

## Murat Nehri Rehabilitasyon Projelerinden Faydalanan Yöre Halkının Memnuniyet Düzeyinin Belirlenmesi (Bingöl, Elâzığ ve Muş Mikro Havzaları Örneği)

Ahmet Uslu<sup>1</sup>, Alaaddin Yüksel<sup>2</sup>, Ersin Karakaya<sup>3</sup>, Semra Çamuka<sup>4</sup>, Şenol Çelik<sup>5</sup>, Bayram Hopur<sup>6</sup>, Mahmut Yılmaz<sup>7</sup>, Serpil Acartürk<sup>8</sup>

<sup>1</sup>Bingöl Sosyal Bilimler Meslek Yüksekokulu / Büro Hizmetleri Ve Sekreterlik, Bingöl , Türkiye

<sup>2</sup>Bingöl Üniversitesi Ziraat Fakültesi, Toprak Bilimi Ve Bitki Besleme Bölümü, Bingöl, Türkiye

<sup>3</sup>Bingöl Üniversitesi Ziraat Fakültesi, Bingöl, Türkiye

<sup>4</sup>Bingöl University International Relations Office, Bingöl, Türkiye

<sup>5</sup>Bingöl University Faculty of Agriculture, Bingöl, Türkiye

<sup>6</sup>Çölleşme ve Erozyonla Mücadele Genel Müdürlüğü, Ankara, Türkiye

<sup>7</sup>Orman Genel Müdürlüğü Tulip İzleme ve Değerlendirme Uzmanı, Ankara, Türkiye

<sup>8</sup>Çölleşme ve Erozyonla Mücadele Genel Müdürlüğü, Ankara, Türkiye

\*Corresponding author: karakayaersin@hotmail.com

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### ÖZ

Bu araştırma; Bingöl, Elâzığ ve Muş illerinde yer alan mikro havzalarda uygulanan projelerden faydalanan yöre halkının memnuniyet düzeyinin belirlenmesi amacıyla yapılmıştır. Araştırmada; 16-25 Ağustos 2021 tarihleri arasında seçilen köylerde yapılan anket çalışması, odak grup (OG) görüşmeleri ve kilit bilgilendirici (KB) görüşmeler birincil verileri oluşturmuştur. Araştırma bulgularına göre; genel olarak katılımcıların proje faaliyetlerinden memnun oldukları ve son bir yıl içinde bireylerin %62,2'sinin proje faaliyetlerine katıldığı, tespit edilmiştir. Yapılan uyum analizi sonuçlarına göre; projenin iş bulma veya çalışma koşullarını iyileştirmede gelir değişimi daha yüksek ve aynı olan yöre halkı üzerinde olumlu etkisi olurken, gelir değişimi daha az olan yöre halkı için olumsuz etkisi olmuştur. Hayvancılıkla uğraşanlar ve satış için araziye ekenlerin projenin iş bulma veya çalışma koşullarını iyileştirmeye etkisi olumlu olmuştur. Araziyi kendi tüketimi için ekenler, yüksek değerli ürün yetiştirmeyenler ve verim artışı sağlayamayanların projenin iş bulma veya çalışma koşullarını iyileştirmeye etkisi olumsuz olmuştur. Bingöl ve Elâzığ'da yaşayan orta halli yöre halkının projenin iş bulma veya çalışma koşullarını iyileştirmeye etkisi olumlu olmuştur. Muş'ta yaşayan fakir yöre halkının projenin iş bulma veya çalışma koşullarını iyileştirmeye etkisi olumsuz olmuştur. Tüm bilgiler çerçevesinde projenin bölge için önemli bir kalkınma kaynağı olduğu ve bu kalkınma düzeyinin gelecek yıllarda daha net bir şekilde ortaya çıkacağı kanısına varılmıştır.

**Anahtar kelimeler:** Mikro Havza, Bingöl, Elâzığ, Muş, Odak Grup Görüşmesi, Uyum Analizi

## Determination of the Satisfaction Level of the Local People Benefiting from Murat River Rehabilitation Project (Bingöl, Elâzığ, and Muş Microcatchment Sample)

### ABSTRACT

This research was conducted to determine the satisfaction level of the local people benefiting from the projects implemented in the microcatchments of Bingöl, Elâzığ and Muş provinces. The primary data of the survey are the focus group interviews (FG) and key informative interviews (KI) conducted in the selected villages between the dates 16-25 August 2021. According to the research results, the participants are generally satisfied with the project activities and that 62.2% of the local people have participated in the project activities during the past year. The results of the compatibility analysis show that the project had a positive impact on finding a job

or improving working conditions among the locals with higher and equal incomes, while it had a negative impact among the locals with lower incomes. The impact of the project on improving employment or working conditions was positive for ranchers and those who farmed land for sale. Those who farm land for subsistence, not grow high-value crops, and cannot increase productivity indicated that the project had a negative impact on finding a job or improving working conditions. The impact of the project on finding jobs or improving the working conditions of the middle class living in Bingol and Elazığ was positive. The impact of the project on the poor local people in Muş on finding a job or improving their working conditions was negative. Within the framework of all information, it has been concluded that the project is an important source of development for the region and that this level of progress will emerge more clearly in the coming years.

**Key words:** Microcatchments; Bingol; Elazığ; Muş; focus group interviews; compatibility analysis

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## INTRODUCTION

Murat River Watershed Rehabilitation Project (MRWRP) is a project implemented in line with the loan agreement signed on February 15, 2013 between the Republic of Turkey and the United Nations International Fund for Agricultural Development (IFAD). The main stakeholders of MRWRP are IFAD, General Directorate of Forestry (OGM) and General Directorate of Combating Desertification and Erosion (ÇEM). Other stakeholders of the project are local people and non-governmental organizations, governorships and special provincial administrations, General Directorate of State Hydraulic Works (DSI), DAP Regional Development Administration and Provincial Directorates of Food, Agriculture and Livestock. The main objective of the MRWRP, which was implemented between 2013-2021 at 34 micro-catchments in Elazığ, Bingol and Muş provinces, is to reduce poverty in the communities living at the mountainous regions of the Murat River Watershed. Project activities are grouped into three main groups to achieve this main purpose:

- a) Natural resources and environmental management,
- b) Investing in natural resources and environmental assets,
- c) Investment in improved livelihoods

MRWRP focuses on some sub-objectives in line with the main purpose mentioned above. These objectives are as follows:

- Reduction of soil erosion, erosion, flood and flood damages,
- Protection and development of forest, agriculture, pasture and water resources,
- Reducing the pressure on the protected (marginal) areas,
- Increasing land productivity,
- Ensuring diversity in agricultural production,
- Adopting and disseminating environmentally friendly agricultural practices,
- Increasing the organic carbon content of the soil,
- Reducing pollution originating from agriculture,
- Improving the living conditions and increasing the welfare level of the local people living in the project area,
- Ensuring rural development with income increasing activities,
- Providing employment and reducing immigration,
- Increasing institutional capacity.

On the other hand, it is possible to collect the activities carried out so far within the scope of MRWRP in four main groups:

1. Investments for the improvement of natural resources: Afforestation, soil conservation and combating erosion, rehabilitation of degraded oak forests, improvement of pasture and grazing lands.
2. Investments to increase income and improve living conditions: Improving wheat and barley yield, improving animal production (forage crop production, improvement of animal shelters), improving crop production (establishment of indoor orchards, vegetable production in the field, vegetable production in greenhouses), small scale irrigation infrastructure investments (establishment of water storage pools, improvement of soil irrigation channels, in-field drip irrigation systems, construction of village fountains for common use), promotion and dissemination of energy-efficient technologies (solar water heating units, building thermal insulation, distribution of energy-efficient stoves, establishment of stone kilns for common use) and supportment of beekeeping.
3. Education and awareness raising activities.
4. Activities to strengthen institutional capacity.

This research has been carried out in order to determine the level of satisfaction of the local people who benefited from the projects implemented at the micro-catchments in the provinces of Bingöl, Elâzığ and Muş.

## MATERIAL AND METHOD

In the research; the primary data consisted of the survey conducted in selected villages between 16-25 August 2021, focus group (FG) interviews and key informative (KI) interviews. The surveys were conducted face-to-face with the heads of the households and their not being affected by others has been regarded. In addition, FG meetings and KI meetings were held with the headmen and notables of each village where the survey was conducted. Besides, secondary data (table, map, report, etc.) of micro-catchments were also benefited. Survey and other studies were carried out according to systematic random sampling method in 30 villages where project activities were implemented and selected in consultation with local authorities. Within the scope of the Project, considering the number of the villages of the provinces, 12 villages from Elâzığ, 11 from Bingöl and 7 from Muş were determined. The village names sent from the project area were listed alphabetically. The systematic random sampling coefficient was determined by dividing the total number of villages by the number of villages to be studied. By starting from the first village and skipping with the determined coefficients, the randomly selected villages were determined as the villages to be studied. Thus, a survey was conducted with 336 beneficiaries. 37.3% of the surveys were carried out in the villages of Bingöl, 34.8% in the villages of Elâzığ and 27.9% in the villages of Muş (Table 1).

Table 1. Number of villages surveyed by provinces

Provinces	Number of villages	Number of surveyed	(%)
Bingol	11	125	37.3
Elazığ	12	117	34.8
Muş	7	94	27.9
Total	30	336	100

The distribution of the answers given by the local people was revealed by creating frequency tables for each question and drawing pie charts for some of them. In order to determine whether there is a difference between the answers given to some questions in terms of the provinces, one-way analysis of variance (ANOVA) was performed since more than two groups were compared. Duncan Posthoc test was used in analysis of variance and in revealing homogeneous subgroups. In the comparison of the answers given by the beneficiary local people to some questions, whether there is a relationship between the two questions was analyzed with the cross tables and the chi-square independence test for these tables. In addition, multiple correlation analysis and logistic regression model were used in the study. Concordance analysis is a method developed to show the association between the categories of a two-dimensional quota table. Coherence analysis determines whether certain levels of one variable are associated with some levels of another variable, using a generally two-dimensional contingency table that presents the observed association of two variables with the aid of eye frequencies. In this direction, fit analysis is a geometric technique developed to show the rows and columns of a two-dimensional contingency table as points in a two-dimensional space, consistent with their association in the table (Lee, 2006). Coherence analysis can also be applied to multi-dimensional tables when the number of variables to be searched is three or more, and it is called multiple concordance analysis. Multiple concordance analysis is a method used to reveal the association and relationships between the subcategories of the variables in the crossed tables in the form of  $r \times c \times m \times p \dots$  in different forms nested (Roux & Rouanet, 2010). While each variable is predominantly represented in one dimension or another in simple fit analysis, two or more variables are represented in one dimension in multiple fit analysis (Coşkun, 2007). In order to apply the multiple fit analysis, first an initial matrix (indicator matrix) is created (Mendes, 2002). This matrix, denoted by L, is expressed as shown below:

$$L = \begin{bmatrix} 1 & \dots & 0 & 1 & \dots & 0 & 1 & \dots & 0 & 1 & \dots & 0 \\ 0 & \dots & 0 & 0 & \dots & 0 & 0 & \dots & 0 & 0 & \dots & 0 \\ 0 & \dots & 0 & 0 & \dots & 0 & 0 & \dots & 0 & 0 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ 0 & \dots & 1 & 0 & \dots & 1 & 0 & \dots & 1 & 0 & \dots & 1 \end{bmatrix}_{149 \times 25}$$

The L matrix's rows contain the number of surveys, or the number of observation units (149), and its columns contain the total number of levels (10+5+5+5=25) of the variables taken into consideration.

Thus, the L matrix in this instance is a 149x25 matrix. Giving the code I for the categories of variables discovered in the questionnaires and 0 for the rest results in the L matrix. In this case, the L matrix's row sums for each category of a variable and the total number of variables in all categories equal 1. The so-called Burt matrix, which is comprised of this matrix's inner products, is used in the study for the L matrix (Gifi, 1990; Mendes, 2002). This matrix;

$$B = L'L$$

is obtained by the equation above. Solution of Burt matrix is as follows;

$$C_B'BC_B = U\Lambda U'$$

The singular value decomposition method is used to do this. With this equation, the entire solution set is produced for the levels of every variable taken into account (Gifi, 1990). The final equation  $\Lambda$  is the s-dimensional diagonal matrix uses the s-dimensional diagonal matrix U, whose diagonal components stand for the eigenvalues, d for the trial's total number of categorical variable levels (25); the d x s columns are a matrix of eigenvectors, and s represents the rank of the Burt matrix. The variable number P, which represents the  $C_B$  matrix in the equation, can be represented as follows;

$$C_\mu = P \begin{bmatrix} C_r & 0 & 0 & 0 \\ 0 & C_c & 0 & 0 \\ 0 & 0 & C_m & 0 \\ 0 & 0 & 0 & C_p \end{bmatrix}$$

Analysis of qualitative data takes place by giving frequency distributions, but in statistical research, it is often aimed to determine the relationships between the variables of interest. It is preferred that the qualitative data collected for the research be categorized into at least two different groups. The observed frequencies in this instance are calculated and compiled in a table using this arrangement, which can be made based on the levels of the relevant variables. These tables are called cross tables. Depending on how many variables were used to create them, crosstabs are categorized into two primary categories: two-dimensional crosstabs and multidimensional crosstabs (Coşkun, 2007). One of the multivariate statistical techniques is multivariate analysis, which can be used to define relationships between categorical variables in huge tables. With the use of maps, relationships between rows and columns in the frequency table are represented graphically as points in a two-dimensional space. The model is not established as a result of the multiple fit analysis because there is no assumption made on the distribution of the data; instead, the results can be understood by looking at the maps. The interrelationships between the levels specified in the rows or only between the levels specified in the columns, as well as the similarities and differences of the data matrices are made sense (Behdioğlu, 2000). In categorical data, multiple conformity analysis is used to analyze the data. It is a technique that visualizes the changes in row and column variables together in a two-dimensional space while interpreting the similarities, differences, and correlations between them in crosstabs (Suner, 2007). By breaking down the data matrix into its row and column sections, this approach explains the relationship between two or more categorical variables. Obtained components are shown with separate graphs and important information about the structure of the data set is reached. In this study, the structures of the crosstabs are determined mathematically, and then a graph with dots representing categories of variables in multidimensional space is generated. It is particularly sensitive to outlier values in terms of both rows and columns because it is a graphical tool (Bayram, 2000). The topic of conformance analysis makes it quite alluring in studies on categorical data analysis. It is a well-liked technique, particularly in fields like medicine, biostatistics, biometrics, economics, and the social sciences where the analysis of categorical data is frequently employed. Depending on the growth in computer usage, it is an ideal scaling strategy that may be used in statistical package programs like SPSS, MINITAB, and SAS (Clausen, 1998). A decision was taken in terms of research ethics from T.R. Bingöl University Rectorate Social and Human Sciences Scientific Research and Publication Ethics Board with number 33117789/044/83126 for the study.

## RESULT AND DISCUSSION

### The Household Description

Table 2 provides the descriptive values of the respondents provided by the surveyed locals to the questions regarding the introduction of the household. It has been determined that approximately 37% of the individuals surveyed live in Bingöl, 35% of them in Elazığ and 28% of them in Muş. Surveys were conducted in 30 villages in total, the distribution of the villages are as follows: 11 villages of Bingöl, 12 of Elazığ and 7 of Muş. In the study named "Monitoring and Evaluation System Annual Result Questionnaire" conducted by Özden and

Erdönmez (2018), a survey was conducted in 30 villages in total, 12 of the villages were from Elazığ, 11 of them were from Bingöl and 7 of them from Muş. In the study called "Monitoring and Evaluation System Annual Results Survey" conducted in 2019, a survey was conducted in 30 villages, 15 of the villages from Elazığ, 9 of them from Bingöl and 6 of them from Muş. While the average age of the individuals surveyed was 53.8 years, this value was calculated as 53.8 years in Bingöl, as 59.4 years in Elazığ and as 46.8 years in Muş. In the studies called "Monitoring and Evaluation System Annual Results Survey" conducted in 2018 and 2019, it was determined that 76.5% and 71.9% of the individuals surveyed were aged 46 and over, respectively. As a result of the studies, it was concluded that the young population in the region is low. It was determined that 68% of the individuals surveyed had health insurance and 32% did not have health insurance. In the studies called "Monitoring and Evaluation System Annual Results Survey" conducted in 2018, 2019 and 2020, the rate of having health insurance was determined as 90.5%, 94.5% and 84.4%, respectively. The fact that the rate of having health insurance in the study is much lower than the values found in previous studies can be considered as dismissals due to the Covid-19 pandemic. It was determined that 78.6% of the individuals surveyed were male and 21.4% of them were female. In the studies named "Monitoring and Evaluation System Annual Results Survey" conducted in 2018, 2019 and 2020, it was determined that 96.7%, 97% and 94.2% of the individuals surveyed were male, respectively. In all three previous studies, it was determined that the number of female individuals was far below the value found in the study. The rate of those who define their household as rich was 1.8%, the rate of those who defined their household as middle income was 86.6%, the rate of those who defined it as poor was 11.3%, and the rate of those who defined it as very poor was 0.3. In the studies called "Monitoring and Evaluation System Annual Results Survey" conducted in 2018, 2019 and 2020, 78.2%, 75.5% and 62% of individuals were defined as middle income. In the previous Monitoring and Evaluation System Annual Results Survey, the rate of individuals who defined themselves as poor and very poor was determined as 20.4% in 2018, as 24.5% in 2019, and as 32.7% in 2020. This value was found to be 11.6% in the study.

Table 2. Descriptive values related to the household definition of the local people.

Features	Descriptive Values
<b>City of residence (%)</b>	
Bingol	37
Elazığ	35
Muş	28
Total	100
<b>Gender</b>	
Male	78.6
Female	21.4
Total	100
<b>Average Age (Year)</b>	
Bingol	53.8
Elazığ	59.4
Muş	46.8
Total	53.8
<b>Health Insurance Status (%)</b>	
Those with health insurance	68
Those without health insurance	32
Total	100
<b>Identification of the House (%)</b>	
Very poor	0.3
Poor	11.3
Middle Income	86.6
Rich	1.8
Total	100

#### Participation Status of Local People in Project Activities

It was determined that 26.5% of the respondents have attended Project activities in 2017, 26.2% of them in 2020, 23.8% of them in 2016, 17% of them in 2019, 4.1% of them in 2021 and 2.4% of them in 2018 (Figure 1). It was found out that 62.2% of the people took part in project activities in the last year while 37.8% of them did not. In the "Monitoring and Evaluation System Annual Results Survey" conducted in 2020, it was reported that 82% of individuals did not participate in project activities in the last year. Looking at the distribution

of project activities that individuals have participated in the last year, it has been determined that individuals have participated in more than one project activity. It was determined that 16.1% of the individuals participated in afforestation, terrace construction, planting and maintenance activities, 2% of them participated in drip irrigation activities, 0.5% of them participated in greenhouse activities, 6.7% of them participated in livestock activities, 85.2% of them benefited from energy saving technologies, 0.5% of them participated in training activities and 6.3% of the individuals participated in other (wheat seed) activities. In the "Monitoring and Evaluation System Annual Result Survey" conducted in 2020, it was determined that individuals benefited from energy saving technologies at the highest rate.

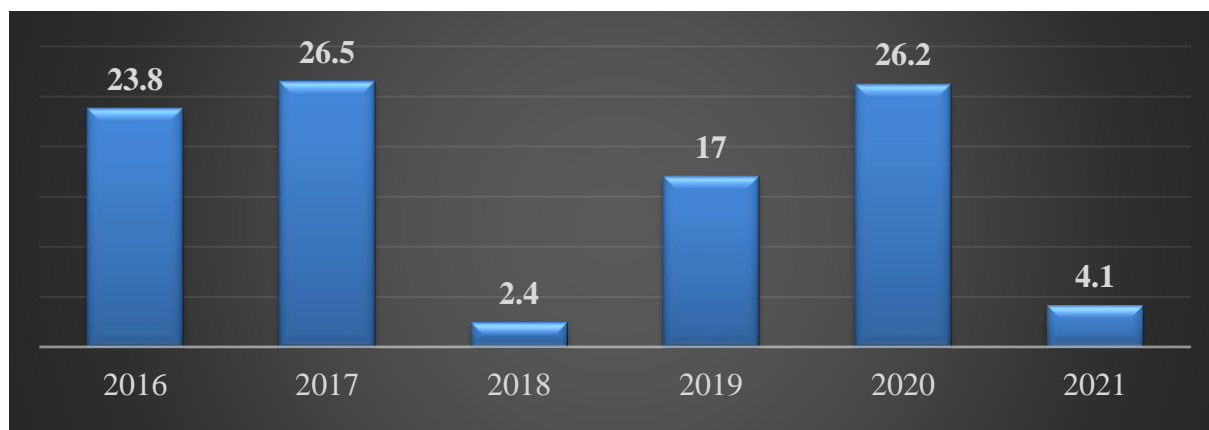


Figure 1. Proportion of individuals taking part in project activities (%)

Satisfaction with participation in project activities is given in Table 3. It was found that 74.5% of the individuals were very satisfied, 16.6% of them were not at all satisfied, and 8.9% of them were moderately satisfied. When the satisfaction level on the participation in project activities in terms of provinces is searched, it is determined that individuals living in Bingöl and Elazığ provinces are very satisfied and their satisfaction rate (76.3%) due to the participation in project activities is same, however; the individuals living in Muş province satisfaction with their participation in project activities if compared to the individuals in the other two provinces is lower (69.9%). It has been concluded that there is statistically a significant relationship between the satisfaction on participating in the project activities in terms of provinces. Individuals' satisfaction with their participation in project activities is dependent on provinces. In the previous "Monitoring and Evaluation System Annual Results Survey", the rate of individuals who were satisfied with the project activities was determined as 74.8% in 2018, as 65.8% in 2019 and as 47% in 2020. Total satisfaction rate was calculated as 83.4% when moderately and highly satisfied individuals are considered together, and this shows that satisfaction with project activities is high. The biggest reason why individuals were not satisfied with the project can be considered as the problems they experienced during the activities they benefit from (insufficiency of the product used within the scope of the project or the poor quality of the product). While the satisfaction rate in terms of the provinces was determined as 84.3% at Elazığ, as 66.3% at Bingöl and as 67.9% at Muş in 2018, it was detected as 89.9% at Elazığ, as 88.5% at Bingöl and as 85.9% at Muş in 2019.

Table 3. Satisfaction of individuals with their involvement in project activities

		Satisfaction with participation in project activities			
Provinces		Not satisfied atModerately			Total
		all	satisfied	Very pleased	
Bingöl	number	12	16	90	118
	%	10.2	13.6	76.3	100.0
Elâzığ	number	20	7	87	114
	%	17.5	6.1	76.3	100.0
Muş	number	22	6	65	93
	%	23.7	6.5	69.9	100.0
Overall average/total	number	54	29	242	325
	%	16.6	8.9	74.5	100.0

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**Chi square and p value 10.618; 0.031**

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On the general average, 63.5% of the individuals stated the frequency of meeting with project officials as occasionally, 22.6% of them as frequently and 13.4% of them as rarely (or never). It has been determined that there is a statistically significant relationship between the frequency of the individuals meeting with project officials in terms of provinces. The frequency of individuals meeting with project officials is dependent on provinces (Table 4). In their "Monitoring and Evaluation System Annual Results Survey", 23.4% of the individuals stated that they met with project officials frequently, 41.3% of them stated that they met occasionally and 35.3% of them stated that they met rarely. In the study of the same name conducted in 2019, 41.9% of the individuals stated that they met frequently, 47.9% of them stated that they met occasionally and 10.6% of them stated that they met rarely. In the study conducted in 2020, 13% of the individuals stated that they met with project officers frequently, 20.4% of them stated that they met occasionally, and 59.6% of them stated that they met rarely. As a result of previous studies and this study, it was concluded that the frequency of meeting individuals with project officials was changed.

Table 4. Frequency of individuals meeting with project officials

Provinces		Frequency of individuals meeting with project officers			Total
		Frequently	Sometimes	Rarely (or never)	
Bingöl	number	28	77	9	125
	%	22.4	61.6	7.2	100.0
Elâzığ	number	37	50	27	117
	%	31.6	42.7	23.1	100.0
Muş	number	11	73	9	94
	%	11.7	77.7	9.6	100.0
Overall average/total	number	76	200	45	336
	%	22.6	63.5	13.4	100.0
<b>Chi square and p value</b>		<b>41.415; 0.000</b>			

#### Livelihood Conditions of the Local People

It was determined that 58% of the individuals surveyed had a cash income source and 42% did not have a cash income source. The rate of having a cash income source was determined as 87.8% during the study conducted in 2018, as 67.5% during the study conducted in 2019 and as 60.5% during the study conducted in 2020. It has been observed that the rate of having a cash income source has changed and decreased over the years. The reason for this change is thought to be due to the fact that the same sample areas are not studied and the effect of the Covid 19 pandemic, albeit slightly. 42.1% of the individuals stated that the change in their cash income was the same if compared to the previous year, 41.6% of them indicated that it was less and 16.3% of them indicated that it was higher. At the study conducted in 2018, 62.7% of the individuals reported that there was no change in their income, 17.8% of them reported that their income increased and 17.2% of them reported that their income decreased. At the study conducted in 2019, 81.9% of the individuals stated that their income did not change, 9.4% of them stated that their income decreased and 8.7% of them stated that their income increased. At the study conducted in 2020, 45.8% of the individuals stated that there was no change in their income, while 40.6% of them stated that their income decreased. In the study, it has been concluded that the rate of individuals who say their income has decreased compared to the previous year is quite higher than the results of the studies conducted in other years, because of the effects of situations such as dismissal or not being able to receive a salary due to the Covid 19 pandemic. It has been understood that the main income of 116 of the individuals surveyed was animal production and its sales, the main income source of 95 of the individuals surveyed was agricultural production and its sales, the main income source of 57 of the individuals surveyed was from salaries and wages, the main income of 18 of the individuals surveyed was from state supports, the main income source of 17 of the individuals surveyed was from other (no income source), the main income source of 14 of the individuals surveyed was unskilled labor, the main income source of 1 of the individuals surveyed was from small-scale trade and afforestation works. According to the model summary table, 37.8% of the variance for the two-dimensional solution was explained by the first dimension and 33.2% by the second dimension (Table 5). While the project had a positive effect on finding a job or improving working conditions, it had a positive effect on those with a higher and the same income, while it had a negative effect on those with less income

(Figure 2). At previous studies conducted in 2018, 2019 and 2020, it was determined that individuals had a high salary or wage income, this is followed by animal production and sales, and agricultural production and sales income. In the study, a different result has emerged compared to previous years and it has been determined that the income of individuals' mostly come from animal production and sales, and agricultural production and sales were the main income sources. In this case, it was concluded that it was caused by the Covid 19 pandemic, and individuals who had problems in terms of salary or wages turned to other income sources. It has been determined that 96.7% of the individuals did not have any other income source, and 3.3% of them had other income sources. When the distribution of income sources of individuals who state that they have other income sources is examined; it was concluded that the livelihood of 60% of them was from salaries and wages, the livelihood of 30% of them was from unskilled labor and the livelihood of 10% of them was from small-scale business. At the study conducted in 2018, the ratio of individuals with the second source of income was determined as 39.8% in Bingöl, as 57.9% in Elazığ and as 67.9% in Muş. In the second source of income, agriculture, animal husbandry and salaries and wages came to the fore as income sources. At the study conducted in 2019, animal production and sales, and agricultural production and sales came to the fore in the distribution of other income sources. At the study conducted in 2020, 48.9% of individuals stated that they did not have any other income source.

Table 5. Summary of the model for the impact of the project on finding employment or improving working conditions by means of livelihood

Number of iterations	Calculated variance		Lost value
	Total	Increase	
30 <sup>a</sup>	1.420225	0.000008	2.579775
Model summary			
Dimension	Cronbach's Alpha	Calculated variance	Inertia
		Total (eigenvalue)	
1	0.452	1.513	0.378
2	0.329	1.327	0.332
Total		2.840	0.710
Average	0.395 <sup>a</sup>	1.420	0.355

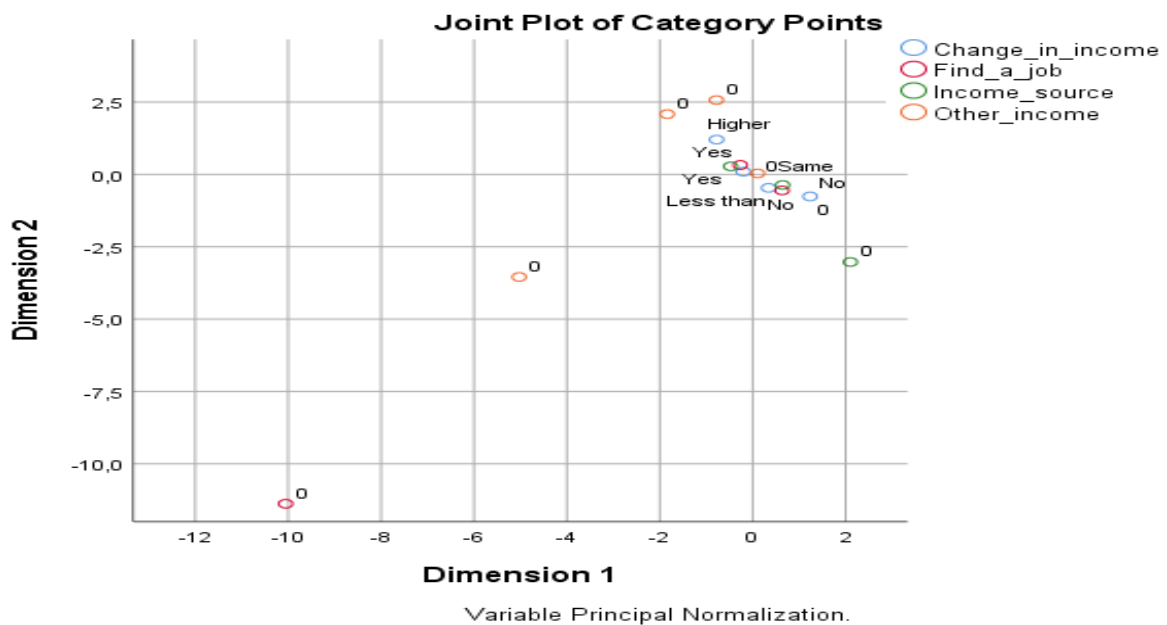


Figure 2. Multiple cohesion graph by livelihood conditions

**Land Use Right of Local People**

The rate of individuals owning a fertile and productive agricultural land was 100%. The rate of individuals with fertile land was 63.5% in the study conducted in 2018, it was 79.5% in the study conducted in 2019, and 56.8% in the study conducted in 2020. The descriptive statistics of the values of the irrigated and dry agricultural lands



of individuals who have a fertile agricultural land are given in Table 5. It has been determined that 58.8% of the individuals have an average of 29.3 da of irrigated agricultural land between 1 and 270 decares. It was determined that 41.2% of the individuals had an average of 25.7 decares of dry agricultural land between 1 and 169 decares (Table 6).

Table 6. Descriptive statistics of agricultural land owned by individuals

Land type	Irrigated farmland	Dry farmland
Number	113	79
Ratio %	58.8	41.2
Average (da)	29.3	25.7
Standard deviation	43.08	29.37
Minimum (da)	1	1
Maximum (da)	270	169

The difference between the averages of irrigated agricultural land by provinces was statistically significant. The irrigated agricultural land owned by individuals in Muş province is larger than the land owned by individuals in Bingöl and Elazığ provinces (Table 7). It has been determined that the dry agricultural land values owned by individuals in Elazığ and Muş provinces are 33.3 and 34 decares, respectively, and they are statistically in the same group, which is higher than the dry agricultural land value (12.4 decares) owned by individuals in Bingöl province (Table 8). In the study carried out in 2018, it was reported that 72.1% of individuals with title deed owned land up to 20 decares, 25.8% had lands up to 100 decares and 2% had lands up to 500 decares. In the study carried out in 2019, it was determined that 71.6% of the individuals had less than 20 da 26.4% were between 20-100 da and 1.9% were between 100-500 da. In the study conducted in 2018, the average of irrigated agricultural land by provinces was found to be 11.5 da for Bingöl, 18.3 da for Elazığ and 16.8 da for Muş. For the same provinces for dry agricultural land, respectively; it was determined as 18.2, as 8.67 and as 22.5 da. In the study conducted in 2019, the average of irrigated agricultural land by provinces was found to be 13.6 da for Bingöl, 22 da for Elazığ and 18.8 da for Muş. For the same provinces for dry agricultural land, respectively; it was determined as 11.8, as 22.4 and as 17.5 da. In the study carried out in 2020, while the average irrigated agricultural land was 17.8 decares, the dry agricultural land was determined as 8.81 decares.

Table 7. Analysis of variance of irrigated agricultural land owned by provinces

Provinces	Average	Standard deviation	Standard error
Bingöl	12.68a	15.743	2.975
Elâzığ	26.76a	33.162	3.708
Muş	99.56b	88.836	29.612
Total	29.3	43.08	4.05
<b>F ve p value</b>	<b>19.156; 0.000</b>		

The differences between the means shown with different letters in the same column are statistically significant ( $p \leq 0.05$ ).

Table 8. Analysis of variance of dry agricultural land owned by provinces

Provinces	Average	Standard deviation	Standard error
Bingöl	12.44a	13.174	2.329
Elâzığ	33.36b	29.421	6.273
Muş	34.00b	36.116	6.825
Total	25.7	29.37	3.305
<b>F ve p value</b>	<b>5.943; 0.004</b>		

The differences between the means shown with different letters in the same column are statistically significant ( $p \leq 0.05$ ).

The rate of individuals who have the right to own property on a land was 54.4%, while the rate of those who do not have the right of ownership was determined as 45.6%. In the study conducted in 2020, 46.7% of the individuals stated that they did not have the right to own the land. There are two main reasons for the high rate of non-proprietary people. The first is that the cadastral works are not completed, and the second is that there are too many uncertainties in terms of ownership, since they are generally ancestral lands. Considering the agricultural land qualification used by individuals who have property rights on a land, it was determined that 90.2% is personal title deed, 4.4% is other uses, and 2.7% is allocation and rental. The rate of individuals with title deed was determined as 64% in 2018, as 68.1% in 2019 and as 75.8% in 2020.

#### **Impact of Project Activity on Yield Increase and Use of A New Agricultural Production Technology Provided Within the Project**

A large part of the individuals (72.9%) stated that any project activity had an effect on these productivity increases, while 27.1% of them stated that any project activity had no effect on the increase in productivity. At the study conducted in 2020, most of the individuals stated that the increase in productivity was not due to project activities. Majority of the individuals (86.5%) stated that they did not use a new agricultural production technology provided by the project within a year, while 13.5% of them stated that they used a new agricultural production technology provided by the project within a year. The rate of individuals using a new agricultural technology introduced by the project in the last year was determined as 24.7% at the study conducted in 2018, as 14.4% at the study conducted in 2019 and as 6.5% at the study conducted in 2020. It has emerged as a result that the rate of the usage of agricultural technology introduced by the project has decreased over the years. It is predicted that the reason for this decrease over the years is due to the fact that the Project is finishing. The rate of individuals using seeder, seed selection, certified seed and vineyard cultivation system technology was as 8%, the rate of individuals using greenhouse and drip irrigation technology was as 4%, and the rate of individuals using other (walnut peeling machine, grape pressing machine) technology was determined as 60%. When the model summary table is examined, 52.8% of the variance for the two-dimensional solution was explained by the first dimension and 31.1% of it by the second dimension (Table 9). The impact of the project on finding employment or improving working conditions has been positive for livestock breeders and those cultivating land for sale. Those who cultivate the land for their own consumption, do not grow high-value crops, and cannot increase their productivity, had a negative impact on the improvement of employment or working conditions (Figure 3). In previous studies conducted in 2018 and 2019, it was determined that individuals living in Elazığ used grapevine cultivation system technology. In the study conducted in 2020, the most used technologies in the region were determined as seeder and drip irrigation.

Table 9. Summary of the model for the impact of the project on employment or improving working conditions by agricultural production and irrigation

Number of iterations	Calculated variance		Lost value
	Total	Increase	
24 <sup>a</sup>	2.099006	0.000008	2.909994
Model summary			
Dimension	Cronbach's Alpha	Calculated variance	
		Total (eigenvalue)	Inertia
1	0.777	2.642	0.528
2	0.446	1.556	0.311
Total		4.198	0.840
Average	0.306 <sup>a</sup>	2.099	0.420

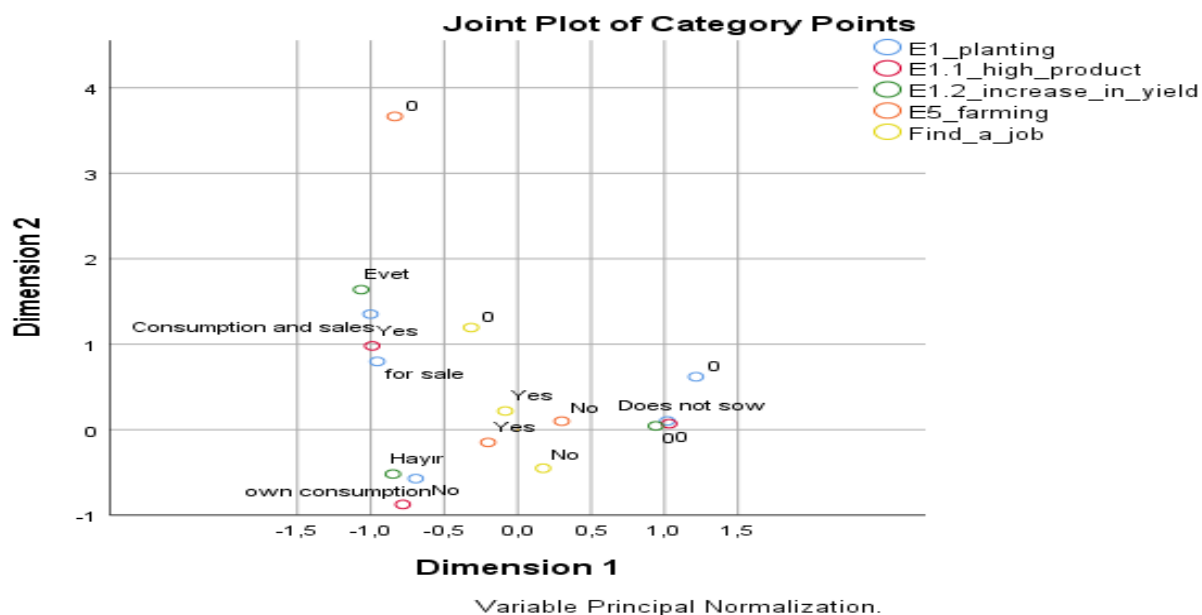


Figure 3. Multiple cohesion graph by agricultural production and irrigation

#### Whether the Increase in Production Area is Related to Any Project Activity or Not

89.6% of the individuals stated that the production area did not increase compared to the previous year, while 10.4% of them stated that it increased. The proportion of individuals who stated that the production area has increased compared to the previous year, during the studies carried out in 2018, 2019 and 2020, was respectively as 17.8%, as 11.5% and as 11%. The production area increase rate was determined to be lower than the value obtained in previous studies. 76.9% of the individuals stated that the increase in the production area was due to the project activity, while 23.1% of them stated that the increase in the production area was not due to the project activity. At the study conducted in 2020, most of the individuals stated that the increase in the production area was not related to the project activities.

#### Increase in The Number of Animals and Its Relationship With Project Activity

Considering the increase in the number of animals compared to the previous year, 72.7% of the individuals stated that the number of animals did not increase, while 27.3% of them stated that the number of animals increased. At the study conducted in 2020, 26% of the individuals stated that the number of animals increased compared to the previous year. While more than half of the individuals (52.7%) think that the project activity has an effect on the increase in the number of animals, 47.3% of them think that the project activity has no effect on the increase in the number of animals. At the study conducted in 2020, 92% of the individuals stated that this increase was not related to the project activities, while 8% of them stated that this increase was related to the project activities. It has been observed that the positive rate in associating the increase at the year 2021 with project activities has increased significantly compared to 2020. It was concluded that this was the result of the barn improvements carried out within the scope of the project activities.

#### Market Accessibility and Its Relation to Project Activity

While more than half of the individuals (53.3%) stated that they did not have a marketing problem, 46.7% of them stated that they had a marketing problem. The proportion of individuals stating that they did not have a marketing problem in 2018, 2019 and 2020 was as 88%, as 94.7% and as 65% respectively and this was found to be considerably higher than the value found at the study. The inability of the products to be sold due to the fact that the traders could not come to the production sites due to the Covid-19 pandemic, and the fact that the manufacturers could not sell in the local markets, can be counted among the reasons for the high market problem value obtained within the study. 66.1% of the individuals stated that access to the market did not improve compared to the previous year, and 33.9% of them stated that access to the market improved compared to last year. At the study conducted in 2020, 25% of the individuals stated that access to the market has improved, while 75% of them stated that there was no improvement. Within the framework of this information, in general, with the partial reduction of the effects of the Covid 19 pandemic in 2020, the problems of individuals in delivering their products to the markets decreased in 2021.

***Access to financial services and relation to project activity***

The rate of individuals who borrowed money in the last year was determined as 33.9%, while the rate of individuals who did not borrow money was determined as 66.1%. While the rate of individuals using debt was as 37.7% in 2018, this rate was determined as 44.4% in 2019 and as 42.2% in 2020. It was concluded that the proportion of individuals who borrowed money decreased in 2021 compared to previous years. 72.7% of borrowers stated that they did not repay their debt, while 27.3% of them stated that they repaid the debt. At the study conducted in 2018, the rate of individuals who could not pay their debts was as 12.2%, and at the study conducted in 2019, the rate of those who could not repay their debt was determined as 3.7%. The rate of those who repaid their debt in 2020 was determined as 40.5%, and the rate of those who could not repay their debt was determined as 59.5%. Compared to 2020, it has been observed that the ability of individuals to pay their debts has decreased in 2021. The emergence of this result is thought to be the effect of the Covid 19 pandemic. The rate of individuals borrowing for consumption purposes is as 61.5%, the rate of individuals borrowing for income generating activities is as 21.3%, and the rate of individuals borrowing for other investments is as 17.2%. At the study conducted in 2018, 33.9% of the debt was used for consumption expenditures, 33.9% of it for income-generating activities, and the rest was used for education, health and housing purchase or improvement. At the study conducted in 2019; 36.8% of the borrowed debt was used for consumption expenditures, 32.4% of it for income generating activities and the rest was used for education, health and housing purchase or improvement. As a general result of the studies, it has been concluded that individuals generally borrow for consumption purposes. 76.4% of the individuals stated that there was no improvement in their household income compared to the previous year, while 23.6% of them stated that there was an improvement. At the study conducted in 2018, the rate of those who stated that their household income increased compared to the previous year was as 43.4%, while this rate was determined as 13.1% in 2019. At the study conducted in 2020, it was revealed that the household incomes of 18% of the participants improved, while the incomes of 79% of them did not improve. It was concluded that the improvements in household incomes were higher in 2021 compared to 2020. While the rate of individuals who answered yes to the issue that the improvement in household income is related to project activities was determined as 29.6%, the rate of those who answered no was determined as 70.4%. At the study conducted in 2019, the rate of those who think that the improvement in their household income is due to project activities in Bingöl was as 19%, as 14.5% in Elazığ and as 20% in Muş. At the study conducted in 2018, the rate of those who think that the improvement in their household income is due to project activities was as 81% in Bingöl, as 67.7% in Elazığ and as 72.7% in Muş. The reason for these large differences in the studies may be the sample difference, as well as the effect of the acknowledgment of project benefits.

***Business development, employment and relation to project activity***

The rate of individuals who own any business other than agriculture and animal husbandry was found to be as 4.8%, while the rate of those who did not was found to be as 95.1%. At the study conducted in 2018, the rate of households owning a business other than agriculture and animal husbandry was determined as 9.3%, as 5.2% in 2019 and as 8.6% in 2020. 79% of individuals stated that the project had no effect on starting a new business or expanding an existing business. Regarding the effect of the project on establishing a new business or expanding the existing business, the proportion of individuals who said yes to establishing and yes to expanding was found to be equal to 10.5%. At the study conducted in 2018, 12.1% of individuals stated that their project activities helped them find a new job or improve their job. At the study conducted in 2019, 3.1% of individuals stated that their project activities helped them find a new job or improve their job. In the study, the rate of individuals who think that the project has a positive effect on both establishing a business and expanding the existing business has been found to be quite higher than previous studies, and it has been concluded that individuals who are project beneficiaries believe in the project. According to the model summary table, 33.7% of the variance for the two-dimensional solution was explained by the first dimension and 30.4% of it by the second dimension (Table 10). The impact of the project on finding a job or improving the working conditions of the middle class local people living in Bingöl and Elazığ has been positive. The poor local people living in Muş had a negative impact on the improvement of employment or working conditions of the project (Figure 4).

Table 10. Model summary for the impact of the project on finding employment or improving working conditions by gender, place of residence, and income

Number of iterations	Calculated variance		Lost value
	Total	Increase	
45 <sup>a</sup>	1.282107	0.000009	2.717893
Model summary			
Dimension	Cronbach's Alpha	Calculated variance	Inertia
		Total (eigenvalue)	
1	0.344	1.348	0.337
2	0.237	1.216	0.304
Total		2.564	0.641
Average	0.344 <sup>a</sup>	1.282	0.321

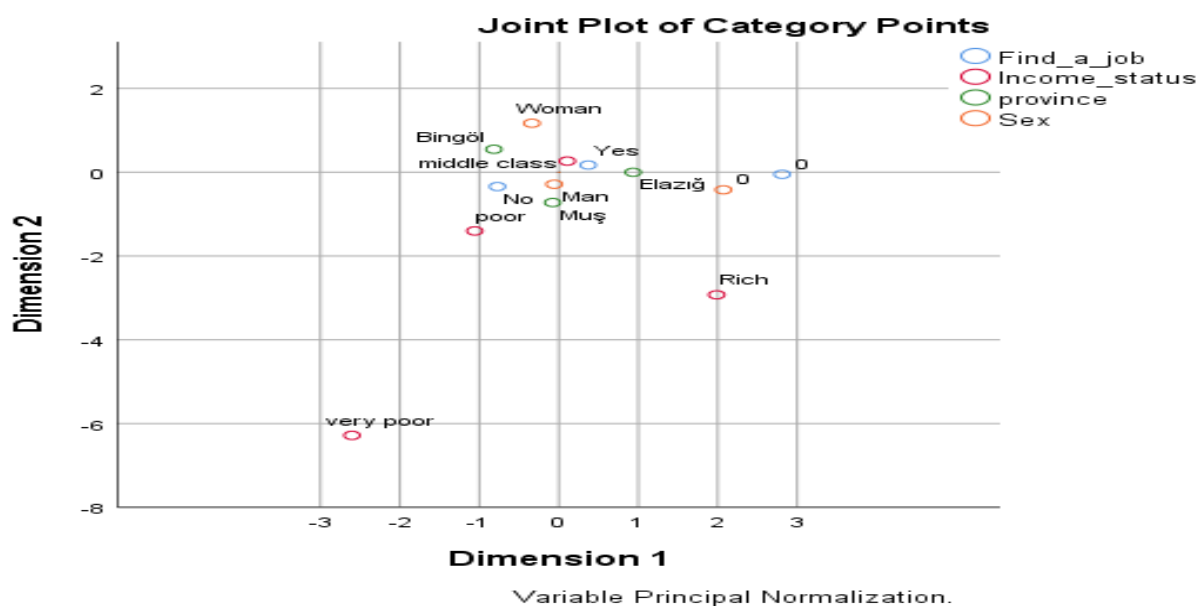


Figure 4. Multiple cohesion graph by income, location, and gender

#### Access to natural resources and its relation to project activities

While the rate of individuals benefiting from the forest was 50.3%, the rate of individuals not benefiting from the forest was determined as 49.7%. The rate of individuals benefiting from the forest was determined as 37.3% at the study conducted in 2018, it was as 45.7% at the study conducted in 2019 and as 33.2% at the study conducted in 2020. It has been concluded that the rate of individuals benefiting from forests has increased over the years. It is thought that this is realized as a result of activities such as the trees planted as a part of income generating activities and the improvement of forest roads carried out within the scope of the project activities. 41.7% of the individuals benefiting from the forest stated that the productivity of the forests did not develop with the project activities, while 58.3% of them stated that the productivity of the forests developed with the project activities. The proportion of individuals who think that the productivity of forests improves with project activities was found to be 30.4% in 2018, as 37.9% in 2019 and as 62% in 2020. Within the framework of these findings, it was concluded that the impact of the project activities on the increase of forest productivity increased from year to year. Within the scope of the project, both the rehabilitation of forests and activities such as solar energy, stove and heat insulation provided for heating have emerged as the most important factors in the improvement of forest productivity. 60.4% of the individuals stated that they benefited from the common pasture land, and 39.6% of them stated that they did not benefit from the common pasture land. At the study conducted in 2018, the rate of those who benefited from the common pasture land was found to be 43.2%, as 48.7% in 2019 and as 45.8% in 2020. It has been concluded that the proportion of individuals benefiting from common pasture land has increased significantly in 2021 compared to previous years. It can be thought that this was realized as a result of the pasture improvement, the construction of the pasture roads and the construction

of the pasture foundations carried out within the scope of the project activities. 75.9% of the individuals who think that the productivity of the pastures have improved, stated that this improvement was with the project activities, while 24.1% of them stated that this development was not together with the project activities. The rate of those who think that the improvement of the efficiency of the pastures is related to the project activities was determined as 32.6% at the study conducted in 2018, as 39.8% at the study conducted in 2019, and as 47% in 2020. It has been concluded that there is an increasing improvement in pastures from year to year and this increase is very high in 2021. In these improvements, it was concluded that the impact of the pasture improvement within the scope of the project activities is high. In the focus group discussions, it was stated by the individuals that the construction of canopy and animal drinking water facilities in the pastures increased the efficiency of the pastures. In addition, individuals stated that as a result of these improvements carried out in the pastures, the length of stay of the animals in the pasture increased and this had a positive effect on the productivity of animal products.









## CONCLUSION AND RECOMMENDATIONS

It was observed that the overall satisfaction with the project was very high in almost all villages where focus group interviews were held. In addition, it has been observed that the villagers generally want to benefit more from the project activities with this high satisfaction. Achieving the targeted female participant ratio in the study has emerged as a positive result of the project. It was concluded that the number of household heads of working age living at the watershed is sufficient for the successful implementation of the project. In general, it has emerged that individuals mostly participated in project activities between 2016 and 2020. In addition, since the activities were not fully implemented in 2021, the rate of participation in the project activities was lower this year. In general, it was concluded that the participants were satisfied with the project activities. At the study, a different result has emerged compared to previous years and it has been determined that individuals' mostly animal production and sales and agricultural production and sales incomes are the main income sources. In this case, it was concluded that it was caused by the Covid 19 pandemic, and individuals who had problems in terms of salary or wages turned to other income sources. In general, it was concluded that the lands were either cultivated by individuals for their own consumption or not cultivated. According to the results of the compatibility analysis; while the project had a positive effect on finding a job or improving working conditions, it had a positive effect on those with a higher and the same income, while it had a negative effect on those with less income. The impact of the project on finding employment or improving working conditions has been positive for livestock breeders and those cultivating land for sale. Those who cultivate the land for their own consumption, do not grow high-value crops and cannot increase productivity, had a negative impact on the improvement of employment or working conditions of the project. The impact of the project on finding a job or improving the working conditions of the middle class local people living in Bingöl and Elazığ has been positive. The impact of the project on the poor local people living in Muş on finding a job or improving their working conditions was negative. In general, as a result of the information obtained from the participants, it can be stated that with the realization of the project activities, positive developments occurred in the villages and a significant contribution was made to rural development. In addition, it has been observed that income generating activities have increased in the villages with the support of project activities and individuals have started to live in the villages regularly. It was concluded that the pressure on the forest vegetation of the union decreased with the MRWRP activities. It has been concluded that the improvements made in the pasture areas make very important contributions to animal husbandry. In addition, with the implementation of income generating activities, additional income sources have been created for the individuals living in the village. Since the agricultural potential of the region plays a very important role in the development of the region, promptly solving the irrigation water problem is important for the success of the project. Within the framework of all information, it can be stated that the project is an important source of development for the region and this level of development will emerge more clearly in the coming years.

**Çıkar Çatışması Beyanı:** Makale yazarları aralarında herhangi bir çıkar çatışması olmadığını beyan ederler.

**Araştırmacıların Katkı Oranı Beyan Özeti:** Yazarlar makaleye eşit oranda katkı sağlamış olduklarını beyan ederler.

## YAZAR ORCID NUMARALARI

Ahmet Uslu 	<a href="https://orcid.org/0000-0003-0273-0069">https://orcid.org/0000-0003-0273-0069</a>
Alaaddin Yüksel 	<a href="https://orcid.org/0000-0003-4760-1092">https://orcid.org/0000-0003-4760-1092</a>
Ersin karakaya 	<a href="https://orcid.org/0000-0002-6734-4962">https://orcid.org/0000-0002-6734-4962</a>
Semra çamuka 	<a href="https://orcid.org/0000-0002-4966-9296">https://orcid.org/0000-0002-4966-9296</a>
Şenol Çelik 	<a href="https://orcid.org/0000-0001-5894-8986">https://orcid.org/0000-0001-5894-8986</a>
Bayram hopur 	<a href="https://orcid.org/0000-0002-7443-8051">https://orcid.org/0000-0002-7443-8051</a>
Mahmut Yılmaz 	<a href="https://orcid.org/0009-0008-9481-1950">https://orcid.org/0009-0008-9481-1950</a>
Serpil Acartürk 	<a href="https://orcid.org/0009-0005-1789-6733">https://orcid.org/0009-0005-1789-6733</a>

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