

## **IDENTIFYING & PRIORITY RATING THE FACTORS, EFFECT ON PARTICIPATION OF CITIZENS IN MAINTENANCE OF ENVIRONMENTAL RESOURCES WITH FUZZY DELPHI METHOD**

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### **Abstract**

It was proven to everyone that natural resources is a part of the sources that play stunning role in development of societies. Unfortunately, In lieu of various factors, these resources were injured by human that efforts of governors for maintenance of these resources haven't had positive results. So this benefiting from citizens as man power who have direct contact with these resources, can have positive results. On the basis of this study identification and priority rating the factories, effective on participation of citizens in maintenance of the environmental resources have been done. This study, based on the applied objective and from view of collecting of data in descriptive studies are placed from field type. The statistical society of the study consists of Managers, supervisors and experts of Environment General Dept. of Tehran province that with using of targeted sampling method on the basis of Cochran formula, number of 30 persons were elected as a sample of research. Identifying factors with benefiting of librarian method was lead to extract 12 factories. Priority-rating these factors , with using of data of inquiries, , its contents validation method and its reliability is confirmed with using of Cronbach's alpha coefficients was done with utilization of triangular fuzzy Delphi. Priority rating of the factors showed that social correlation, traditional values, culture-building and environmental educations is respectively the most effective factors in participation of citizens in maintenance of bio-environmental resources. Finally, based on the obtained results, a proposals were presented for development of the partnership level of citizens.

**Keywords;** Participation, Citizens Participation, Environmental Resources.

### **Introduction**

Human ever needs nature and it is required that for continuation of life to various genic specimens are available in pristine to as one genetic bank can be used for removing of types of food, pharmacy, researching, science, researching necessities (Chen et al, 2020). So for responding to this necessary , a part of pristine and valuable areas should be guarded as the protected areas and certainly, the natural beds are protected for benefits of people, while, the future generations has right of being utilization from natural environmental and its valuable resources. (Maleki, S., Godarzi, Ma. & Savestan, 2016) In the conditions that there is a lot of pressure on nature and pollution problem has reached to crisis border. It can be avoided effects of adverse and destructive effects that cause creating of irreparable damage to the environmental with utilization of active and interested forces of collaboration of environmental Organizations and creating collaboration and people's participation. (Lahijanani, a. O., 7 Shiehbeiki, 2016).

The favored methods in subject of environmental protection are the methods that people have an important role in environmental protection (Seitz, 2020, Ketzer, D., Weinberger, N., Rosch C., &). environmental protection indicates feeling of responsibility of every person of society and maintaining of values of Planet Earth and symptom of our responsibility's feeling for future generations and debt compensation to Islamic and human beliefs. (Maiello et al, 2013)

Today, participation is from requirements of urban life and can impress sever on managing and programming (Goron, C., & Bolsover, 2020). From this view, confrontation with urban problems and

subjects such as pollution, traffic, house, etc. is feasibility with suitable utilization from power and capabilities of urbanites in the framework of the participating programs. (Shao-shan, 2012). Therefore, it can be said that the people's participation in urban decision making procedure, one of main elements is Democracy and increasing of participation of people in urban affairs, can play a valuable role in creating urban balance. (You 2006). It is clear that with consideration to extent and complexity of environmental problems of being expensive of the methods and tools, confrontation with it, the best election is utilization of people's participation. (lim, J.Y., & Moon, 2020). It is worth considering that despite the formation though of participation in all dimensions and fields of life and necessity of entering of Civil society organs for management and control cities, this fact was not realized really and it is confronted with obstacles and habitats that it is necessary to identification and presentation of solutions for removing of them. (Wu, J., & Chang, 2020). From other hand, it is clear that the present organs is not enough for consideration to constant development challenges (Nikolic, N., Gajovic, A., & Paunovic, 2015). Obviously, with consideration to extent and complexity of environmental problems and being expensive of methods and tools confrontation with it, the best election is utilization of people's participation.

On the basis, the present study indicates to identifying of the factors, effective on citizens' partnership for protection of environmental resources.

### **Research Records:**

In relationship with citizens' partnership for protection of environmental resources, the studies have been done that in this part, some of the most important of these studies are represented.

One of the first studies in this scope that is based on the work of Carton and Dunlap and their collators, has indicated to conceptions about Paradigms and various worldviews. Upon their reasoning, the dominant worldview of America has been challenged for "environmental Novin Paradigm". Van Lir and Danlep (1980) has reviewed 21 studies which has been done between 1968 and 1978 and considered some or all following varieties them: age, social class (income, study and job), residence, political majoring, political ideology and sex. They have found that the younger persons, more educated, more liberal, have more concerns about environmental than older, less literate and carter conservative (Van Lir and Danlep 1980, quoted from Beliki 360: 2005).

Rezaeian and collaborators (2018) have studied the role of partnership of citizens in protection urban environment in an essay. The present research has been done with goal of studying rate of the partnership of the citizens of Dist. 9, Tehran in the field of protection. In this research that has been performed to descriptive – surveying manner, librarian , field and tools of questionnaire have been used for collection of information and the data was analyzed with using of descriptive and inference statistics in software SPSS. With consideration to the obtained results from the present research, total average of varieties of partnership of residents of Dist. 9, obtained in the field of protection from urban environmental, equal to 1138/3 and amount of sig equal to 003/0 that indicates from enough partnership of citizens. Also, based on the results of Faridman test, citizens have maximum rate of partnership in the field of protection from parks and green space of district (with rank average 47/8) and the least rate of partnership in the field of partnership in cleaning of district (with rank average 81/2). The results showed that there is a positive and meaningful relation between rate of environmental partnership of citizens and age, sex, marital stats, studies and record of. In this research, tests of Box, Lamboday-e Vilks and Lon, for the analysis, related to effects among exams that the results showed: the meaningful level is equal to 001/0 that is smaller than error amount (05/0), therefore, it can be inferred that the partnership of citizens of Dist. 9 of Tehran for urban environmental protection has meaningful effect. Kalantari and Collaborators (2016) studied the social factors, effective on belonging toward environment in an essay. In this research, sociological of the factors, effective on belonging feel of Tehran citizens to environmental has been studied with using of method of gauging and with tools of questionnaire. Bivariate Relationship between environmental values, experience of relationship with nature, sociability of environmental and religiosity are confirmable and extensible. Multivariate regression indicates that theoretical model has described 48% of related variation changes among sample of research. Analysis independent variations path with dependent variable shows that the variables of experience of relationship with nature with 0.617 and environmental values with 0.346%, respectively, have had the most effect on the dependent variable. Lahijanian and Shieh Beiki 92015) studied the social partnership obstacles of citizens in

urban environment with using of the method SWOT and presentation a suitable solutions for constant promotion of the environmental. Objective of performing of this research is studying the social partnership obstacles of citizens in urban environment with using of method SWOT and represent a suitable solutions for sustainable upgrade of environmental. This research is from descriptive and gauging type and questionnaire tool were used for information collection. Statistical society of this research is from boundary of Dist. 4 of (Mahaleh of Seyed Khandan, Davoudieh) T boundary of Dist. 5 (Mahaleh Darrous, Gholhak) and boundary of Dist. 6 (Mahaleh Ghoba and Tavousieh) Tehran to number of 3800 persons. The conception framework of the research has been designed and organized based on the theories of Weber, Homniz, Lerner, Gay, Deram, Okli and Marsenden and Pasonz. Research of relationship among variables of sex, occupation status, marital status, studies, consent from urban services, membership in social formations and social partnership obstacles of citizens were tested. The one-sample and T statistical test for test of theories. The results, obtained from the bivariate test show that the relationship between the above variables is one of the most important factors affecting social participation. The results of multivariate test showed that the independent variables 52 explained the variance of the dependent variables. Meanwhile, the social participation variable has the largest share in explaining it, but the component of social participation among citizens is not yet known as a component of urban and modern life. In this thesis, Mokhtari malek abadi (2014) analyze and recognize urban environmental behaviors. This study examined the impact of some variables, including environmental knowledge, environmental attitude, people's relationship with nature, age, gender, marital status, socio / economic status. This research was conducted in survey method by distributing the questionnaire among samples to 400 persons in 2012. Sample individuals were selected in a quota of the statistical community of citizens above fifteen years of Isfahan. The results indicate that the environmental behavior of Isfahan citizens is more responsible than the previous decade. Individual's communication with nature is the most important predictor of environmental behavior among other factors investigated. Older people and women tend to be treated more frequently than men, such as waste sorting and the use of eco - friendly transportation. Social / economic position is a predictor of people's use of eco - friendly transportation and environmental purchase, which is of course negative, as individuals with a higher socio - economic situation are less likely to use environmentally friendly transportation. Women use more environmentally friendly transportation and have more favorable behavior in the field of waste sorting. Rahimi & Dashti mokhar have investigated the role of citizens in urban environmental protection. Considering that the promotion of knowledge level and the community in environmental issues is considered as sustainable from achieving sustainable development, thus providing continuous and targeted environmental training can increase their sensitivity to environmental issues and thus contribute their participation in providing solutions. In this paper, the role of citizen participation in protecting urban environment of Tehran with descriptive - analytical method has been done using documentary data (library) and statistical data to complete the questionnaire and field observations, which have been analyzed by the pearson correlation coefficient method, excel and ArcGis & the results show that the higher education and duration of citizens are higher, their participation in environmental protection is higher and there is a significant relationship with the level of awareness of citizens. Kalantari et al. (2007) conducted a study entitled "Social factors influencing the environmental behavior of citizens" in Tehran. The results showed that environmental behavior of people in urban areas is directly or indirectly affected by variables such as age, gender, income, education, environmental issues, environmental legislation environmental, environmental attitudes, concern & Preparation for environmental behavior.

### **Research Method:**

This study is based on goal, practical and in terms of method of data collection in the field of descriptive studies. The statistical population of this study has been set up by managers, supervisors and experts in environmental management in Tehran province using a targeted sampling method of 30 person as a sample of research.

Identifying effective factors in this study was done using library method and literature review and related literature. to compare the average of the identified factors and prioritize each of the factors, Fuzzy Delphi method was used.

The data required in this study were collected to measure and compare the identified factors using a

questionnaire based on a five - point Likert scale.

This study was investigated using content validity method based on the opinions of 10 experts on the topic and its reliability with the help of Cronbach's alpha coefficient.

The result of the validity & reliability of the identified factors is as follows table 1.

**Table 1.** Validity and Reliability of the Questionnaire

Factor	Content Validity Factor	Cronbach's alpha Coefficient	Factor	Content Validity Factor	Cronbach's Alpha Coefficient
Social Media	798%	779%	Social Correlative	911%	798%
Mutual Trust Between the Government and Citizens	699%	823%	Governance Structure	745%	777%
Establishment of popular Formations	802%	847%	Social Responsibility	690%	863%
Culturization	847%	886%	Social Ethics	745%	837%
Environmental knowledge	862%	879%	Traditional Values	888%	923%
Environmental Education	785%	703%	Religious Values	895%	878%

### Research Findings:

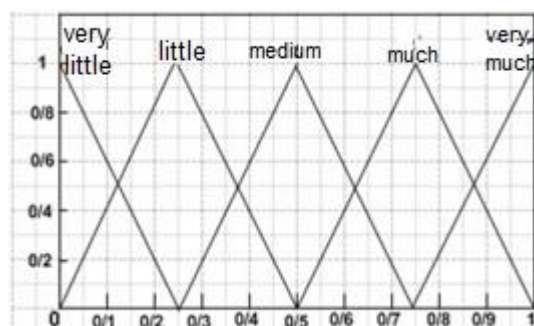
After reviewing the literature, the factors affecting the participation of citizens in maintaining environmental resources resulted in identification of 12 factors.

The ranking of the effective factors was performed using triangular fuzzy method. In the first step, the formulated questionnaire was presented to sample the number of responses provided by experts on the importance of each factor with respect to the five - point Likert scale to obtain the fuzzy mean and determine the rank of each of them. In order to compute the fuzzy mean, the identified factors have been used.

$$A_{ave} = (m_1, m_2, m_3) = \left( \frac{1}{n} \sum_{i=1}^n a_1^{(i)}, \frac{1}{n} \sum_{i=1}^n a_2^{(i)}, \frac{1}{n} \sum_{i=1}^n a_3^{(i)} \right)$$

$$A_i = (a_1^{(i)}, a_2^{(i)}, a_3^{(i)}), i = 1, 2, 3, \dots, n$$

In this formula,  $A_i$  suggests an average opinion of the  $i$  &  $A_{ave}$  shows the average opinion of experts. Considering that in Fuzzy Delphi method, different personality traits of experts affect their perceptions and perceptions of qualitative variables; therefore, by defining the range of qualitative variables, the experts respond with a similar attitude to questions. These variables are defined as triangular fuzzy numbers with respect to Fig. 2.



**Fig. 1.** Definition of Linguistic Variables Based on a Five - Point Likert Scale Spectrum

The method of converting the linguistic variables into triangular Fuzzy numbers and definite fuzzy

numbers is shown in Table 2.

**Table 2. Conversion of Linguistic Variables to Triangular Fuzzy**

Linguistic Variable	Triangular Fuzzy Number	Definite Fuzzy Number
Very much	(1,1,75%)	75%
Much	(1,75%, 5%)	5625%
Medium	(25%, 5%, 75%)	3125%
Little	(5%, 25%, 0)	625%
Very little	(0,0,25%)	0,625

After calculating the triangular fuzzy mean for each category, using the Minkowski formula as follows, the fuzzy numbers are calculated for each of the 12 categories.

$$\chi = m + \frac{\beta - \alpha}{4}$$

### First Stage Survey

According to the mentioned cases, in the first stage the questionnaire was placed at the disposal of experts and the frequency of responses of experts was calculated on the basis of the importance of each factor on a five - point Likert scale. The result from estimating the frequency of responses in the first step is as follows.

**Table 3. Results of the Frequency of Responses in the First Stage**

Effective Factors	Very much	Much	Medium	Little	Very little
Social Media	16	9	3	1	1
Mutual Trust Between the Government and Citizens	15	8	5	2	0
Establishment of Popular Formations	14	8	6	2	0
Culturization	19	10	1	0	0
Environmental Knowledge	16	9	3	1	1
Environmental Education	20	8	2	0	0
Social Correlation	21	8	1	0	0
Governance Structure	16	11	3	0	0
Social Responsibility	13	8	4	2	3
Social Ethics	12	13	3	2	0
Traditional Values	20	9	1	0	0
Religious Values	20	8	2	0	0

After calculating the frequency of the responses, the triangular fuzzy average and defuzzification for each of the industrial development propellant were calculated using the Minkowski formula. The results of the calculations taken in table 4 are observed.

**Table 4. Average Number of Opinion Experts from the First Stage Survey**

Factor	Triangular Fuzzy Average (m, $\alpha$ , $\beta$ )	Defuzzification Average	Factor	Triangular Fuzzy Average (m, $\alpha$ , $\beta$ )	Defuzzification Average
Social Media	(508%, 816%, 95%)	541%	Social Correlations	(666%, 916%, 925%)	668%
Mutual Trust Between the	(508%, 816%, 925%)	581%	Governance Structure	(608%, 858%, 975%)	637%

Government and Citizens					
Establishment of Popular Formations	(556%, 783%, 916%)	599%	Social Responsibility	(491%, 716%, 858%)	526%
Culturization	(65%, 9%, 925%)	656%	Social Ethics	(541%, 791%, 941%)	578%
Environmental Knowledge	(508%, 816%, 95%)	541%	Traditional Values	(658%, 908%, 991%)	678%
Environmental Education	(65%, 9%, 983%)	670%	Religious Values	(65%, 9%, 983%)	670%

### Second Stage Survey

After estimating the mean defuzzification of the first phase, the questionnaire was developed for the second time at the disposal of experts and the frequency of responses of experts was calculated on the basis of the importance of each factor in order to compare the results of the two stages.

The result of the frequency estimation of the responses in the second stage is as follows in table 5.

**Table 5. The Results of the Frequency of Responses in the Second Stage**

Effective Factors	Very much	Much	Medium	Little	Very little
Social Media	15	10	3	1	1
Mutual Trust Between the Government and Citizens	15	7	6	2	0
Establishment of Popular Formations	15	8	5	2	0
Culturization	21	8	1	0	0
Environmental Knowledge	17	8	3	1	1
Environmental Education	19	9	2	0	0
Social Correlation	21	9	0	0	0
Governance Structure	18	9	3	0	0
Social Responsibility	13	9	6	0	2
Social Ethics	13	12	3	2	0
Traditional Values	20	10	0	0	0
Religious Values	19	9	2	0	0

After estimating the frequency of responses of experts, the triangular fuzzy mean and defuzzification were calculated for each of the factors using the Minkowski formula for the perspectives of experts from the second stage. The results of the calculations taken in table 6 are observed.

**Table 6. The Mean of Experts from Survey of the Second Stage**

Factor	Triangular Fuzzy Average (m, $\alpha$ , $\beta$ )	Defuzzification Average	Factor	Triangular Fuzzy Average (m, $\alpha$ , $\beta$ )	Defuzzification Average
Social Media	(566%, 933%, 808%)	597%	Social Correlations	(675%, 925%, 1)	65%
Mutual Trust Between the Government and Citizens	(541%, 916%, 790%)	572%	Governance Structure	(625%, 875%, 975%)	65%

Establishment of Popular Formations	(583%, 941%, 816%)	614%	Social Responsibility	(525%, 4758%, 9%)	560%
Culturization	(666%, 991%, 916%)	684%	Social ethics	(55%, 8%, 941%)	585%
Environmental Knowledge	(825%, 55%, 925%)	575%	Traditional Values	(666%, 916%, 1)	687%
Environmental Education	(73%, 49%, 885%)	664%	Religious Values	(641%, 891%, 983%)	664%

After each computation is carried out in two stages of survey of experts, it is necessary to investigate the difference between the defuzzification mean of factors affecting the participation of citizens in maintaining environmental resources. Accordingly, the result of the difference between the defuzzification mean in the first and second stage is as follows in table 7.

**Table 7. The Defuzzification Mean Difference between the First and Second Stage Survey**

Effective Factors	Defuzzification Average of First Stage	Defuzzification Average of Second Stage	Defuzzification Average Difference of First & Second Survey	Rank
Social Media	541%	597%	56%	7
Mutual Trust Between the Government and Citizens	581%	572%	009%	10
Establishment of Popular Formations	599%	614%	15%	6
Culturization	656%	684%	28%	3
Environmental Knowledge	541%	575%	34%	9
Environmental Education	670%	664%	006%	4
Social Correlations	668%	693%	15%	1
Governance Structure	637%	65%	13%	5
Social Responsibility	526%	560%	36%	11
Social Ethics	578%	585%	007%	8
Traditional Values	678%	687%	009%	2
Religious Values	670%	664%	006%	4

According to the survey results of the first stage and its compliance with the results of the second stage, in case of defuzzification mean difference in two stages Less than 1, the survey process terminated. According to the defuzzification average difference of expert's opinion in two stages less than 1, the experts have reached a consensus about propellants & survey form them is stopped at the second stage; that means who experts have a relatively an equal understanding about industrial development propellants.

### **Discussion & Conclusion**

Nevertheless, today environmental degradation has become a global crises increasing the depth & scope of this crises. Because of that, protecting from that has become so moral value which the penal supporting is necessary. Contemporary human being emerged as uncontested lord of nature & for achieving to goals & resolving his growing needs, chose the plunder way & in result the relationship between human & nature became from one equal relation to unequal who the human known as nature governor. This way, the achievement of sustainable development encountered the problem. the environment is one of the main factors of sustainable development that plays an effective role in human life and has become a vital tool to achieve early development on the basis of profit - based

approaches in capitalist world. If the current trend of exploitation and environmental degradation continue with reliance on capitalism, it will not only prevent the development of sustainable development but also exposes the future of life at risk of extinction.

The goal of this study was to identify and prioritize the factors affecting the participation of citizens in maintaining natural resources. Identifying effective factors with library method resulted in determining 12 factors affecting citizens' participation in maintaining natural resources. The results of the prioritization of 12 identified factors have shown that, respectively, social cohesion, traditional values, cultural training, social media, governance structure, social ethics, Mutual trust between the government and citizens are the most important factors affecting citizens' participation in maintaining natural and environmental resources respectively.

Natural resources are wealth that nature has made for human use, and the human factor does not contribute to its formation. The eradication of natural resources and the pollution of the environment is one of the greatest problems of the present age that endangers human life. According to scientists, most of the natural disruption, such as floods, Seawater intrusion, groundwater table depletion and ozone vulnerability is due to the destruction. From the viewpoint of religious teachings, protection of natural resources and the environment, is one of the most important economic issues.

It also credited the study of culture as an effective factor in the development of natural resources preservation. Irregular use of environmental resources, false & Unprincipled planning has caused the water, soil, and air to be degraded in the human environment and reduce their health. Especially this destruction and destruction in large cities, populated and industrial cities such as Tehran. Perhaps many factors can be called the destruction of the human environment, but none are as important as the cultural structure of the people of the community. The role of humans and the environment has an undeniable impact, and culture & environment are two intertwined issues and cannot be separated. Culture has an important factor in the development or destruction of natural and biological resources. Media is another determinant of environmental protection. The environment at the global and national level is subject to serious threats. The protection of the environment depends on the attention of the entire population. the attitude and influence of people from the media affect the type of their behavior to the environment, so the media have a great impact on the promotion of environmental culture and attention to them to preserve the environment. Therefore, the impact of media on the different dimensions of the people's personality is of noteworthy importance. While highlighting environmental issues and raising awareness about the risks to the environment, media reports that the government's policies, actions and promises are effective in enhancing the accountability of political decision - makers and statesmen to environmental issues. Today, the environmental issue is a global issue, and this is not possible without media assistance and assistance. Reflecting on the strengths and weaknesses of any organization or office, the media can make public opinion sensitive to those issues, and authorities also act to compensate for the shortcomings, noting that the media reflects their activities. As an observer on the activities of each organization, the media plays an invaluable role in improving conditions and preventing shortages. In our world, governments also respond to the civil society in addition to responding to political parties, in addition to interaction with economic agencies, and this could not be done except by widening the role of written, visual and visual media as well as the emergence of blogs & social networks.

### **Suggestions**

1. Strengthening of responsibility in environmental protection, given that citizen responsibility is a factor that can improve citizens' behavior in preserving the environment in society.
2. Reinforcing the religious and traditional values of citizens in enhancing the protection of the environment.
3. Considering the right policies in educating citizens in the creation and strengthening of environmental culture, planners are trying to take a pivotal step in saving the environment.
4. The distribution of packets containing brochures and CDs is associated with the contents of the importance of environmental protection, biodegradable garbage bags, and cases such as passengers travelling to the city.



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