asked about their satisfaction with the project as part of the final monitoring household surveys, four out of every five respondents (79.7%) across the 12 MCs stated that they were satisfied with the project. So, it is possible to say that the criticized issues were resolved after the project was realized.

During the planning process in the first years of the project, requests to be included in the project started to come from some villages that were excluded from the project due to the

unwillingness of the villagers or some other problems. In these villages, the demand for successful supports such as solar water heating systems, beekeeping, greenhouse cultivation, thermal insulation has increased gradually. Moreover, it has been observed that some citizens, who saw the successful results of the supports within the scope of the project, insulated their houses or purchased solar water heating systems with their own means, without requesting any support from the project. This situation indicates that besides the direct positive effects of the project on the applied households, it also creates positive externalities for other households, and we can say that this project has a widespread effect.

In order for more realistic and effective socio-economic monitoring in integrated watershed rehabilitation projects, a certain period of time must pass over the support activities. Even in the short period between the beginning and the end of the project, 6 of the 11 indicators (A2, A4, A5, B2, C1 and D1) used for socio-economic monitoring in the project villages have changed in the expected direction, serving the purposes of the project.

A study conducted in Turkey shows that forest villagers have a household income (\$2492), which is only one-fifth of the average household income in Turkey (\$11018) (DB, 2016). These figures show that those living in forest villages have an income and welfare level far below the national average. Therefore, it is necessary to provide alternative sources of income to forest villagers and increase their income levels. At this point, the increase in the income/expense ratio of forest villagers as a result of ÇRWRP can be stated as an important development.

In this study, the expected change (decrease) in the indicators of the percentage of households with members outside the village (A2) and the percentage of households considering migration out of the village in the next 5 years (A4) indicates that the socio-economic effects of the activities carried out within the scope of the project started to be observed after 3-4 years. In the study of Gürbüz and Karabulut (2008) on the relationship between rural-urban migration and socio-economic characteristics in Turkey, it is stated that factors such as the increase in the amount of irrigated land that can be

cultivated in rural settlements, the development of fruit growing, and the introduction of economic activities other than agriculture and animal husbandry reduce rural migration.

One of the preconditions for achieving sustainable development throughout the country is to ensure sustainable rural development. Watershed rehabilitation projects such as ÇRWRP play an important role at this point. Through these projects, rural-urban migration can be reduced by providing alternative sources of income to local people and improving their living conditions. By monitoring the contribution of these projects to rural people, shortcomings in the projects can be addressed and sustainable development can be realistically pursued.

In terms of the success of the project and the achievement of its goals, steps should be taken to solve the problems expressed by the villagers, especially in the form of beekeeping, solar water heating systems and irrigation projects. Those who benefit from the supports should be visited at regular intervals, and the continuity of the supports should be checked, and guidance should be provided at the point of solving the problems encountered.

In determining the households to which income generating activities will be allocated, it would be beneficial not to prefer those living in the village temporarily without meeting the demands of the permanent residents of the villages. Otherwise, both the negative opinions and prejudices of the permanent residents of the villages about the project increase and the continuity of the income generating activities may be adversely affected.

It is important to repeat monitoring and evaluation studies in the following years in order to reveal the impact of this project in the medium and long term in a more realistic way. In this way, the holistic effects of the project will be monitored. Finally, in such projects, in addition to monitoring for the long-term holistic effects depending on the indicators, in order to see the direct effects of the projects on the households selected beforehand, monitoring of activities regarding the living conditions (beekeeping, greenhouse cultivation, irrigation, solar water heating

system, thermal insulation etc.) should also be carried out.

When the similar watershed rehabilitation projects in Türkiye are examined, we can say that in Türkiye, various supports and projects aiming rural development have been implemented so far. Also, studies have been carried out in order to reveal the success of these supports and projects. While some of these studies examined the effectiveness of certain supports for forest villagers (Önal & Bekiroğlu, 2011; Daşdemir & Türkyılmaz, 2018; Kaplan et al., 2019; Daşdemir & Köse, 2021; Çiray & Ünal, 2021), some studies focused on the results of agricultural and rural development supports in a limited area (Tan et al., 2016; Çobanoğlu et al., 2017; Bedel, 2019; Oruç, 2019). In some studies, it was aimed to determine the impact of a single variable such as migration (Gürbüz & Karabulut, 2008; Güreşçi & Yurttaş, 2008), ecotourism (Aydın, 2010; Güreşçi & Eke, 2012) or on women living in rural areas (Erem Kaya, 2011). However, when these studies are evaluated in general, there is no study in Türkiye that deals with the success of an integrated watershed rehabilitation project with a wide application area with different dimensions, and that makes longer-term socio-economic monitoring and evaluation to determine the change between the beginning and the result of the project. Therefore, this study is a pioneering and original study.

In other words, apart from this study, there is no comprehensive research on M&E studies of integrated watershed rehabilitation projects or similar projects in Türkiye. In this context, a general evaluation of the M&E studies in agricultural and rural development (ARD) projects around the world has been made in cooperation with the Food and Agriculture Organization of the United Nations (FAO) and The World Bank. In this study, a critical review of the use of M&E in 59 completed ARD projects was provided (Muller-Praefcke et al., 2010). There are some problems in design, implementation and utilization of the M&E system such as poor operationalization of planned M&E systems, lack of monitorable performance indicators, inadequate focus on project beneficiaries, and over-ambitious or unworkable methodologies. As suggested in the related study, continued efforts and

conceptual and methodological advances are required to improve the use of M&E as a management tool in such project evaluation.

A similar agriculture and rural development project (The Rural Infrastructure Sector Project), aiming to improve rural infrastructure to increase agricultural and off-farm production, raise personal incomes, facilitate access to markets and basic services, and reduce poverty in wide areas, implemented in Viet Nam. Under this project, the benefit M&E program was carried out and this program reported a range of socioeconomic benefits to the target provinces such as improving income, reducing the number of poor households, increasing agricultural production, better access to health-care and social services (ADB, 2010).

By integrating M&E with the project management system, deciding what to monitor and evaluate, ensuring participatory approach using both qualitative and quantitative information gathering techniques, linking project design, annual work plans and budgets, and M&E and having good communication and feedback with stakeholders, it is possible to enhance the utility of M&E systems (Muller-Praefcke et al., 2010; de Bruin & Barron, 2012).

Based on the situation stated above, improvements can be made to the M&E system used in the current study. In this way, it can be determined whether the ÇRWRP fully achieves its goals with new M&E studies in the future, and the changes in the relevant indicators can be followed more realistically. In order to ensure sustainability in M&E, it is necessary to establish an administrative structure under the coordination of the relevant institutions and to develop a web-based system where the obtained data is stored. In addition, it would be beneficial to make periodic evaluations by determining a wider set of indicators, and to make new arrangements in activities and methods according to the evaluation results.

#### Acknowledgement

We would like to thank the General Directorate of Forestry (Türkiye), Japan International Cooperation Agency (JICA), ÇRWRP Management Team, and Pyramid Photogrammetric Services – Ede Geographic

Information Systems Joint Venture for providing all kinds of opportunities and support for the work carried out by us within the scope of the ÇRWRP. In addition, we would like to thank the managers and employees of the General Directorate of Forestry provincial organization, and all the project stakeholders for their contributions in the field surveys.

#### Ethics Committee Approval

N/A

#### Peer-review

Externally peer-reviewed.

#### Author Contributions

Conceptualization: A.Ö.; U.D. and İ.Z.Y.; Investigation: A.Ö.; Material and Methodology: A.Ö.; U.D. and İ.Z.Y.; Visualization: A.Ö. and U.D.; Writing-Original Draft: A.Ö. and U.D.; Writing-review & Editing: A.Ö.; U.D. and İ.Z.Y. All authors have read and agreed to the published version of the manuscript.

#### Conflict of Interest

The authors declare that they have no conflict of interest.

#### Funding

This study was financially supported by the ÇRWRP.

#### References

- ADB, (2010). *Viet Nam: Rural infrastructure sector project, performance evaluation report*. Independent Evaluation Department of Asian Development Bank, Viet Nam.
- Anonim. Çoruh Nehri Havza Rehabilitasyon Çalışması Fizibilite Raporu, 101 s.
- Aydın, İ.Z. (2010). Ekoturizmin Türkiye orman köyleri kalkınmaları üzerindeki sosyo-ekonomik etkilerinin ölçümü (Artvin-Camili biyosfer rezerv alanı örneği). Karadeniz Teknik Üniversitesi Fen Bilimleri Enstitüsü, Orman Mühendisliği ABD, Yüksek Lisans Tezi, Trabzon
- Bandaragoda, D.J. & Babel, M.S. (2010). Institutional development for IWRM: An International perspective. *International Journal of River Basin Management*, 8(3-4), 215-224. <https://doi.org/10.1080/15715124.2010.496707>

- Baş, T. (2001). *Anket*, Seçkin Yayıncılık, Ankara.
- Bedel, N. E. (2019). Tarım ve kırsal kalkınmayı destekleme kurumu tarafından desteklenen tarımsal işletmelerde kırsal kalkınma, kalite ve sürdürülebilirlik algısı üzerine bir alan araştırması (Bursa İli). Bursa Uludağ Üniversitesi Fen Bilimleri Enstitüsü, Tarım Ekonomisi Anabilim Dalı Yüksek Lisans Tezi, Bursa.
- Bennett, N. J., Schuhbauer, A., Skerritt, D. & Ebrahim, N. (2021). Socio-economic monitoring and evaluation in fisheries. *Fisheries Research*, 239, 105934. <https://doi.org/10.1016/j.fishres.2021.105934>
- Çağlar, Y. (2010). Gains and losses of foreign funded integrated watershed rehabilitation projects. *III. Ulusal Karadeniz Ormancılık Kongresi*, Artvin, Turkey.
- ÇEMGM. (2016). *Entegre mikrohavza rehabilitasyon projeleri izleme ve değerlendirme çalıştay raporu*, 18-18 Mart 2016, Antalya. Orman ve Su İşleri Bakanlığı Çölleşme ve Erozyonla Mücadele Genel Müdürlüğü.
- Çiray, İ. & Ünal, H. E. (2021). Analysis of the application results of the loans given by ORKÖY in kütahya central district forest villages (2000-2019). *Eurasian Journal of Forest Science*, 9(3), 246-258. <https://DOI/10.3195/ejeifs.998708>
- Çobanoğlu, F., Cankurt, M., Tunalıoğlu, R., Yılmaz, H. İ. & Nalbantoğlu, A. (2017). Kırsal kalkınma yatırımlarının desteklenmesi programının etkisinin değerlendirilmesi: Bursa ili örneği. *Journal of Tekirdag Agricultural Faculty*, 14(1), 16-27.
- Daşdemir, İ. & Köse, M. (2021). The impact of ORKÖY activities on sustainable forest management in Istanbul Province, Turkey. *Small-scale Forestry*, 20(4), 517-542. <https://DOI/10.1007/s11842-021-09479-4>
- Daşdemir, İ. & Türkyılmaz, Y. (2018). The impact of ORKOY activities of the Giresun Regional Directorate of Forestry on sustainable rural development [Paper presentation]. *International Congress on Engineering and Life Science*, Kastamonu, Turkey.
- DB. (2016). *Türkiye'deki orman köylülerinin Sosyo-ekonomik analizi raporu*. Dünya Bankası ve Orman Genel Müdürlüğü, Ankara.
- de Bruin, A. & Barron, J. (2012). *AWM investments: Monitoring and evaluation of social, environmental, and economic impacts*. Stockholm Environment Institute, Stockholm, Sweden.
- Erem Kaya, T. (2011). Kırsal kadının tarımsal yenilikleri benimsemesini etkileyen faktörler üzerine bir araştırma (TRA1 bölgesi örneği). Atatürk Üniversitesi Fen Bilimleri Enstitüsü, Tarım Ekonomisi ABD, Doktora Tezi, Erzurum.
- Farrington, J., Turton, C. & James, A.J. (1999). *Participatory watershed development challenges for the twenty-first century*. Oxford University Press, New Delhi.
- Ffolliott, P.F., Baker, M.B., Edminster, C.B., Dillon, M.C. & Kora, K.L. (Eds). (2002). *Land stewardship through watershed management, perspective for 21st century*. Kluwer Academic/Plenum Publishers, New York.
- Gülçubuk, B., Yıldırak, N., Kızılaslan, N., Özer, D., Kan, M. & Kepoğlu, A. (2010). Kırsal kalkınma yaklaşımları ve politika değişimleri. *Türkiye Ziraat Mühendisliği VII. Teknik Kongresi*, Ankara, Turkey.
- Gürbüz, M. & Karabulut, M. (2008). Kırsal göçler ile sosyo-ekonomik özellikler arasındaki ilişkilerin analizi. *Türk Coğrafya Dergisi*, (50), 37-60.
- Gürer, N. & Eke, F. (2012). Dağlık alanlarda turizm ve ekonomik kalkınma ilişkisinin sürdürülebilirlik göstergeleri ile irdelenmesinde bir yöntem önerisi: Erzurum, Erzincan, Bayburt bölgesi örneği. *Journal of the Faculty of Engineering and Architecture of Gazi University*, 27(1), 125-133.
- Güreşçi, E. & Yurttaş, Z. (2008). Kırsal göçün nedenleri ve tarıma etkileri üzerine bir araştırma: Erzurum İli İspir İlçesi Kırık Bucağı örneği. *Tarım Ekonomisi Dergisi*, 14(2), 47-54.
- Hooper, B.P. (2005). *Integrated river basin governance, learning from international experiences*. IWA Publishing, London.
- Rijke, J., Herk, S.V., Zevenbergen, C. & Ashley, R. (2012). Room for the river: Delivering integrated river basin management in the Netherlands. *International Journal of River Basin Management*, 10(4), 369-382. <https://DOI/10.1080/15715124.2012.739173>.
- Kaplan, K., Kaplan, E. & Bal, H.S.G. (2019). Orman köylülerine yönelik orkoy destekleri, üretici memnuniyeti, desteklerin kullanılabilirliği ve sürdürülebilirliği (Tokat İli Almus İlçesi örneği). *3rd International UNIDOKAP Black Sea Symposium "Sustainable Agriculture and Environment"*, Tokat, Turkey.
- Karpuzcu, M. & Delipinar, Ş. (2011). Integrated watershed management: Socioeconomic perspective. *The Online Journal of Science and Technology*, 1(3), 1-7.
- Kaynak, M. (2009). *Kalkınma iktisadı*, 3. baskı. Gazi Kitabevi, Ankara.
- Mbiha, E.R., Senkondo, E.M.M. (2001). *Socio-economic monitoring and evaluation system for the rufiji environment management project*.

- Rufiji Environment Management Project, Dar es Salaam, Tanzania.
- MoAF. (2022). *Project Completion Report on Çoruh River Watershed Rehabilitation Project Loan Agreement No TK-P19*. Ministry of Agriculture and Forestry, Ankara.
- Montgomery, D.R., Grant, G.E. & Sullivan, K. (1995). Watershed analysis as a framework for implementing ecosystem management. *JAWRA Journal of the American Water Resources Association*, 31(3), 369-386, <https://doi.org/10.1111/j.1752-1688.1995.tb04026.x>.
- Muller-Praefcke, D., Lai, K. C. & Sorrenson, W. (2010). *The use of monitoring and evaluation in agriculture and rural development projects. Findings from a review of implementation completion reports*. FAO Investment Centre, Rome, Italy.
- Narendra, B.H., Siregar, C.A., Dharmawan, I.W.S., Sukmana, A., Pratiwi Pramono, I.B., et al. (2021). A review on sustainability of watershed management in Indonesia. *Sustainability*, 13(19), 11125, <https://doi.org/10.3390/su131911125>.
- Oruç, S. (2019). Tarım ve Kırsal Kalkınmayı Destekleme Kurumu Desteklerinin Kırsal Kalkınmaya Etkisi: Çanakkale İli Örneği. Çanakkale Onsekiz Mart Üniversitesi Sosyal Bilimler Enstitüsü Kamu Yönetimi Anabilim Dalı Yüksek Lisans Tezi, Çanakkale.
- OSİB. (2014a). *Ulusal Havza Yönetim Stratejisi (2014-2023)*. Orman ve Su İşleri Bakanlığı, Ankara.
- OSİB. (2014b). *Dış Kaynaklı Projeler*, Orman ve Su İşleri Bakanlığı, Ankara.
- Önal, P. & Bekiroğlu, S. (2011). Orman köylerinde ORKÖY tarafından gerçekleştirilen köy kalkındırma projelerinin uygulama sonuçlarının araştırılması (Şile-İstanbul). *Journal of the Faculty of Forestry, Istanbul University*, 61(2), 53-66.
- Öztürk, A. (2019). *Çoruh Nehri Havzası Rehabilitasyon Projesi İzleme Ve Değerlendirme Sistemi, Sosyo-Ekonomik İzleme ve Değerlendirme Nihai Raporu*. Orman Genel Müdürlüğü, Ankara.
- Tan, S., Özen, A. & Everest, B. (2016). Kırsal kalkınma destekleri kapsamında tarıma dayalı yatırım ve hibe projelerinin değerlendirilmesi: Aydın ili örneği. *ÇOMÜ Ziraat Fakültesi Dergisi*, 4 (2), 29–36.
- Tesfaye, G., Debebe, Y. & Yakob, T. (2018). Impact of participatory integrated watershed management on hydrological, environment of watershed and socio-economic, case study at Somodo watershed, South Western Ethiopia. *The International Journal of Earth & Environmental Sciences*, 3(1), 1-7.
- Thapa, P. S., Chaudhary, S. & Dasgupta, P. (2022). Contribution of integrated watershed management (IWM) to disaster risk reduction and community development: Lessons from Nepal. *International Journal of Disaster Risk Reduction*, 103029, <https://doi.org/10.13140/RG.2.2.12419.35362>.
- Tüfekçioğlu, A., Duman, A., Dinç, M., Tüfekçioğlu, M., Yavuz, M., Açıkgöz Harşit, C. (2019). *Çoruh Nehri Havzası Rehabilitasyon Projesi İzleme ve Değerlendirme Sistemi: S-3 Toprak ve Vejetasyon İzleme Raporu, (Bölüm 1. Toprak)*. Orman ve Su İşleri Bakanlığı, Ankara.
- Wang, G.Y. & Innes, J.L. (2005). Watershed sustainability: Strategic and tactical level assessment in the min river watershed, China. *Environmental Informatics Archives*, 3, 76-83.
- Wang, G., Mang, S., Cai, H., Liu, S., Zhang, Z., Wang, L. & Innes, J.L. (2016). Integrated watershed management: Evolution, development and emerging trends. *Journal of Forestry Research*, 27(5), 967-994, <https://doi.org/10.1007/s11676-016-0293-3>.
- Wani, S.P., Sreedevi, T.K., Reddy, T.S.V., Venkateswarlu, B. & Prasad, C.S. (2008). Community watersheds for improved livelihoods through consortium approach in drought prone rainfed areas. *Journal of Hydrological Research and Development*, 23, 55-77.