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## The Comparison between Two Approaches of Governmental Management and Public Participations on the Performance of Irrigation and Drainage Networks of Great Karun

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Faramarz Mahmoudi Kouhi<sup>1</sup>, Mousa Mojtabaie<sup>2\*</sup>

<sup>1</sup> MS Graduated of Management, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

<sup>2</sup> Department of Management, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

Received: 10<sup>th</sup> Jan 2017, Accepted: 24<sup>th</sup> Jan 2017, Published: 15<sup>th</sup> March 2017

### Abstract

This essay is a comparative study of the influence of administrative management and public contributions on the function of Great Karoon irrigation and drainage network. In Shoushtar irrigation network 300 questionnaires were distributed based on the statistic population of 1296 people and Morgan table and 288 ones of these questionnaires were collected. In northeast Ahvaz irrigation network 327 questionnaires were distributed based on the statistic population of 2120 people and Morgan table and 285 ones of these questionnaires were collected. This research is applied and developmental in nature and it is conducted in a descriptive manner. Its methodology contains two librarial and field study stages. For the answers of the questions we have received consults from various professional experts. The data collection tools that have been used in this research are questionnaires. The questionnaires used in this research consist of cooperative and managerial operation and the questionnaire of operation. Lizrel and structural functions have been used for the analysis of the collected data. In addition to the application of Cornbach's alpha for determination of reliability coefficient, we have also taken advantage of Kolmogorov–Smirnov test and multiple regressions. After the analysis of the collected data all research hypotheses have been approved. The chief finding of this research is the fact that contributive management is more efficient than administrative management in the improvement of the irrigation and drainage network.

**Key Words:** Function, Administrative Management, Karoon irrigation and drainage network.

### Introduction

The new business era in the 21st century has recognized change as one of the main features. This situation originates from factors, such as excessive competition, globalization, and technological progresses. To survive and prosper in such a highly competitive environment, sensing and responding to threats and organizational opportunities is essential (Walsh, 2014). Therefore, one of the cases that could be helpful

for organizations and their planning in this sensitive situation is participation and operations. This requires a supportive and knowledge-based environment in which the participation programs can be implemented based on dynamic and changed human resources. In doing so, the organization operation can be helpful for the matter.

The important factor for the existence of human resources planning is the plan of reaching the needs of skill, education, and ultimately, the partnership of human resources. The most effective way to achieve the competitive advantage in the current situation is to develop the efficiency of organization employees by means of their improvement, optimization, and participation and what is important in development of human resources is that the improvement of human resources is not acquired only out of technical and professional educations, but it also needs other different ways to develop the human resources and this important task is feasible only by conducting strategic management in the realm of human resources. One of the most important fundamental factors in management behavior is human being (Chen, 2013).

The agricultural sector plays a vital role in economy of Iran, since it provides 11.4 percent of Gross domestic product (GDP), 22 percent of employment and 25 percent of non-oil exports. Employment in agriculture sector and the important role of agriculture in economic development are the most important theories of economists (Poursina, 2010).

Water is known as one of the most important factors limiting the agricultural development in most countries. Therefore, the countries that are in the arid and semi-arid areas should have specific strategies in order to get correct and optimal use of it. Predictions by FAO indicate that during the twenty-first century, the amount of precipitations in the region of Middle East and Iran will have a downward process. Therefore, the use of the mechanisms and ways to fix the problems, limitations, and improving the management of water resources seems very much necessary. According to conducted studies, one of the ways to optimize the use of water resources is the participation of farmers in the construction,

maintenance, and utilization of irrigation and drainage network (Najafi, Shirani, 2013).

If the necessary legal and institutional foundations for the participation of beneficiaries of water in the management of irrigation networks is prepared and their actual status is recognized and they have the sufficient rights and mandates for managing, without any doubt, the agricultures will have stronger motivations than governmental employees in optimized utilization of network and this will cause the suitable irrigation services, the constant utilization of water resources and irrigation installations, the promotion of agricultural water utilization, and the achievement of the potential for producing agricultural productions in irrigation and drainage networks (Faghihi, Abolhasan, 2002).

It is now obvious and proven that the creation of water utilizer organizations and their active participation in the management of the irrigation system can be a major solution to help improve the knowledge, view and skill levels of farmers in efficiently managing the water resources in different aspects. Also, the creation of these organizations can be considered as a major solution for efficiency improvement and the effectiveness of irrigation systems in order to overcome the problem of water shortage (ShahroudiVachidzi, 2007).

Today, the networks of irrigation and drainage in the Great Karun which include big part of various agricultural sectors in the cities of Getond, Shushtar, and Bavi, despite all the regarded efforts and services, they have failed to reach the optimal utilization in terms of operation. The followings are the obvious management dimensions:

- A) The necessity for operationalizing the culture of management and participatory approaches.
- B) Implementation of operations and management approaches in the form of participation.
- C) The communication with objectives and characteristics of employee's success as well as necessary actions to achieve the optimal operation.
- D) The necessity of increasing employees' participation in functional activities and participation in decision making through direct interaction with farmers and stakeholders.

By looking at the above cases, we can understand the increase of the degree of urgency and importance of this research in irrigation and drainage networks of the Great Karun.

Therefore, according to the above matters, the researcher aimed to choose the subject of comparison of the effect of two approaches of governmental management and public participation on the operation of irrigation and drainage networks of the Great Karun, according to the necessity of the research, and investigate in the research place.

### **Research Methodology**

To answer the hypotheses of research, this study needs information about the current status of the studied subject that is not already available. Therefore, this research is based on primary data which are obtained in a survey. In terms of the nature of the problem and the aim of the research, the current study is considered to be an applied research and in terms of operational method, it is a descriptive-survey research.

The static population refers to the entire group, people, events, and phenomena in which the researcher is interested (sanjari, 2009). The static population of this study includes only:

- Farmer members of water utilizer organization in irrigation network of Shushtar'sMinab (the number of static population of farmers in this organization is 1296 utilizer).

- Network farmers of North East of Ahwaz (the number of statistic population in this network is 2120 utilizer).

Sampling is the selection procedure and choosing a number of population members, so that by studying the sample and understanding the testable properties or characteristics of the sample, we will be able to generalize the characteristics or features to the elements of our population (Sarmad et al., 2010). The team starts the sampling due to several reasons, such as cost reduction, updating facility, quick gathering of information, and conclusions (Alavi, 2004).

Due to the fact that the sampling is conducted in two irrigation networks with specific features, the used sampling in this study is stratified random sampling with proportional enrollment and it will be used in every network, in accordance with their being deployed in the middle upstream or downstream.

In the cases where we don't have the population variance or where the error percentage and the population size are determined, we can use this table to estimate the sample size. This table gives the maximum number of samples and if you use the sample size calculation formula of Cochran, the smaller number of samples will be obtained.

In irrigation network of Shushtar'sMianab, due to the statistic population (1296 people) and the Morgan Table, 300 questionnaires were distributed, 288 of which were collected. In irrigation network in North East of Ahwaz, according to the statistic population (2120 people) and Morgan Table, 327 questionnaires were distributed, 285 of which were collected. A total of 573 questionnaires were collected in both networks.

To collect literature of the subject, the library method, i.e. books, magazines, reports and web sites is used and to collect data for investigation of hypothesis testing and providing solutions, the field and survey method is used.

**Library Studies:** In order to develop principles, definitions, and theoretical concepts, the library resources were used which the most important and most useful resource have been Internet surfing, databases and university libraries in the country and the use of statistics, information, and records of previous activities in the range of irrigation and drainage networks.

**Field Studies:** In order to collect intended information and measure the research variables, the questionnaire will be used. The ultimate questionnaires were distributed in person between the farmers.

In this study, in order to test the hypotheses and process the conceptual models, the descriptive statistics and analytic statistics were used which is aided by the structural equation modeling. There are different approaches in relation to structural equation modeling. This means that structural equation modeling can be conducted based on the different statistical methods, according to sorts of variable and statistic sample characteristics of the research. One of the statistical methods in this field is the partial least squares method. The software that uses structural equation modeling based on statistical methods is compatible with the existence of conditions, such as independent variables being linear, the data being non-normal and sample being small. In the current study, LISREL and SPASS Software were used and descriptive and inferential statistics were used for data analysis.

The used data collection method in this study was a questionnaire within the framework of the used method, and the questionnaire method was used to collect the needed data. One of these questionnaires is made by the researcher and the other one is the standard questionnaire which is designed in the Likert Scale. Reliability coefficients are consisted of:

The table of reliability alpha coefficients of the study questionnaires

Questionnaire	Cronbach Alpha
The questionnaire of management and participation approach	0.88
The questionnaire of operation	0.90
The entire questionnaire	0.89

As it can be observed in the above table, the amount of Cronbach Alpha is approved in all cases. Generally, closer amount of Cronbach Alpha to one shows the good and fantastic reliability of the questionnaire. The total reliability of the

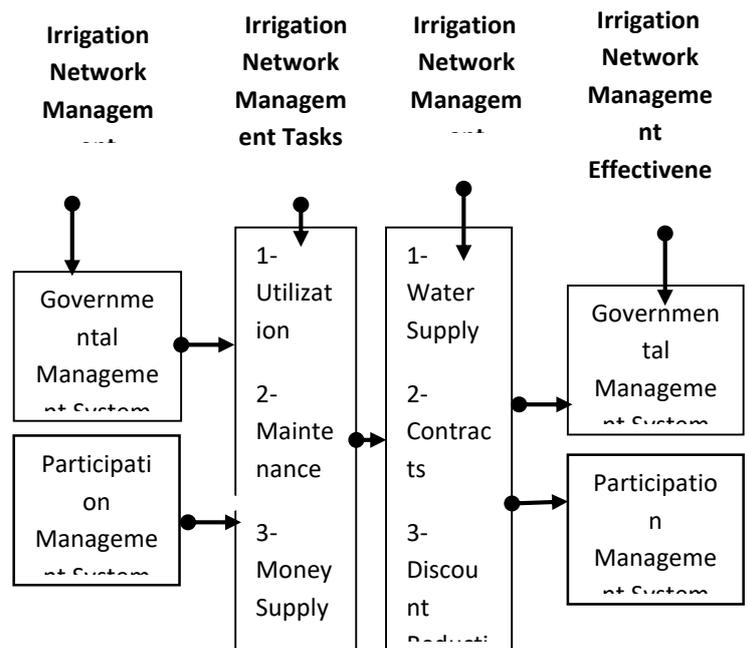
questionnaires is acquired 0.89 which depicts a very good reliability of the questionnaires.

In this study, in order to verify the normal distribution of data, the Kolmogorov-Smirnov test is used. The results of this test are shown in the table below. Because the sig is obtained greater than 0.05 for all of the variables; therefore, as a conclusion, the data distribution is normal for all the variables.

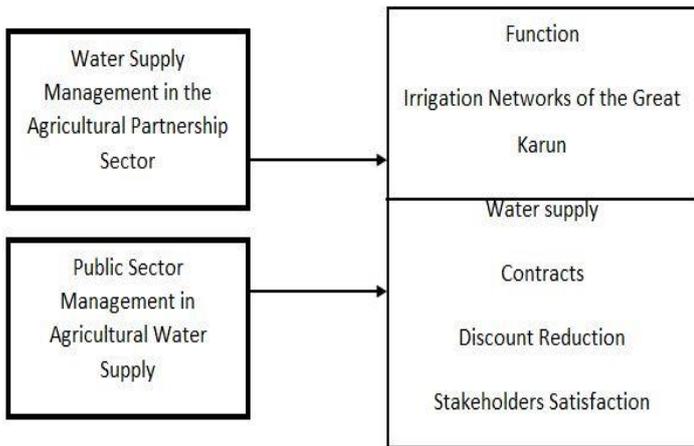
**The significant level of Kolmogorov – Smirnov test of indexes**

Level of significance	Variables
0.063	Water Supply
0.059	Contracts
0.069	Discount Reductions
0.070	Stakeholder Satisfaction

**The Theoretical Framework of Research:**



**Conceptual Model:**



The above model is self-made, which before finalization, it has been consulted with experts of irrigation organization and water and electricity organization of Khuzestan and is also conducted by the aid of several related thesis and after investigation and modification by the supervisor professor.

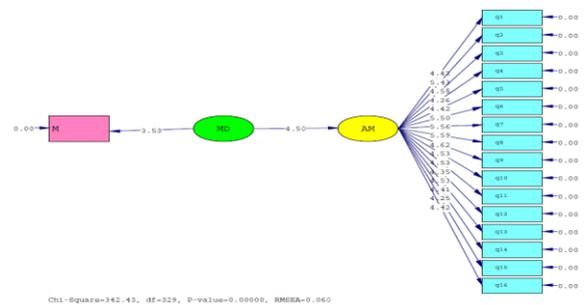
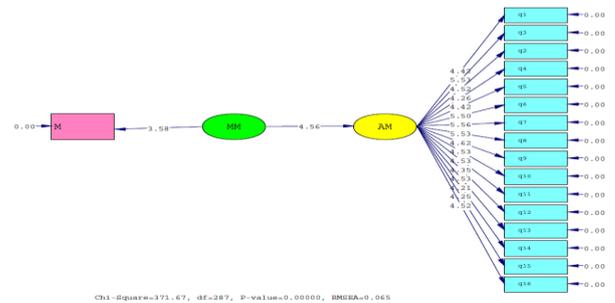
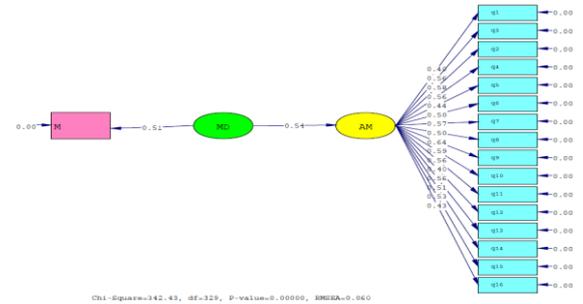
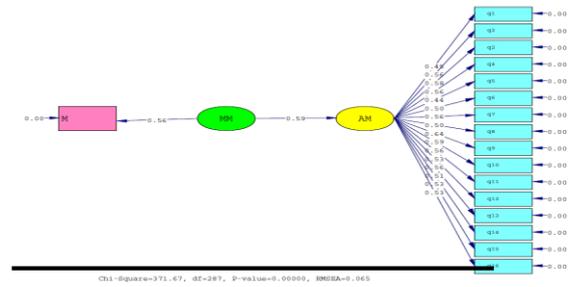
According to the output of LISREL, the calculated K2 equals 371.67. The low amounts of this index represent the small amount of difference between the conceptual model and the observed data of the study. Also, the amount of RMSEA (mean square errors of the model) is equal to 0.065, which indicates a good fit. The allowed limit, RMSEA, is 0.08; this amount is seen to be less than the allowed limit, which also indicates a better fit. The lesser the amount is, the better the model fits. AGFI and GFI (adjusted index of fit goodness) Indexes are measures of the relative amount of variances and common variances, which are justified by model in some way. The closer this amount to one is, the better the data fits. These amounts respectively equal to 0.93 and 0.9 in this study, which is very convenient. Also, the non-standard fit index or NNFI should be higher than 0.9, which in this study is an amount equal to 0.94.

The results of fit goodness by the LISREL software confirm the fit goodness of the model.

NN	AG	G	RMS	P-	D	CHI-
FI	FI	FI	EA	VAL	F	SQUA
				UE		RE1
0.9	0.9	0.	0.065	0.000	28	371.67
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**The Main Hypothesis of This Study:**

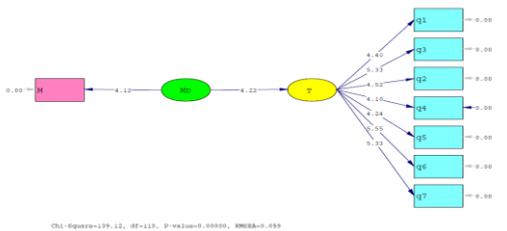
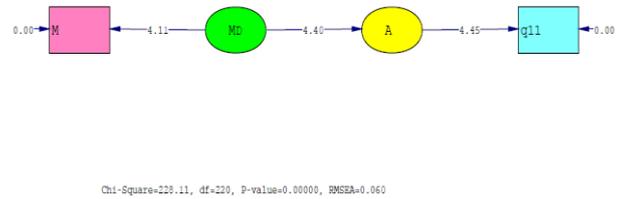
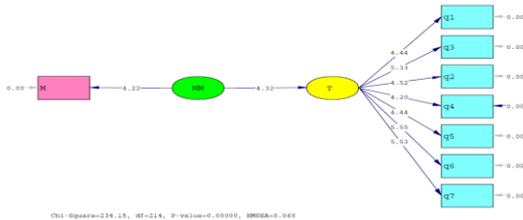
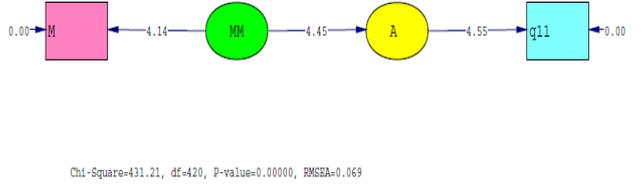
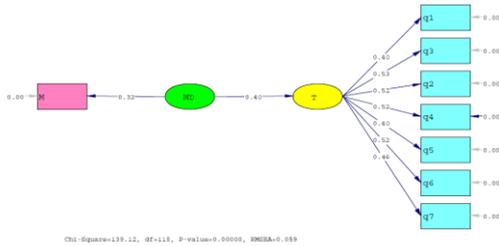
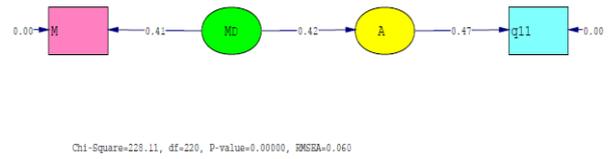
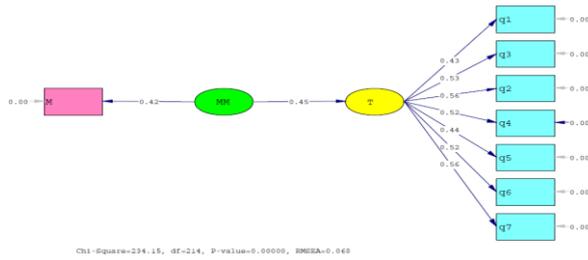
The participatory management in comparison with the governmental management is more effective on the irrigation and drainage network operation of the Great Karun.



According to the structural equation which is obtained in the significance level of 0.05, the null hypothesis is rejected; therefore, the researcher's claim is supported with an accuracy of 0.95 and with a 5% error rate, it can be mentioned that the participatory management in comparison with the governmental management is more effective on the irrigation and drainage network operation of the Great Karun.

**The First Research Subsidiary Hypothesis:**

The participatory management in comparison with the governmental sector management is more effective on the water supply sector in irrigation and drainage networks of the Great Karun.



According to the structural equation which is obtained in significance level of 0.05, the null hypothesis is rejected; therefore, the researcher's claim is supported with an accuracy of 0.95 and with a 5% error rate, it can be mentioned that the participatory management in comparison with the governmental sector management is more effective in the contracts sector in irrigation and drainage networks of the Great Karun.

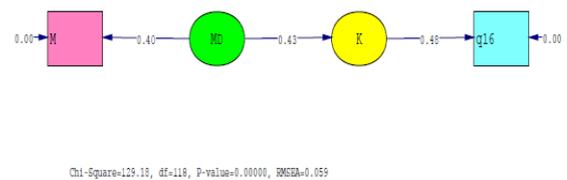
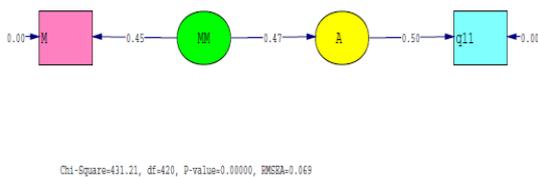
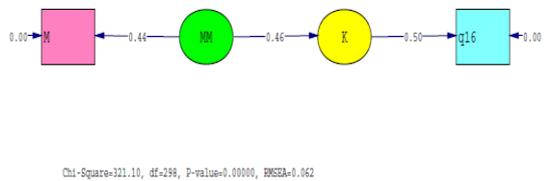
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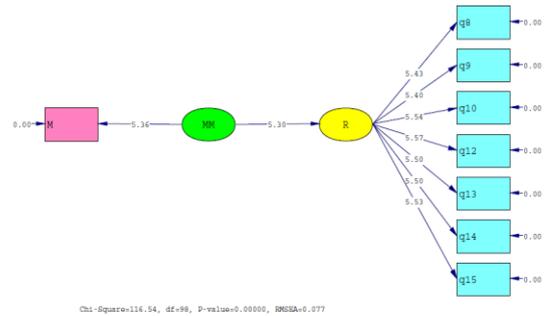
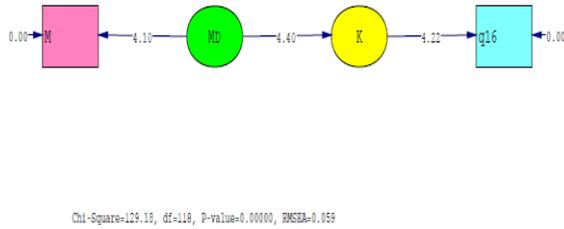
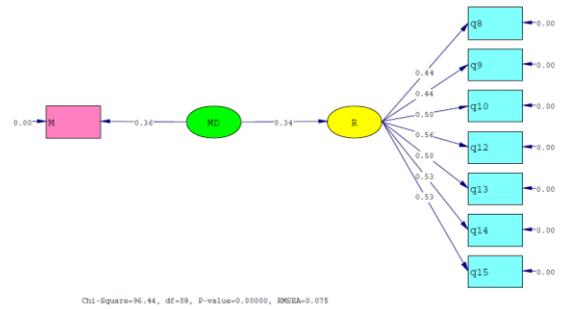
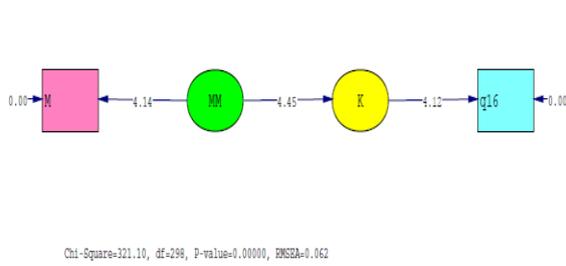
**The Third Research Subsidiary Hypothesis:**

The participatory management in comparison with the governmental sector management in discount reduction sector is more effective in irrigation and drainage networks of the Great Karun.

**The Second Research Subsidiary Hypothesis:**

The participatory management in comparison with the governmental sector management in contracts sector is more effective in irrigation and drainage networks of the Great Karun.

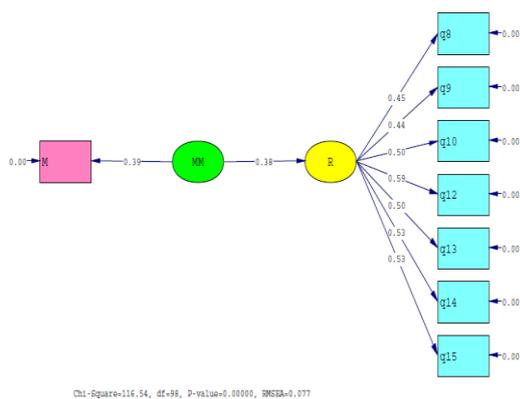
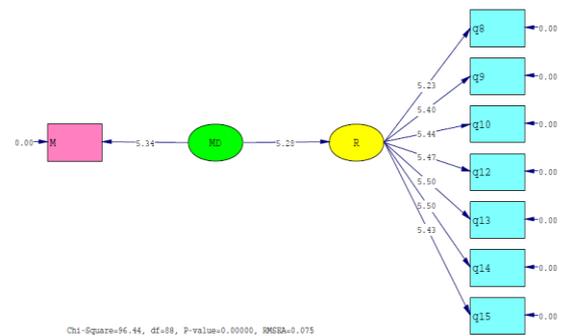




According to the structural equation which is obtained in significance level of 0.05, the null hypothesis is rejected; therefore, the researcher's claim is supported with an accuracy of 0.95 and with a 5% error rate, it can be mentioned that the participatory management in comparison with the governmental sector management is more effective in the discount reduction sector in irrigation and drainage networks of the Great Karun.

**The Fourth Research Subsidiary Hypothesis:**

The participatory management in comparison with the governmental sector management in stakeholder satisfaction sector is more effective in irrigation and drainage networks of the Great Karun.



According to the structural equation which is obtained in significance level of 0.05, the null hypothesis is rejected; therefore, the researcher's claim is supported with an accuracy of 0.95 and with a 5% error rate, it can be mentioned that the participatory management in comparison with the governmental sector management is more effective in the stakeholder satisfaction sector in irrigation and drainage networks of the Great Karun.

**The Conclusion of the Main Research Hypothesis:**

The participatory management in comparison with governmental management is effective on the irrigation and drainage networks operation of the Great Karun. In order to justify the matter, it can be expressed that in irrigation and drainage networks of the Great Karun, the amount of water which is provided for the farmers responds to their cultivation and the needed operational practices are conducted to punctuate and make turns of water supply.

In this case, water loss is prevented and water supply factors, i.e. the butlers, have made their encounter with farmers more appropriate. Broken canals and water ways, in which water is wasted have been repaired and reconstructed and the conducted drainages were evaluated and monitored and if necessary dredged, and problems and disputes have been terminated locally.

**The Conclusion of the First Research Subsidiary Hypothesis:**

The participatory management sector in comparison to the governmental management sector is more effective on the water supply sector in irrigation and drainage networks of the Great Karun. To justify this, it can be stated that in irrigation and drainage networks of the Great Karun, water will be distributed to farmers at the distribution spot, i.e. the irrigation valves and also, the operation of control over transmission, supply and distribution of water among farmers is conducted by means of control and supervision by technicians of water distribution and members of water utilization cooperatives (managing director, chairman of the board, water distributor crew and water butlers) on time and according to plan.

**The Conclusion of the Second Subsidiary Research Hypothesis:**

The participatory management in comparison with the governmental management is more effective on contracts sector in irrigation and drainage networks of the Great Karun. To justify this, it can be stated that, in irrigation and drainage networks of the Great Karun in participatory management sector:

- Setting contract by the cooperative is conducted generally and outright, which practically prevents fining the farmers that have not been able to set the contract in time.
- The payment of Water Price and outstanding debt will be in installments during cultivation season.
- To provide appropriate facilities in order to set contracts in the location of the farmers.
- Cost reduction of visits by farmers to company offices by means of making new offices by cooperatives in the villages.

**The Conclusion of the Third Research Subsidiary Hypothesis:**

The participatory management sector in comparison to governmental management sector is more effective on the discount reduction sector in irrigation and drainage networks of the Great Karun. To justify this, it can be stated that:

- The reduction of discounts due to the sense of responsibility among stakeholders in property of facilities and the fact that they are forced to make up for it.
- To accept the norm and criterion in regard to the rights of others.

- To pay attention to the social and cultural values and fear of force.
- To monitor, control, and follow-up the cooperative factors in carrying out timely repairs.
- To justify farmers by holding meetings in mosques in their location on the proper use of available facilities and resources.

**The Conclusion of the Fourth Research Subsidiary Hypothesis:**

The participatory management sector in comparison to governmental management sector is more effective in stakeholder's satisfaction sector in irrigation and drainage networks of the Great Karun. To justify this, it can be stated that in irrigation and drainage networks of the Great Karun, the followings cause the satisfactory in the participatory management:

- In relevance to timely supply of water and implementation of the turn program in water supply.
- Timely performance of the basic maintenance, canals dredging, and timely scheduled drainage.
- The formation of water utilizer cooperatives and selection of board members and the managing director by stakeholders.
- The benefit of professionals and water butlers who are publically approved, regarding the water distribution and management.
- The splitting of water prices during the cultivation season.
- No fines in lack of contract setting, regarding the fact that the cooperative sets outright contracts with the firm.
- The establishment of offices by cooperatives in the villages of stakeholder locations while in addition to reducing travel costs and better utilization of time, it creates new jobs as well.
- The lack of exposure to banks and long lines at banks to set contracts and establish appropriate facilities at the offices of cooperatives.
- Solving conflicts and problems of many stakeholders in offices of the cooperatives.
- Social and cultural changes in behavior that increase trust and respect between farmers and the authorities.

**Offers from Hypothesis**

**Offers from the Research's Main Hypothesis:**

The participatory management in comparison to governmental management sector is more effective on the operation of irrigation and drainage networks of the Great Karun. In this regard, it is suggested that:

- The farmers' needed water supply should be distributed among them volumetrically, because it causes the farmer to cultivate more efficient and profitable products based on economic values, which practically causes economic prosperity in the agricultural community.

- Repairing, reconstruction and dredging of drainage canals and all the buildings and measuring facilities should be conducted for the extraction, transport and distribution of water, according to the scheduled program.
- Dredging operations and rehabilitation of the canals and drainages of grade 3 and 4 should be planned and managed by the related authorities.
- The suitable situation for management transfer from the governmental sector to participatory sector will be planned and conducted by taking into account all aspects and available backgrounds.

**Offers from the First Research Subsidiary Hypothesis:**

The participatory Management sector in comparison to the governmental management sector is more effective in water supply sector in irrigation and drainage networks of the Great Karun. Hence, it is suggested:

- Ensuring the timely distribution of water in the right place, at the right time and at the point of delivery.
- By quotas, control, making turns, and continuous inspections, water losses should be reduced at the end of the fields.
- The factors of water supply, water distribution operators, and water butlers should make their behaviors with farmers more appropriate.
- With proper maintenance of channels, valves, and drains, water loss should be prevented.
- Regulatory factors in the transmission, supply, and distribution of water among farmers should have more careful monitoring and necessary control by continuous and ongoing inspections.

**Offers from the Second Research Subsidiary Hypothesis:**

The participatory management sector in comparison to governmental management sector is more effective in contract sector in irrigation and drainage networks of the Great Karun. Hence, it is suggested:

- In determining the water value tariff, more occurrences are conducted and according to the law which determines that 3 percent of the product should be yield as the price per hectare, so the real statistics should be used.
- At the time of setting contracts, splitting of the debts and the amount of water prices should be revised.
- The behavior of contracting authorities should be based on the Islamic Principles and avoiding any prejudice and the necessary facilities for the welfare of patients should be provided.

**Offers from the Third Research Subsidiary Hypothesis:**

The participatory management sector in comparison to the governmental management

sector is more effective on the discount reduction sector in irrigation and drainage networks of the Great Karun. Hence, it is suggested that:

- Debts should be splatted by the use of force, which carries penalties with offenders.
- Reports and obstructions should be submitted to authorities and decision makers.
- By holding general meetings and educating and promoting farmers, the necessary culture should strengthen the sense of ownership and responsibility.
- Timely maintenance performances of canals and drainages are necessary.
- In order to avoid any distortion, the area of channels and drainages should be marked and determined.
- Warning and alarmed signs should be installed in the path to channels and drainages.

**Offers from the Fourth Research Subsidiary Hypothesis:**

The participatory management sector in comparison to the governmental management sector is more effective on the stakeholder satisfaction sector in irrigation and drainage networks of the Great Karun. Hence, it is suggested that:

- Using the standpoints of farmers in determining the price for water.
- The utilization of the standpoints of utilizers in maintaining the irrigation facilities for utilization of water resources.
- Clarifying the roles and responsibilities of transferring management should be considered.
- Providing the necessary facilities and equipment to develop the knowledge levels of stakeholders in the range of operating cooperatives by holding educational seminars, meetings and classes.
- Paying attention to the challenges of the current situation and providing sound solutions to achieve optimal utilization system of water resources.

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