Recognition and Analysis of Coping strategies with Drought in Yazd Province from Agricultural Expert Views

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ABSTRACT: The purpose of this study was to survey the strategies of coping with drought in rural areas, from the agricultural expert's viewpoints in Yazd Province. This survey is a functional type and is analytical-explanatory. The population of this study includes over four hundred and twelve (412) persons using Morgan and Krejcie's table. One hundred and eighty-five (185) of them were chosen randomly for sampling, and the tool used is a researcher's questionnaire. Formal validity of questionnaire was proven by expert panels. A survey of the same population with thirty (30) questionnaires was done, and a finding by the use of Cronbach alpha formula in the SPSS software, obtained a stability of 0.84. To analyze the data, factor analysis model was used, and findings revealed the most important strategies with drought in the study area which includes six (6) components (economical and supportive, informative and educational, local institution reinforcement, capacity building, optimum water management and irrigation, reinforcing systematic approach and cooperative management and psychological and social)of variance and cumulative variance by these six components are 92.23. Finally, it is presented based on findings of practical research suggestions.

Keywords: Drought management, agricultural development, rural development, water source management, Iran

INTRODUCTION

Iran is in one of the driest part of the world, and lack of water is the most important factor militating against agricultural development (Hasheminia, 2012:26). There is no area that is not facing water crisis and drought. Based on natural situations, it will experience this destructive phenomenon (Ghayor, 2008: 28), related with this issue, it can be said that Yazd Province with 106 milliliter average rainfall is not an exception, considering the reduction in amount of rainfall, this province is also experiencing drought. However, considering the climate differences in the different parts of the province, the effects of drought has not been the same. In some villages, drought was more noticeable than in others. The effect of drought severity in some areas was so much that it led to unemployment, immigration and consequently too deserted rural areas. Due to the connection between villages and agriculture, the negative effect of drought has become visible on the rural economy and agriculture (Mohammadiet al., 2012: 58) and its continuity led to the change of function and rural immigration (Mohammadi and Hakim,2009). Economic and social outcomes consist of reduction in villagers properties, manufactured institution offers, performance of farms and spirit of cooperation (Amir et al.,2012: 223). It also consists of soil erosion and desertification, reduction in quality of water source, destruction of animal habitats and wildlife.In addition, (Sobhani, 2009: 795- 799) increase in

psychological tension and local differences in rural areas are considered as effects of psychological drought (Rezaie et al., 2011: 112). There have been several studies on drought, its effects and the strategies of coping with it have been mentioned in the course of this study.

Gholami et al. (2013) concluded that there is a relationship between drought variables with the count of villages and their populations. Findings in agricultural studies (Rezaie et al.,2011) revealed a group of natural, social, and economical factors that led to permanent immigration; however, natural and economic factors provides temporary immigration. Nasaji (2011) concluded in his studies that the most important outcome of drought in economic and environmental outcomes consists of reduction in farmer's income and employees of agriculture increase in price of inputs and immigration and unemployment index, reduction in price of fields and soil quality and increase in food price. Findings from the study of Keshavarz and Karami (2008) showed that drought effects are divided into four (4) groups: agricultural, general economic, hydrologic and environmental. Findings based on the study of Rezaei (2011) revealed the strategies of coping with drought are managed in five (5) factors: educational, promotional, economical, protectoral and social. The variance percentage of these five factors is 68.66%. Pour et al. (2013) found out that managing the risk of drought is an appropriate approach for reducing economic vulnerability in society and villages, and as such focused on reducing the impacts of drought and its management.

It can be concluded that there are no ways to prevent drought from occurring in any area (from natural aspect and drought periods), it is also very difficult to cope and reduce the economical and social effects during the crisis. It seems that the very first step of this issue is to study and recognize the drought phenomenon and utilize the appropriate strategies based on which the side effects can be reduced to a minimal. In recent years, despite the importance of this matter, and after repetitive drought, many studies have not been conducted in Yazd Province. On the other hand, the purpose of this survey was to analyze and recognize strategies of coping with drought in rural areas of Yazd Province from agriculture expert viewpoints. For this reason, this study surveys this question: what strategies to undertake in coping with drought in rural areas? First, theoretical and background study about coping strategies with drought are discussed, and the strategies in rural areas surveyed.

MATERIALS AND METHODS

The present survey is one of the quantities from the natural point of view, on the terms of rate and control degree of variables, and is non-experimental and on the term of collecting data is considered as one of the fieldworks. Populations of this analytical-explanatory survey consist of four hundred and twelve (412) experts and promoters of agricultural department in Yazd Province. Considering the study of Morgan and Krejcie's table, one hundred and eighty-five (185)were chosen by simple random sampling for the survey. The data collecting tool used is the researcher's questionnaire, based on individual and professional respondents and expert views and it was conducted based on the important variables of coping strategies by using theoretical literature about researches in the inside and outside of the country, and persistence of experts extracting the key studies. To measure the second part of the score scale 11°was used (0=minimum and 10=maximum).Formal validity of questionnaire was proven by expert panels. A survey with the same population with thirty (30) questionnaires was held, and a finding by the use of Cronbach alpha formula in the SPSS software obtained stability was 0.84.In order to respond to proven questionnaire, they were given to statistic population and after its complement, data were analyzed using the SPSS software. To analyze the data, descriptive and inferential statistics was used. In descriptive part of the statistic, the data was described using statistics like frequency, mean, standard deviation and percentile, but in statistical inference, the most important strategy that was used is factor analysis.

Results

A) Descriptive findings

Based on the results, majority of the respondents were in the middle-aged range (30-60) with 42 years mean. Most of the studied respondents were males (84.5%) while females were only 15.5%. From the marital viewpoint, 74.5% of respondents with mean of three (3) household members were married, and the other 25.5%were singles. Age mean and expert's work experience were studied in order of 37.5 and 15.5 years. From the educational level, the most frequency of respondents consisted of individuals with bachelor degree.

B) Inferential findings

From views of agriculture experts, factor analysis was used to check coping strategies with drought in rural areas. The calculations in Table 2 show that in order to determine the cohesion of data to benefit the factor analysis, MO[1]

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[1]- Kaiser-Meyser-Oklin

Test and Bartlet[2] were used. Here, the amount of KMO equals 0.835 and Bartlett statistics were used to study the coping strategies with drought equals 3269.32 that in level one 0.000 is significant. According to the data, appropriate factor analysis was distinguished.

Table 2: Amount of KMO and Bartlett test.

Series analysis	Amount of KMO	Amount of Bartlet	Significant level
Coping strategies with drought in rural areas of Yazd province	0.835	3269.321	0.000

Source: Research's finding,2015.

In this survey, the basis of determining standard factors was eigenvalue and variance percentage. Varimax was used to rotate the factors and variables with the load factor greater than 0.5, and are known as significant load factors. Extraction factors of series analysis were presented with eigenvalue, variance percentage and cumulative variance percentage in Table 3. As shown in this table, Kaiser Criterion with 6 factors have high amount in one survey with coping strategies of drought in rural areas of Yazd Province. After the factor rotation by Virmax[3] strategy, related variables to survey the coping strategies with drought in rural areas were divided into six (6) factors.

Table3: Extraction factors with eigenvalue and variance percentage before rotation.

Factors	Eigenvalue	Variance percentage	Cumulative percentage
First factor	12.96	29.99	29.99
Second factor	9.52	23.22	53.21
Third factor	6.97	17.01	70.22
Fourth factor	3.81	9.29	79.52
Fifth factor	2.7	6.6	86.12
Sixth factor	2.5	6.1	92.23

Source: research's findings, 2015.

Naming and rotation of factors (factor analysis for checking coping strategies with drought in study area)
To facilitate describing the factors and simplify the structure of rotation factors, Varimax was used. Table 4 shows the six (6) extraction factors with eigenvalue and variance percentage after the rotation. As it is shown, the first factor has the highest share (21.06%) while the sixth factor has the lowest share (9.4)in total variables of variance.

Table 4: Extraction factors with eigenvalue and variance percentage after rotation.

Factors	Eigenvalue	Variance percentage	Cumulative percentage
First factor	8.63	21.06	21.06
Second factor	7.11	17.34	38.41
Third factor	6.46	15.76	54.18
Fourth factor	5.89	14.37	68.55
Fifth factor	5.85	14.27	82.82
Sixth factor	3.85	9.4	92.23

Source: research's findings

Also in this survey, to determine the significant level and role of every variable in related factor, the load factor was more than 0.4. Findings indicate that all the input variables have more load factor than 0.4. Finally, Table 5 shows the variables that are in every 4 mentioned factors.

First factor: The variables in this factor are diversity of career, promotion of drought insurance, meeting primary needs, removing the middlemen, developing substructures and presenting supporting services, benefiting the system of values, helping villagers, presenting banking values, enhancing local funds and protecting environment are in this factor. Load of these factors showed that all of them have a positive correlation with this factor. Considering the variables that are in this factor label "economical and supportive "was chosen for this factor. Considering the eigenvalue (8.63), this factor was more than the other factors; it explains more than 21.06% of all the variance.

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[2] - Bartlet Test
[3] - Virmax

Second factor: Variables in this factor include: promoting knowledge and public awareness, educating techniques of water consumption, crisis drought management in educational schedule, presenting publications, securing and promoting staff awareness, paying attention to local knowledge, modulation of research activities with local knowledge system, and educating villagers in the field of agriculture. As can be seen, the load factor of these variables is between 0.74 to 0.86. All the variables have a positive correlation with the second factor. According to the nature of the variables, the name "informing and educating" was chosen for this factor, with eigenvalue (7.11) in total (17.34), which explains the whole variance percentage.

Third factor: Strengthening the national institution for drought crisis management, local organizations reinforcement, setting necessary values in the schedule and budget, benefiting of local institution capacity, rules codification and supportive strategies are in this factor. Considering the nature of effective variables, the third factor was named "reinforcing local institution and capacity building". This factor was explained with (6.46) eigenvalue, in total (15.76) variance percentage.

Fourth factor: Variables in this factor include: developing substructures, enhancing plow methods, benefiting from floodwater and surface waters, stable extraction of water sources, replacement and general scheduling of water consumption. , Based on this, the factor was named "efficient water and watering management". This factor was explained with (5.89) eigenvalue, in total (14.37) variance percentage.

Fifth factor: Variables in this factor include: polychotomy view, trendy informative bank, participating in the local society, survey and rule correction about water and watering, considering drought such as prognosis process, pests' management and drought sicknesses, and integrated field management to benefit from water. Based on this, the factor was named "reinforcing systematic view and collaborative management". This factor was explained with (5.85) eigenvalue, in total (14.27) variance percentage.

Sixth factor: Variables in this factor include: reinforcing society funds, reinforcing consulting programs for reducing stress, reinforcing local organizations and building appropriate judicial organizations. Based on this factor, it was named "social and psychological". This factor was explained with (3.85) eigenvalue, in total (9.4) variance percentage**.**

Table5: Related variables to very factor and obtained load factor in rotated matrix.

Factors name	Variables	Factor loading
Economical and supportive	Paying subsides and support financing entrepreneurship in rural areas to occupy and revive rural system of living	0.92
	Providing job diversity and income sources from developing agricultural and nonagricultural parts	0.89
	Developing various insurances of rural drought	0.87
	Meeting the primary needs of villagers in drought crisis	0.85
	removing the middlemen owing to providing direct presentation to consumers	0.81
	Developing substructures and providing supportive services and social security in vulnerable areas	0.75
	Developing financing and utilizing values systems in rural areas	0.74
	Helping and presenting short term services to villagers	0.71
	Providing special banking values, diverse, enough, low interest and gratuitous helps	0.68
	Enhancing local fund values in order to upgrade the capacity with rural families	0.65
	Protecting environment and managing natural sources as the main rural living component	0.63
Informing and educating	Upgrading knowledge and general awareness of villagers to economical and social issues with drought	0.88
	Educating the correct tactics , and distributing water and watering consuming	0.86
	Including drought subjects in educational schedule and other related universities	0.85
	Providing publications in related subjects with drought for different rural groups	0.81
	Essential planning to aware staff about water management in rural areas in the city and province	0.79
	Focusing on local knowledge and farmers experiences along the new tactics	0.76
	Combining survey activities with knowledge system and local experiences about drought	0.75
	Educating about suitable time planting to harvest due to special climate	0.74

Reinforcing local institution and capacity building	Organizing and enhancing national organ to manage the drought and integrating huge decisions and related strategic	0.84
	providing and reinforcing local organization and submission the essential needs related to crisis	0.82
	Credit adjustment in planning system and budget for managing the drought crisis	0.79
	Enhancing and benefiting of local institution capacity, such as consults, cooperatives and etc in coping with drought	0.76
	Codification of rules and supporting strategies in vulnerable villagers in drought crisis	0.75
Efficient water and watering management	Developing the substructures and watering by the local situations	0.81
	Enhancing plow methods and other agriculture operations due to preventing the waste of water	0.79
	Planning to control, save, benefiting the floodwater, surface waters	0.75
	Recognizing and stable extraction of substitute water source	0.72
	Long term general planning in supplying and consuming water	0.70
Reinforcing systematic view and collaborative management	Including polychotomy (agricultural, servicing, industrial) in codification and presenting the plans of coping with drought	0.80
	Providing informative bank in rural drought in province	0.78
	Operational commitment in consulting the local society in drought management process	0.75
	Checking and correction rules and related criteria in rural areas considering the drought situation	0.73
	Considering the drought crisis management like one process, awareness, reconstruction, revive and capacity building	0.71
	Utilizing thoughts in managing pests and drought sicknesses	0.68
	Providing an opportunities to integrate the fields and benefiting water	0.65
	Harmonizing the organizations, researches, educating to utilize the findings in researches	0.61
Social and psychological	Enhancing social finances to participate more villagers in the plans related to predicting the drought crisis	0.76
	Codification of consulting plans about reducing stress in villagers in drought crisis	0.72
	Enhancing local and civil organizations to fight against drought in necessary situations	0.65
	Providing organizations and appropriate judicial references to solve the issues and conflicts in using the water	0.59

Source: research's findings

Conclusion

Results show that the basic strategies of coping with drought in rural areas include: variable subsides, diversity of career, drought insurance, meeting primary needs, removing the middlemen, developing substructures and presenting supporting services, benefiting the system of values, helping villagers, presenting banking values, enhancing local funds and protecting environment are in this factor, while variables in this factor include: promoting knowledge and public awareness, educating techniques of water consumption, crisis drought management in educational schedule, presenting publications, securing promoting aware staff, paying attention to local knowledge, modulation of research activities with local knowledge system, educating villagers in agricultural field, strengthening national institution for drought crisis management, local organizations reinforcement, setting necessary values in the schedule and budget, benefiting from local institution capacity, rules codification and supportive strategies, developing substructures, enhancing plow methods, benefiting from floodwater and surface waters, stable extraction of water sources, replacement and general scheduling of water consumption, including polychotomy view, trendy informative bank, commitment to participating in the local society, survey and rule correction about water and watering, considering drought such as prognosis process, pests' management and drought sicknesses, integrated field management to benefit from water, reinforcing society funds, reinforcing consulting programs for reducing stress, reinforcing local organizations and building appropriate judicial organizations.

This essay surveyed coping strategies with drought in rural areas of Yazd province. In this survey, to recognize coping strategies with drought in the studied area, (41) an index was used and data were used in factor analysis module. In this survey Kaiser Criterion having6 factors had a high amount in one survey with coping strategies with drought in rural areas. After the factor rotation by Virmax strategy, related variables used to survey the coping strategies with drought in rural areas were divided into 6 factors. The first factor was named" economical and supportive" considering the eigenvalue (8.63) that is more than the other factors, it explains more than 21.06% of all the variance, suggesting that this finding coincides with the study of Amirkhani et al. (2012).The second factor was named "informing and educating", that with eigenvalue (7.11) in total (17.34) explains the entire variance percentage, and this finding coincides with the study of Jafari et al. (2010).The third factor was named "reinforcing local institution and capacity building" was explained with (6.46) eigenvalue, in total (15.76) variance percentage, these findings are in line with the studies of Erfanian and Alizade (2009). The fourth factor named "efficient water and watering management "is explained with (5.89) eigenvalue,in total (14.37) variance percentage, these findings

agree with the studies of Saleh and Iraj (2007).The fifth factor was named "reinforcing systematic view and collaborative management" explained with (5.85) eigenvalue, in total (14.27) variance percentage, this finding is in linewith the study of Zahedi and Abghari,1996, 2007).In addition, the sixth factor named "social and psychological" was explained using(3.85) eigenvalue, in total (9.4) variance percentage, in this part, "economical and supportive factor"werein the highest range and "social and psychological" was found to be in the lowest range. Amount of variance and cumulative variance explained in the six (6) factors is 92.23.Finally,some proceedings like building apart to integrate the immense decisions and managing water and drought in the province, and scheduling and harmonizing organizations, related educational research, education on water consumption, benefiting from people's cooperation in crisis, including drought crisis management in educational schedule, introducing job opportunities in agriculture in period of drought, promoting staff awareness,, providing balanced economical opportunities in different farmer classes by a saving fund, focus on local knowledge, encouraging integration, and combining research activities with local knowledge system, correct use of fertilizers, and appropriate agricultural methods, and educating villagers about agricultural operations are recommended.

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