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Factors influence on technical 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 technical effectiveness of watershed and natural resources plans of Tajan dam area. This is a descriptional - 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 towards watershed management and effect of educational-extensional activities had the greatest role on the changes of technical effectiveness.

Keywords: Technical effectiveness, Tajan dam area.

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 (Rajaee 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 knows 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 forwards 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 appositive 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 technical effectiveness of projects of natural resources and watershed management for Tajan dam area.

And its specific objectives are to determine:

- The technical effectiveness of the projects of natural resources and watershed management,
- The relationship between the characteristics of the beneficiaries of Tajan dam and effectiveness of technical of the projects of natural resources and watershed management,
- Role of independent variables on the effectiveness of technical 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 technical 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. Technical effectiveness of natural resources and watershed management plans:

Technical effectiveness rate of natural resources and watershed management plans was measured by 14 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 technical effectiveness of natural resources and watershed management projects will be 70 and the minimum score will be 14. Table 1 shows mean standard deviation and coefficient of variation and rank of each technical effect of watershed management plans among the respondents. According to the table, planting, Loose-rock, Pit-seeding and seeding are the most important technical effects of natural resources and watershed management plans. Table 2 shows technical effectiveness rate of natural resources and watershed management projects among the respondents. According to the table 2, 5.7% of respondents expressed technical effectiveness rate is normal and 94.3% said it is high. Mean of technical effectiveness rate of natural resources and watershed management projects is 60.3 and its deviation standard is 7.8.

Table 1: Priority of related questions with technical effectiveness of natural resources and watershed management plans

Item of Technical	M	SD	C.V	Rank
planting	4.33	0.56	0.129	1
Loose-rock	4.39	0.59	0.135	2
Pit-seeding	4.30	0.61	0.142	3
seeding	4.20	0.60	0.142	4
Contour trench	4.22	0.62	0.146	5
exclosure	4.34	0.64	0.147	6
Turkey nest& soil dam	4.32	0.65	0.151	7
dike	4.33	0.65	0.151	8
Brush wood dams	4.34	0.66	0.151	9
Water transport	4.28	0.66	0.154	10
Masonry check dam	4.30	0.66	0.154	11
Gabion	4.32	0.67	0.155	12
Making water trough	4.28	0.68	0.159	13
Graze management	4.39	0.76	0.172	14

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

Table 2: Technical effectiveness of natural resources and watershed management plans

Situation of technical effectiveness	Frequency	% of Frequency	Cumulative % of Frequency
Very low(17-30)	0	0	0
Low(31-44)	0	0	0
Moderate(45-58)	10	5.7	5.7
High(59-72)	76	43.2	48.9
Very high(73-85)	90	51.1	100
Total	176	100	-

M= 60.3 *SD=7.8*

2. Relation among variables of the research and technical effectiveness

Table 3 shows a meaningful level, relation direction and intensity among the research variables and technical effectiveness of natural resources and watershed management projects .there is 95% meaningful and positive relation among social penetrability, participation in Tajan project and the rate of using information resources with technical effectiveness of natural resources and watershed management project and there is also 99% meaningful and positive relation among attitude towards watershed management, attitude toward participation, social participation and effect of extensional – educational activities with technical effectiveness of natural resources and watershed management plans.

Table 3: Determination of relation among variables of the research and technical effectiveness

Variables	Correlation coefficient	significant
Age	-0.066	0.384
Education level	0.010	0.896
Experience of farming	-0.103	0.174
Level of mechanization	0.022	0.770
Gardening and framing cultivated level	0.041	0.592
Number of cattle units	0.104	0.169
Social penetrability	0.180*	0.017
Attitude towards watershed management	0.469**	0.000
Attitude towards participation	0.391**	0.000
Social participation	0.252**	0.001
Participation in Tajan project	0.193*	0.010
The rate of media using	0.032	0.673
The rate of using information resources	0.167*	0.026
The rate of contact to the Extension Agent	0.135	0.075
Effect of extensional – educational activities	0.386**	0.000

**p<0.05* ***p<0.01*

3. The role of research variable on technical effectiveness of natural resources and watershed management plans

In order to predict the role of research variables on technical 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 watershed management and effect of extensional – educational activities came into the equation in two steps. Means that the variable of attitude has the most effect on dependant

variable (Technical effectiveness) and this variable, by itself, has explained 22% changes of the technical effectiveness. In the second step, attitude and extensional- educational activities together have explained 28.2% changes of technical effectiveness variable.

Table 4: Regression analysis of technical effectiveness of natural resources and watershed management plans

steps	R	R square	Adjusted R square	F	Sig
1	0.469	0.220	0.215	49.1	0.000
2	0.531	0.282	0.274	33.9	0.000

Table 5: Standardized and non- Standardized coefficients of technical effectiveness

Variable	B	Beta	t	Sig
Attitude towards watershed management	0.39	0.39	5.66	0.000
Effect of extensional – educational activities	0.17	0.26	3.86	0.000
Constant	22.09	-	5.67	0.00

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

Y= 0.39x1+0.26x2

X1= Attitude towards participation,
X2= Effect of extensional –educational activities

DISCUSSION AND CONCLUSION

Correlation analysis revealed that there was a meaningful and positive relation in 95% level among social penetrability, participation in Tajan project and the rate of using information resources with technical effectiveness of natural resources and watershed management project. So the users, who participated, penetrability and using information resources more, believe there is higher technical effectiveness of projects. Rate of this correlation in connection with social penetrability, participation in Tajan project and the rate of using information resources are 18%, 0.19 and 0.17 respectively. While they are low level. There is also a positive and meaningful relation in 99% level among attitude towards watershed management, attitude toward participation, social participation and effect of extensional – educational activities with technical effectiveness of natural resources and watershed management plans Users who had more had better attitude, more participation and believed that the effect of extensional – educational courses is more and technical effectiveness of projects is more. the rate of these correlations in connection with attitude towards watershed management, attitude towards participation, social participation and effect of extensional – educational activities are respectively 47%, 39% , 25% and 39% that these correlations are in a high and normal levels and these subjects corresponds with the researches of (Poormohsen, 2006), (Baghaei et al, 2008), (Mehdipoor, 2009), (Ghodoosi et al, 2005), (Jalali, 2001), (Sadeghi et al, 2003), (Keene and Pullin, 2011), (Rammel et al, 2007), (Babu and Reidhead, 2000) ,(Keysi , 2012).

The step – to – step regression results showed that attitude towards watershed management and effects of extensional actives came respectively into the equation in two steps. Means that attitude variable alone has the most effect on the dependent variable (technical effectiveness) and this variable explained alone 22 % changes of technical effectiveness. The second step, attitude and extensional – educational activities together explained together 28.2% of the changes of technical effectiveness variable that confirms the researchers by (Khalighi and Hematzade, 2007), (Baghaei et al, 2008), (Heydari, 2009), (Mehdipoor, 2009), (Jalali, 2001), (Keene and Pullin, 2011), (Rammel et al, 2008), (Babu and Reidhead, 2000), (Keysi , 2012).

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 technical 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 technical 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 increase technical 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.

5. In order to increase technical 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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