



RESEARCH PAPER

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management of water resources for drought conditions in aqueduct Gonabad City

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Abstract

Of all the natural disasters, drought is the most gradual and the most hard to predict. Further reported that not only climate change but also several human activities foster drought in Iran . It is a recurrent event in some parts of the country, but the northwest region is more prone to drought area because of its high rainfall variability. The purpose of this paper is to investigate the drought crisis, social problems caused by the drought management strategies to reduce the adverse effects of drought on human societies. In analyzing the data for this field study was conducted and the descriptive statistics and inferential statistical methods were used. Resources in this area included 30 aqueducts are represented as their quarterly rate measured from the water samples they tested every six months also according to the results obtained from the water for every shows the quality of ground water extracted has been declining. In this paper, first the definitions and concepts of drought zero sum Vtfs been studied and different perspectives on disaster management and risk management strategies that can change the material and end the use of a variety of drinking water in and needs of the waters of the needs of the quality agricultural the industrial city be solved. Also suggestions on effective to deal with it, and drought management are presented.

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Introduction

Droughts of varying extent are a regular occurrence in many countries (Zhang *et al.*, 2008). A sense of urgency must therefore be created to ensure that both farmers and public servants are prepared for the next drought event. The traditional approach to drought management has been reactive, relying largely on crisis management (Marzieh *et al.*, 2010). This approach has been ineffective because response is untimely, poorly coordinated, and poorly targeted to drought stricken groups or areas (Loukas and Dalezios, 2003). In addition, drought response is post-impact and relief tends to reinforce existing resource management methods (McKee *et al.*, 1993). It is precisely these existing resource management practices that have often increased societal vulnerability to drought (i.e., exacerbated drought impacts). The provision of drought relief only serves to reinforce the status quo in terms of resource management (Kandlinkar and Risbey, 2000). Many governments and others now understand the fallacy of crisis management and are striving to learn how to employ proper risk management techniques to reduce societal vulnerability to drought and, therefore, lessen the impacts associated with future drought events (Jones, 2003). This change in emphasis is long overdue. Mitigating the effects of drought requires the use of all components of the cycle of disaster management (i.e., crisis and risk management), rather than only the crisis management portion of this cycle. In the past, when a natural hazard event and resultant disaster has occurred, governments and donors have followed with impact assessment, response, recovery, and reconstruction activities to return the region or locality to a pre-disaster state (Nasreen and Hossain, 2002). Drought conditions of rainfall and rising temperatures that may occur in any situation in the region. Aqueduct existed since ancient time's decisive role in the economic, social, cultural and even political in every region and its people have. Today subterranean vital role in economic development and prosperity of cities and villages, and are completely dependent on his

social life. the city is located in the town aqueduct (Marzieh *et al.*, 2010).

Therefore, since it is an important social issue needs to be researched and the researchers have done in the city of Khorasan Razavi province Gonabad functions that were known to the ancient Qanat city and the world's longest and oldest Qanat the city is located in the town aqueduct (Paul, 1998). The aims of this research is that due to the shortage of fresh water in the world and the limited water resources in the future with critical and Will be facing a huge water crisis. Therefore, there is fourteen years of drought, in the city Gonabad.

Materials and methods

Descriptive statistics and inferential statistics

In this study two methods for data analysis, descriptive statistics and inferential statistics will be used (Rojas Blanco, 2006). Thus, the researchers first using descriptive statistics to describe the current status of aqueducts, and drought and by obtaining frequent measurements tend to centre sprawl indicators, charting, etc.

Salinity and conductivity

Variables, will describe the method as inferential statistics, performance or cause and effect relationship between two variables, and it will be reviewed and predicted. Because of aqueducts and the dispersion is very high in this study, 10 Aqueduct brackish saltwater and 10 freshwater canals and 10 will be randomly selected and the sample preparation and the tests will be carried out. The most important quality criteria for classification of agricultural water salinity (electrical conductivity) and the amount of sodium in it. Because these two not only affect plant growth, but the degree of appropriateness of irrigation water and its impact on soil Permeability make (Shahid and Behrawan, 2008).

Results and discussion

Classification of agriculture

The most important quality criteria in the classification of agriculture, salinity and sodium

content in it. Drought does not only affect plant growth, but the degree of appropriateness in terms of irrigation water and its effect on soil physicochemical properties can be determined of water for drinking with measurement the use of the Schuler's classification diagram (Shahid and Hazarika, 2009).

The country of Iran the reduced amount of rainfall (about 250 mm per year) and poor distribution of rainfall (terms of location and time). Iran is arid and semi arid. In this condition, increasing urbanization and the development of various sectors of agriculture and industry, demand is increasing. If trends continue and the current status of water in the form below:

- A - With the increase in population, the average rate in the renewable water phase to water stress and crisis stage, the water will decrease.
- B - with decreasing of existing systems regarding the extraction efficiency and utilization of water resources continues are excessive use of groundwater and surface water resources.
- C - The infestation continues, access to good quality water resource limits.
- D - Continue the current policy will lead to waste and loss of water resources.

Given the above, it is recommended that optimization (cache Evers emphasized that the greater part of the water formed various amounts of lead) in exchange blue and are revised, and alternative methods management within the Taking into account structural and management changes beyond structural reform programs Current improper payments.

Table 1: The water quality in the study area

Row	Location of Sampling	SAR	EC	Water Quality
1	Aqueduct	2.4	760	Salinity- Be used for agriculture
2	Aqueduct	2.3	556	A little saline-suitable for agriculture
3	Aqueduct	4.73	168	Saline

Dependent variable or impressive

In this study, problems have arisen, such as the 14 years consecutive drought caused by rainfall shortages and decreases agricultural water. This problem has arisen in that region and it causes dehydrated, which caused a crisis will not affect the dependent variable called (Tanner *et al.*, 2007).

Independent variables

According to the city's main aqueducts, some of which have been influenced by rainfall and water levels and water quality of It has no effect on the preservation of aqueducts called the independent variable

Undesirable or disturb or unrelated variables

- 1 - Increasing water pollution caused by sewage leaks into subterranean home
- 2 - Salty and brackish water, some aqueducts

The basic strategies for to deal with water crisis in:

Changing the current approach to water resources management

Today, global water resources utilization based on three abundant water resources, the control of management reform on the utilization and management of resources demand (consumption) can manage ourselves, water in the country is currently working on the shield control modification, fashion and stage management and resource utilization demand management agent The correct approach in water resources management, especially regarding water needs of wetlands and river regulation should Either attitude change in the concept development and provide models for determining environmental water requirements of wetlands take place. Generally, a Changing the in the management of water resources must observe the following points.

- Determine the actual cost of water services and valuing water for all consumers
- Transparent management of water resources with a focus on customer request
- Increase public participation in the preservation and water supply

- Culture making of consumption and utilization of water resources
- Review the policies and programs of water resources (surface , groundwater) irrigation , agriculture , plantation , cultivation patterns , land desertification and climate criteria and to develop , change and modify them according to the weather conditions in different parts of Iran through groundwater and surface water resources are severely reduce
- Given the above, it is recommended that the optimal consumption pattern (with emphasis on with the highest percentage of Evers stretch of water to form various amounts of lead) Evaluated and revised and replaced with a more principled approach to the policy And planning of water resources and related sectors in areas in areas of low population considering the long-term preservation and environmental quality be examined (Wilhite *et al.*, 2000).

Conclusion

For these reasons, the subject of this study is very important according to the city 's ancient subterranean city Gonabab Been known for about 212 aqueducts life in the city continues to have a research on this important

About the investigation into the origin of new achievements and knowledge of water and wastewater departments , water department Rural Water and Waste , Water Affairs Management, Agriculture, Gonabad city governor and other interested researchers and people Region to develop scientific strategies for maintaining aqueducts , planning and management on drought disaster Dehydration will overcome the crisis .

References

Jones J W. 2003. Agricultural responses to climate variability and climate change. Paper presented at Climate Adaptation.net conference “Insights and Tools for Adaptation: Learning from Climate Variability,” November 18–20.

Kandlinkar M, Risbey J. 2000. Agricultural impacts of climate change: If adaptation is the answer, what is the question? *Climatic Change*, **45**, 529–539.

Loukas A,vasiliades, Dalezios N R.2003.Inter comparison of ete orological Drought indices for drought assessment and monitoring in Greece.8 International conference on Environmental Science and Technology Lemons Island,Greece,8-10Setember

Marzieh K, Ezatollah K, Ali A. 2010. A typology of farmers’ drought management. *American-Eurasian Journal of Agriculture and Environmental Science*, **7**, 415- 426.

McKee B, Nolan T, Doesken J , Kleist J. 1993. The relationship of drought frequency and duration to tomer Cales, &th. Conference on Applied Clintology, 17-22 Junury, Anaheim CA, PP. 179-184.

Nasreen M,Hossain KM.2002. Sustainable development: Bangladesh perspective.Paper presented at the NGO session of World Summit on Sustainable Development(WSSD), Johannesburg, South Africa, August 26-September 4.

Paul B K. 1998. Coping mechanisms practiced by drought victims (1994/95) in North Bengal, Bangladesh. *Applied Geography*, **18**, 355 -373.

Rojas BA. 2006. Local initiatives and adaptation to climate change. *Disasters*, **30**,141-147.

Shahid S, Hazarika M K. 2009. Groundwater drought in the north-western districts of Bangladesh. *Water Resource Management*, **24**, 10.

Shahid S, Behrawan H. 2008. Drought risk assessment in the western part of Bangladesh, natural hazards. *Journal of the International Society for the Prevention and Mitigation of Natural Hazards*, **46**, 391-413.

Tanner T M, Hassan A, Islam K M N, Conway D, Mehler R, Ahmed A U, Alam M. 2007. ORCHID: Piloting climate risk screening in DFID Bangladesh. Detailed research report. Institute of Development Studies, University of Sussex, Sussex.

Wilhite D, Hayes A M J, Knutson C. 2000. Planning for drought: Moving from crisis to risk management. Journal of the American Water Resources Association, **36**, 697-710.

Zhang J, Xia X, Jia C, Li T. 2009. Analysis of scenario and factors on China's urban wastewater emission. Resource Development and Market, **25**, 397-399.