

## **Factors influence on economic-social effectiveness of watershed and natural resources plans**

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### **ABSTRACT**

*The Objective of this study is to analyze the effective factors on the economic-social effectiveness of watershed and natural resources plans of Tajan dam area. This is a descriptive - correlational study. The district exploiters were chosen as a statistical society of this study and 189 exploiters were chosen as the statistical sample through random sampling. The validity of the study tools acquired through the faculty members of agricultural education and extension group and specialists and experts of natural resources of Mazandaran province. The primary test and questionnaire validity were obtained by the completion of 30 questionnaires outside the statistical sample and certainty coefficient of Cronbach's Alpha was estimated 0.83. The results showed that the variables of attitude to the participation, effect of educational-extensional activities, use of media, level of mechanization, the cultivated area and participation in Tajan plan had the greatest role on the changes of economic-social effectiveness.*

**Keywords:** Economic-social effectiveness, Tajan dam area.

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### **INTRODUCTION**

Human and social conditions are often associated with complexities caused by human interactions with each other and their surroundings. Although a complex situation, will never lead to a definitive solution and what is possible is only to improve the complex situations.

To understand the complexity of the situations ,to improve it and to Present definitive solutions emerge when daily life matters that are often non – objective , immeasurable and unspeakable are taken into account instead of the more study on the trend of the historical phenomena [6]; [16].

One of the current concerns in the country is the containing trend of water and soil degradation and loss of land potential for the planned application. The fact is that the scientific and public knowledge about the importance of natural resources and watershed plan is less in the developing countries compared with the developed countries[12].This issue caused underestimation of the actual social and economic values of natural resources and their destruction is justified in terms of economic and social view.

Therefore, it is necessary to justify well the implementation of the projects and presentable services in the projects Related to natural resources and watershed management so that the importance of these projects get comprehensible and clear for users, rural people and even officials.

Obviously, the first necessary step in the implementation of watershed management and natural resources is the primary study and enough knowledge in the field of renewable natural resources available in the area, physical

characteristic of the area, economic and social issues of the residing communities in the area or related to the area. Renewable natural resources (forests, pastures and etc) are about 62% of the total country. Regardless of the views and needs of people; government can not achieve success alone, due to the vast areas of renewable natural resources and large volume of operation related to it. Therefore, one way to rescue the renewable natural resource is that the governmental agencies gradually let and provide public participation [11]. The topic of Tajan dam sustainable management of soil and water as one of the most important strategies of integrated rural development and participation is the most important subject for the internal and external experts that prevents accelerated erosion and degradation of the country's natural resources and reviews the rural economy again.

The main question of this study is the effectiveness of natural resources and watershed plans in this area. Comprehensive study of all areas needs a long time, due to the watershed areas of the province covering more than 2.70 million Hectares. So, the watershed area of Tajan dam (Rajae dam) is evaluated for the social –economic effectiveness of natural resources and watershed plan. Tajan is a relatively large area of hydrologic unit. Soil and water in this area is one of the most important bases of economic and agricultural growth of Sari district and Mazandaran province; consequently the knowledge of geology, geomorphology and watershed management is the need to maintain it. It contains a large proportion for irrigation of the lands in this region. Tajan dam was constructed on the Dodangeh River which starts the Mazandaran Tajan River and located on the northern slopes of the Alborz mountain ranges and a limestone straight known as Soleiman straight and the distance of this area from the Caspian – sea is 70 km. We can say that the Tajan dam watershed area is one of the first areas in the country that watershed management studies are coordinated with the operation of the dam construction. Therefore this study could be a good model for more efficient utilization and optimal use from the existing natural resources area and also for finding the factors for social economic effectiveness of natural resources and watershed plans which ultimately leads to the improvement of living standard for the people of the area users and finally economic and social development of the area [9].

Poormohsen [13] concluded that with using interviews and collecting 337 sample and data analysis with the use of Logic model the relationship is meaningful in the high level of 0.999 among variables of awareness from the need for watershed management practice, awareness from the watershed facilities, construction facilities of village, awareness from the consequences of degradation and variable of effectiveness of the projects. Finally, cognitive and attitude factors, environmental requirements, construction facilities and educational classes are effective on the plan. Baghaei et al [2] conducted a study on the factors affecting participation by rural people of watershed areas of Zarcheshmeh Honjan in the watershed project. The results showed a significant and positive relationship between the variables of age, social participation, social status, level of attitude towards the participation, modernity level, and trust to different individuals and willingness for working together with the variable of rural participation amount in watershed plans. In a multiple linear regression test, variables of age, social participation, social status level, attitude towards participation rate, the modernity, the trust to different people and the willingness of people for working together including 75.7 percent contribution from changes of participation rate in watershed projects.

The research was conducted by Mehdipoor [10] came to the conclusion that the participation is one strategies to progress natural resources and the watershed planning approaches have been developed. The results of step by step multiple regressions showed awareness of rural people about the watershed projects is in a low and very low level. There is also a significant and positive relationship between the variable of effectiveness in plans and variables of age, history of agricultural and ranching activities, annual farming and non– farming income, social status, involvement of local communities, knowledge and attitude towards the plans, attention to the local knowledge.

Keene and Pullin [7] on a research conducted in 2011 found out that to achieve an effective revolution in natural resources and watershed management plans. It is necessary to utilize evaluation plans.

Schandl and West [18] concluded that the effectiveness in the natural resources and watershed management provides a reduction of poverty and resources security in a middle term and long term.

Sahrawat et al [16] found that the activities of watershed management lead to improvement of water and soil resources quality in the long term.

In a study conducted in 2011, Schilling and Chiang [19] concluded that apposite view of the natural resources will have a significant effect on economic development for future generations, and also we should use approaches the reduce environmental degradation and preserve natural resources and energy.

Thackway et al [20] concluded that the vegetation cover information and necessary operation for improving the vegetation cover cause effectiveness of natural resources.

During the evaluation of structural changes in land use management in Wisconsin, USA, white [22] showed that the economic and social factors needs of farmers, indigenous knowledge and history of the team works on the effectiveness of the programs that actually reflect the structural changes are influential.

In the study conducted in 2011 Williams [23] came to the conclusion that the compromised management of natural resources that has to counseling and repeating phases, cab be influential in the effectiveness of projects for natural resources.

The aim of this study is to identify influencing factors on the social - economic effectiveness of projects of natural resources and watershed management for Tajan dam area.

And its specific objectives are to determine:

- The social – economic effectiveness of the projects of natural resources and watershed management,
- The investigation of personal characteristic, agronomic, economic, social, communication and training – extensional accountability between respond ate,
- The relationship between the characteristics of the beneficiaries of Tajan dam and effectiveness of social – economic of the projects of natural resources and watershed management,
- Role of independent variables on the effectiveness of social – economic of natural resources and the watershed management of the Tajan dam area.

## MATERIALS AND METHODS

With regard to this study , the researcher pursues to determine social – economic effectiveness level of natural resources and watershed management projects in Tajan dam area and identify the effective sectors on it .in other words ,the results of this study can be used to improve Tajan dam area .therefore this research is a practical type from the aim point of view. On the other hand , this research according to the type of data collection is non-experimental (descriptive) because it is not possible to control and manipulate the variables and it analyzes the status quo, and it describes it and since it pursues to analyze the relation among variables according to the research aim . It is correlation type too.

In this research, rural users of Tajan Dam area are from the statistical community. The total numbers of statistical community are 2000 users. With the use of simple accidental sampling and according to Bartlett et al (2001) the samples of 189 users with certainly of 99 percent were chosen.

The necessary data was collected through questionnaires that these questionnaires were designed according to the research objectives and variables. Determine super facial and content validity, several copies of questionnaires were given to some agricultural education and extension specialists and some experts of natural resources in Mazandaran province. After receiving , we points necessary modifications , these final modifications and we points were applied and above – mentioned questionnaires prepared to determine the validity of research tools and to gain variance for sampling , a primary test was carried out . In this test, the above -mentioned questionnaires were given to 30 users who were geographically, economically, culturally and socially similar to the statistical community. After the analysis of this data, coefficient of Cronbach's Alpha was 83 percent for all variables of ranked scales. to determine personal characteristics 6 questions, economic and agricultural characteristics 8 questions, social characteristics that contain variable of social penetrability with 3 questions and variable of attitude to natural resources and watershed management with 15 questions and variable of attitude to the participate with 8 questions and variable of social Participation with 6 questions and variable of participation in Tajan dam plan with 5 questions were evaluated. Also to determine the communicative characteristics , variable of the use of informative resources with 12 questions and extensional - educational activities with 16 questions were evaluated that all had five – choice spectrum of likert.

## RESULTS

### **1. Social – economic effectiveness of natural resources and watershed management plans:**

Social – economic effectiveness rate of natural resources and watershed management plans was measured by 17 questions that had five –choice spectrum of likert . Scoring is as follows: very low =1, low = 2, normal = 3, high = 4, very high = 5. Therefore the maximum score for social-economic effectiveness of natural resources and watershed management projects will be 85 and the minimum score will be 17. Table 1 shows mean standard deviation and coefficient of variation and rank of each social – economic effect of watershed management plans among the respondents. According to the table, income rise , increase in gardening and agricultural products, rate of social responsibility, water saving and increase in underground water are the most important social- economic effects of natural resources and watershed management plans. Table 2 shows social- economic effectiveness rate of natural

resources and watershed management projects among the respondents. According to the table 2, 1.1% of respondents expressed social – economic effectiveness rate is normal and 98.9% said it is high. Mean of economic – social effectiveness rate of natural resources and watershed management projects is 78.1 and its deviation standard is 7.2.

**Table 1: Priority of related questions with social-economic effectiveness of natural resources and watershed management plans**

Item of Social – economic	M	SD	C.V	Rank
Income raise	4.70	0.46	0.098	1
Increase in gardening and agricultural products	4.69	0.46	0.099	2
Social responsibility rate	4.76	0.48	0.101	3
Water saving and increase in underground water	4.69	0.49	0.104	4
decrease in flooding	4.64	0.50	0.109	5
Increase in cattle products	4.64	0.52	0.111	6
Increase in social culture	4.64	0.53	0.113	7
Relation rate of people together	4.58	0.52	0.113	8
Participation rate of different social groups	4.63	0.53	0.114	9
Collective planning and concluding	4.52	0.52	0.116	10
Improvement of ranchlands situation	4.64	0.55	0.118	11
Decrease in oil erosion	4.57	0.56	0.123	12
Intellectual participation rate of people	4.57	0.57	0.125	13
Attention of the youth to agriculture	4.60	0.71	0.154	14
Gender integration (attention to woman participation)	4.46	0.72	0.161	15
Opinion poll rate from people in activities	4.39	0.75	0.170	16
Return Migration	4.36	0.84	0.194	17

Very low=1, low=2, normal=3, high=4, very high=5

**Table 2: Social and economic effectiveness of natural resources and watershed management plans**

Situation of economic – social effectiveness	Frequency	% of Frequency	Cumulative % of Frequency
Very low(17-30)	0	0	0
Low(31-44)	0	0	0
Moderate(45-58)	2	1.1	1.1
High(59-72)	39	22.2	23.3
Very high(73-85)	135	76.7	100
Total	176	100	-

M= 78.1

SD=7.2

**Table 3: Determination of relation among variables of the research and social-economic effectiveness**

Variables	Correlation coefficient	significant
Age	-0.127	0.094
Education level	0.195**	0.009
Experience of farming	-0.124	0.101
Level of mechanization	0.115	0.129
Gardening and framing cultivated level	0.129	0.089
Number of cattle units	0.077	0.312
Social penetrability	0.064	0.396
Attitude towards watershed management	0.472**	0.000
Attitude towards participation	0.615**	0.000
Social participation	0.213**	0.005
Participation in Tajan project	0.184*	0.014
The rate of media using	0.118	0.118
The rate of using information resources	0.128	0.089
The rate of contact to the Extension Agent	0.271**	0.000
Effect of extensional – educational activities	0.444**	0.000

\* $p < 0.05$

\*\* $p < 0.01$

## 2. Relation among variables of the research and social-economic effectiveness

Table 3 shows a meaningful level, relation direction and intensity among the research variables and social – economic effectiveness of natural resources and watershed management projects .there is 95% meaningful and positive relation between participation in Tajan project and social – economic effectiveness of natural resources and watershed management project and there is also 99% meaningful and positive relation among education level, attitude towards watershed management, attitude toward participation, social participation, conduct to the extension agent and effect of extensional – educational activities with social – economic effectiveness of natural resources and watershed management plans.

### 3. The role of research variable on social-economic effectiveness of natural resources and watershed management plans

In order to predict the role of research variables on social – economic effectiveness of natural resources and watershed management projects, step – to – step regression was used. Regression analysis provides the Possibility for the researcher to predict the changes of dependent variables through dependent variable and to determine the share of each independent variable in the specification of dependent variable .In the step – to – step method, the strongest variables come into the coefficient equation one by one and it continues as long as error of significant test gets to 5%. According in the table 4, attitude towards participation, effect of extensional – educational activities, use of media, level of mechanization, cultivated area, and participation in Tajan project respectively came into the equation from the first to sixth steps. Means that the variable of attitude has the most effect on dependant variable (Social – economic effectiveness) and this variable, by itself, has explained 37.8% changes of the social- economic effectiveness. In the second step, attitude and extensional- educational activities together have explained 47.8% changes of social- economic effectiveness variable .In the third step, attitude, extensional – educational activities and use of media have totally explained 51% changes of effectiveness variable. In the fourth step, attitude, extensional – educational activities, use of media and level of mechanization totally have explained 52.4% change of effectiveness variables. In the fifth step, extensional – educational activities, use of media, level of mechanization and cultivated area have explained totally 56% changes of effectiveness variables .in the sixth step, attitude, extensional – educational activities, use of media, level of mechanization, cultivated area and participation in Tajan project have totally explained 57.3% changes of social – economic effectiveness variable.

**Table 4: Regression analysis of social – economic effectiveness of natural resources and watershed management plans**

steps	R	R square	Adjusted R square	F	Sig
1	0.615	0.378	0.374	105.7	0.000
2	0.691	0.478	0.472	79.2	0.000
3	0.714	0.510	0.502	59.7	0.000
4	0.724	0.524	0.513	47.1	0.000
5	0.748	0.560	0.547	43.2	0.000
6	0.757	0.573	0.558	37.8	0.000

**Table 5: Standardized and non- Standardized coefficients of social – economic effectiveness**

Variable	B	Beta	t	Sig
Attitude towards participation	1.23	0.57	4.23	0.000
Effect of extensional – educational activities	0.19	0.33	3.21	0.000
Use of media	0.22	0.30	2.08	0.000
Level of mechanization	-3.22	-0.28	2.45	0.000
Cultivated area	2.76	0.28	2.14	0.000
Participation In Tajan project	0.25	0.16	1.89	0.023
Constant	18.53	-	6.22	0.00

Dependent variable: social – economic effectiveness of natural resources and watershed management projects.

According to Beta amount in Table 5, regression equation can be written:

$$Y: 0.57x_1 + 0.33x_2 + 0.30x_3 - 0.28x_4 + 0.28x_5 + 0.16x_6$$

X1= Attitude towards participation,

X2= Effect of extensional –educational activities

X3= Use of media

X4= Level of mechanization

X5= Cultivated area

X6= Participation in Tajan dam project

### DISCUSSION AND CONCLUSION

Correlation analysis revealed that there was a meaningful and positive relation in 95% level between participation in Tajan project and social – economic effectiveness of natural resources and watershed management project .so the users who participated more, believe there is higher social – economic effectiveness of projects. Rate of this correlation in connection with participation in Tajan project is 18% while it is in a low level. There is also a positive and meaningful relation in 99% level among education level, attitude towards watershed management ,attitude towards participation, social participation, contact to Extension Agent and effect of extensional – education activities on social – economic effectiveness of natural resources and watershed management plans. Users who had



more literacy, had better attitude, more participation and contact and believed that the effect of extensional – educational courses is more and social – economic effectiveness of projects is more. The rate of these correlations in connection with education level, attitude towards watershed management, attitude towards participation, social participation, contact with Extension Agent and effect of extensional – educational activities are respectively 20%, 47%, 62%, 21%, 27% and 45% that these correlations are in a high and normal levels and these subjects corresponds with the researches of [13], [2], [10], [3], [5], [15], [7], [14], [1], [8].

The step – to – step regression results showed that attitude towards participation, effects of extensional activities, use of media, level of mechanization, cultivated area and participation in Tajan projects came respectively into the equation from the firsts to the sixth steps. Means that attitude variable alone has the most effect on the dependent variable (social - economic effectiveness) and this variable specifies alone 37.8 % changes of social – economic effectiveness. The second step, attitude and extensional – educational activities together specify together 47.8% and the third step, attitude, extensional educational activities and use of media specify totally 51% and the fourth step, attitude, extensional educational activities, use of media and level of mechanization specify totally 52.4% and the fifth step, attitude, extensional – education activities, use of media, level of mechanization and cultivated area specify totally 56% and the sixth step, attitude, extensional – educational activities, use of media, level of mechanization, cultivated area and participation in Tajan project specify totally 57.3% of the changes of social – economic effectiveness variable that confirms the researchers by [21], [2], [4], [10], [5], [7], [14], [1], [8].

#### Recommendations

1. With regard to the normality of the effect of Tajan dam extensional -educational courses, it is recommended to present applied and practical courses so that corresponds with the needs of users and it should be practical and urgent for them.
2. With regard to the normality of social – economic effectiveness of natural resources and watershed management plans, it is recommended to involve the users intellectually and actively in planning, implementation and evaluation of these projects.
3. With regard to the meaningful difference of social – economic effectiveness of natural resources and watershed management plan about agricultural system, it is recommended to encourage the users to diversify their activities not only in agricultural and gardening fields, but also trying in other fields such as cattle – raising and bee – rising.
4. In order to optimize social – economic effectiveness of natural resources and watershed management plans on Tajan dam, it is recommended to increase the cultivated area and function of users.
5. In order to increase social – economic effectiveness of natural resources and watershed management plans on Tajan Dam, it is suggested to improve the attitude of the users to natural resources and watershed management.
6. In order to increase social – economic effectiveness of natural resources and watershed management plans on Tajan dam, it is suggested to develop and expand information channels among the users.

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