

Evaluation of Droughts Risk Management Role in Reducing Economic Vulnerability of Rural Farmers (Case Study: Kangoor Rural Districts of Kalaleh City)

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Abstract

Droughts is a phenomenon that occurs in any kind of weather. In fact, droughts are the most dangerous natural disaster that affect a wide range of climates and ecosystems, which the most important impact could be in rural areas and the economic situation of rural farmers, among these risk management can reduce the damage caused by this natural phenomenon in rural areas. The purpose of the present study was to investigate the role of droughts risk management in reducing the vulnerability of the economy of rural farmers in Kangoor Rural districts in the city of Kalaleh for that purpose. Descriptive-analytic method and field scrolling were used. The study population in the present study is the whole Kangoor village which is using Cochran method is selected. 86 questionnaires were distributed by simple randomization between them. The obtained results of the analysis of SPSS software and chi-square test indicated that the implementation of some aspects of drought risk management, including technical irrigation (Pressure irrigation, drip irrigation...) and the use of resistant species against drought with a significant coefficient of 1%. Also, implementation of drought risk management in the study area could improve the economic situation of farmers in some areas, such as the diversification of rural products, maintaining rural meadows, agricultural economic stability and poverty reduction in the rural vulnerable groups.

Keywords: Risk management; Drought; Rural economy; Kangoor rural districts

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Introduction

Drought is a phenomenon which frequently or almost occurs in every kind of weather. The most obvious definition of this phenomenon is reducing the amount of precipitation, which takes place on average a long period. In comparison with other natural disasters, drought symptoms gradually are distributed in a wider geographic area [1]. In fact, the most dangerous natural disaster drought is affected a wide range of climates and ecosystems [2], and geographic areas affected by sharply increased in the past four decades [3]. Therefore we can say drought occurs in almost all climate regimes. This phenomenon occurs in both low and high rainfall areas. Also drought creates a lot of problems in the field of social, economic and environmental. In fact, the drought has broad implications and long-term effect on all aspects of human life [4]. Rural and agricultural communities are the first

communities that suffer the most damage it so that during the last ten years, the damage caused by drought in the agricultural sector of Iran have been reported more than 240 trillion rials. In addition, the economic effects of recent drought in developing countries and in developed countries are indicating the vulnerability of communities against drought. According to some researchers, such as Swif, Scoones and Sear. Quality and quantity of vulnerability of droughts vary from country to another and vulnerability can imagine a dynamic and changing situation [5]. In fact, the vulnerability of the drought is affecting the management approach (risk management or crisis management) such that in many poor countries of the world, drought led to famine and will include many economic consequences, which for farmers is more important as a vulnerable groups. The purpose of the present study assess the role of drought risk management in the reduce vulnerability of the economy of rural farmers Kangoor

district area of Kalaleh city. For that Purpose have been used the descriptive - analytical and field surveys.

Theoretical Foundations

Drought phenomena have very long history and exist from human lifetime. Today, the effects of global warming and climate change caused by incorrect and aberrant operation of human has become one of the major concerns of human beings and actually become the previous cause of drought [5] and is differenced with other natural disaster such as flood, earthquake and Storm. The main differences are in the gradual impact of the drought over a relatively long period, lack of accurate determination sequence of onset and the geographic extent of its impact [6]. In recent years, the crisis of drought, reducing the rainfall, the indiscriminate use of underground wells, regardless of the feeding of this area is caused irreparable damage to the natural resources on the one side and on the other economic and financial resources of farmers. Agricultural drought occurs as a result of the shortage of rainfall compared with normal rainfall in certain time periods, soil moisture is reduced to such an extent that agricultural areas are significantly affected. The agricultural sector is the first sector is affected economically by drought.

The direct effects of the drought are often related to climate and climatic and ecological characteristics, while the indirect effects of drought that are more intangible and broader, Which are related to economic and social damage caused by the nature and its characteristics can hardly recognize their quantity [7]. Actually because of the close relationship of the countryside and agriculture, the negative impacts of drought on rural economy

and agriculture will appear during a few years and it's continuing to cause the change of function and rural migration. Drought at the global level is still known as a hidden risk and at the local level is also social and economic impacts which are targeted the rural poor households disproportionately [8]. However, the frequent occurrence of drought has caused this crisis for farmers is not considered as a new phenomenon, but the complexity the factors of underlying and interconnectedness negative impact of the drought is changed this phenomenon to a main concerns of farmers living in areas with critical conditions [9]. So the agricultural drought management to reducing the obtained results has a great important [10]. In this regard, the National Center reducing the effects of drought in America in 1995, the risk management which is including reduces the effects and preparedness programs that are offered to reduce the vulnerability of rural communities [11]. Chambers [12], believes that the vulnerability has two dimensions, an external dimension that involve risk and danger which is affected individuals and families, and an internal dimension, including the ability of people to meet, anticipate, or improve the effects of a hazard [12]. The concept of danger and vulnerability in the first time were employed by Oookif and his colleagues, in some of definitions associated with vulnerabilities that have wide application, to the degree of various social groups is referred which has different situation against the risk. This definition focuses on economic theory [13]. Flexibility is the closest related to the concept of vulnerability. Vulnerability is the possibility of consequences out breaking of negative and adverse events in the community. This is while the flexibility is tolerance threshold and limits analysis in community and against the basic changes in the environment

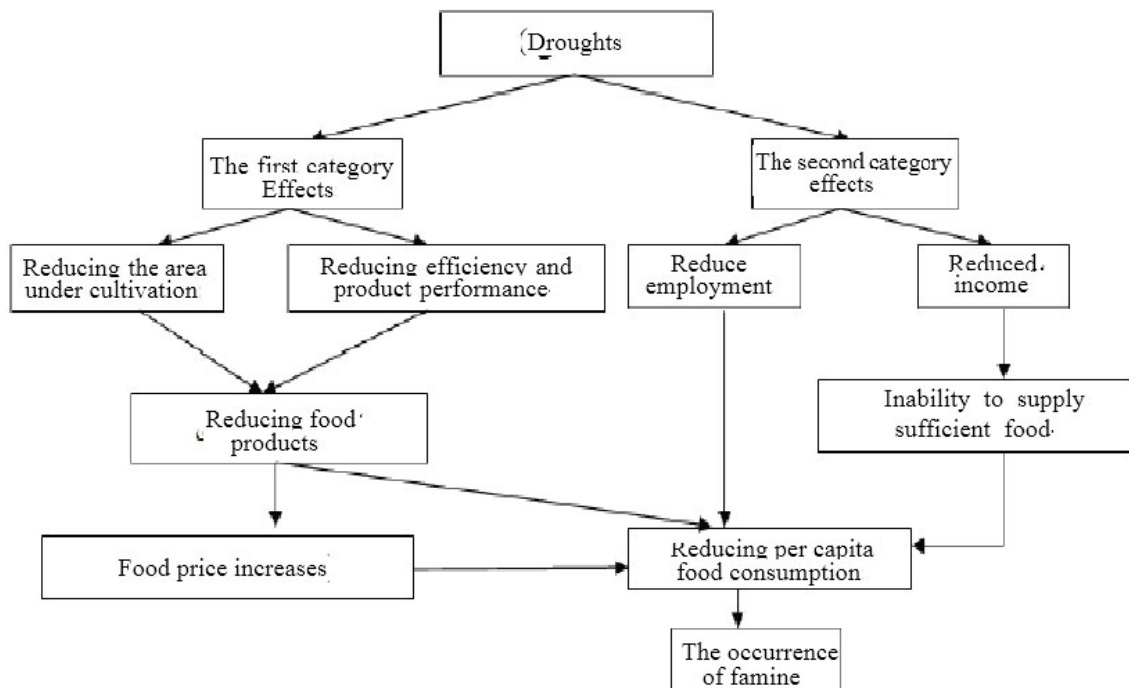


Figure 1 The impact and consequences of the drought.
Source: (Keshavarz and Karami, 2008: 268) [27].

and contrast with them. Population power to deal with change, find a way to cross the vulnerability, which has meaning the concept of flexibility (Figure 1) [14].

Because of Iran's position in the drought belt and adjacent to the subtropical high pressure has an arid and semiarid climate as a result, in most years, was suffering from severe drought [15]. So that the in term of extent and amount of damage during the last 50 years has been unprecedented and create unheard cold weather and lack of rain in most parts is caused lack of sufficient plant growth and incur losses the villager's economy [16]. So to deal with drought in various countries have used different approaches. Something that so far to reduce drought damage in Iran is considered, it was drought management [17]. So management practices in drought are important step in reducing the human and financial losses this phenomenon and inhibition of some of its consequences. Due to inefficient management practices drought in the country, to find an approach that would eliminate the existing shortcomings and improve the ability to cope with drought is important. Thus, in particular drought planning should be in line with management [18]. Drought has extensive and long-term consequences, and on all aspects of human life affects [4]. In communities that their economy is based on agriculture, direct or firsthand the effects of drought like a reduction of food production is due to reduced acreage, reduced operations of harvest. Accordingly, it can be deduced that the drought is a big threat to families and communities that are dependent on agriculture for their livelihoods [9]. The consequences of the drought could lead to instability rural livelihoods. Because of the natural disasters in terms of loss of agricultural production are suffering and hardship for farmers [19].

Drought risk management is set of measures that are done before the drought occurrence and surprising during the operation lead to lowest level. This type of management which in the least developed countries has less consideration include several stages such as: evaluation, prevention, reduction, control, early warning and preparedness. Given that the environment, society and economy are the main components of sustainable development and this disasters have negative impact on sustainable development, proper and true risk management is essential (Figure 2) [20].

Background Research

Coombs [21], the effects of drought in three categories: the effects of economic, social and environmental are classified, and the interaction between these consequences and synergistic effect on each other is emphasized. Kenny in his study is concentrated on the social impact of drought and could referred to as main social consequences of drought like Physical and mental stress, anxiety and depression, family conflicts, reduced quality of life, increased migration, increasing poverty. Mohammadi and Hakim [22], on the economic effects of the drought were concentrated and to determine its effect on the stability of their villages in Zanjan province. The results showed that between drought and the amount of rural exodus and exist a significant and positive correlation with 95 percent confident. Sharafi and Zarafshani [23], in a study to assess the technical and psychological vulnerability wheat farmers during the drought in the city of Kermanshah, to the Sahneh and Ravansar with survey method by selecting 370 farmers have multi-stage stratified random sampling method. The results showed that farmers Ravansar city has the highest

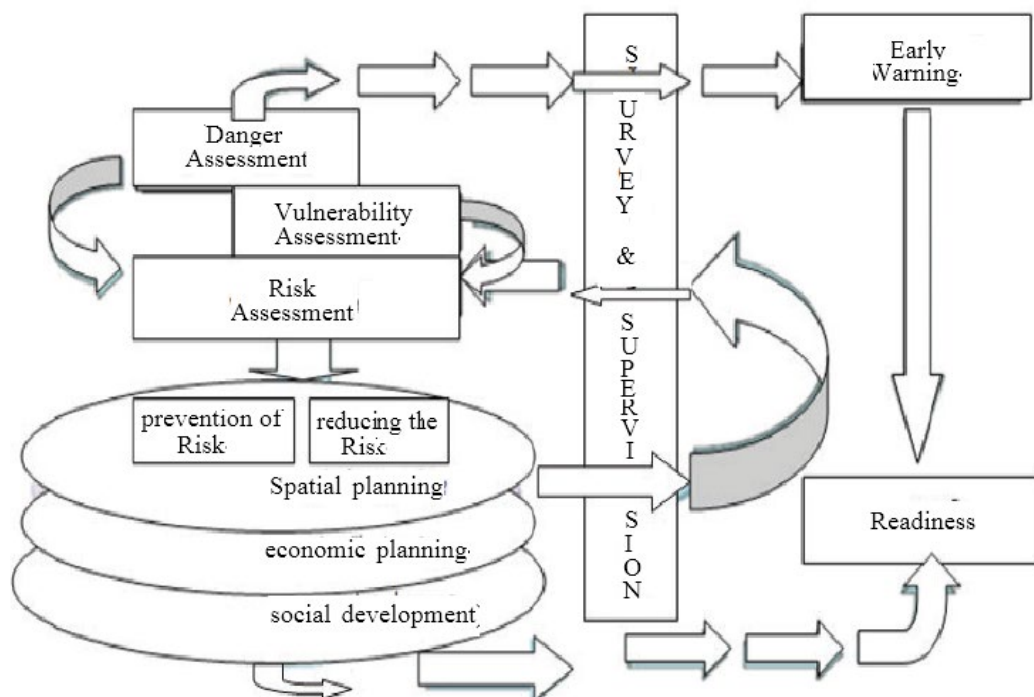


Figure 2 The risk management process.
Source: (stanganelli, 2008: 93) [28].

coefficient of vulnerability and farmers of Kermanshah city have the lowest rate of injury- in terms of technical and psychological indicators. Hosseini et al. [5], in a research to explaining the elements of crisis management of drought in rural and nomadic areas of South-East of the country through a census of 201 people involved experts have studied in crisis management of drought. Factor analysis showed that the environmental impacts - ecological, economic consequences-livelihoods, social and psychological consequences altogether has 76/84% of the variance. Poortaheri et al. [24], in a research to examine the roles of drought risk management approach to reduce socio-economic vulnerability of rural farmers in villages Sulduz of West Azerbaijan from officials and experts views. The results showed that drought risk management approach is studied for reducing economic and social vulnerability in rural areas. Ghanbari [25], in a study to examine and identify the impact of drought on rural households in the village of Saver in Semirrom city by selecting 245 subjects, the results showed that the effects of drought in the village of saver in a production and economic main categories of factors (including income, reduced production performance, increased production costs, increased natural hazards, reduce the incentive-agricultural investment and reduce job opportunities for agriculture) is close to 46/24 percent of the variance. Rezaei and Yeganeh [26], in an article is analysis the effects of drought on the agricultural economy and rural migration by selecting 7 villages of 35 villages of Abarkooh city during 2005-1996. The findings suggest that drought by reducing the performance of agricultural production has led to the rural economy instability.

Research Methodology

This research in terms of nature is descriptive-analytic and in term of implication is a kind of survey method and in terms of data collection method is a kind of fielding method. In the beginning, the organized study in order to prepare Literature and

theoretical foundations in library and in the field research stage using needed tools research (researcher made questionnaire) to collect the data needed. The population studies in this research is the district area of Kangoor a part of Kalaleh city which using Cochran formula 86 subjects as a sample were selected.

Cochran formula:

$$n = \frac{N(t.s)^2}{Nd + (t.s)^2}$$

N=Population velume

S=Variance of family dimension

D=Possible accuracy

t=1/69

n=Sample volume

$$n = \frac{21465(1.69 * 11)^2}{21465(2)^2 + (1.69 * 11)^2} = 86$$

Introducing the study area

Kangoor rural district is located in Golestan province in the city of Kalaleh and geographic location between 55 degrees and 29 minutes east longitude and 37 degrees and 22 minutes northern latitude. This rural district has warm and humid climate and has pristine beauty of nature. Kangoor rural district has 46 villages and its population in 2011 was around 21,465 people. Also rural district has 6 villages with over 1000 population (**Figure 3**) [27-29].

The research findings

The research findings provide the first state to insurance and employment status (in terms of permanent or temporary) then findings of the analysis are displayed. Information contained in **Table 1** shows the sample group insurance condition. As can be

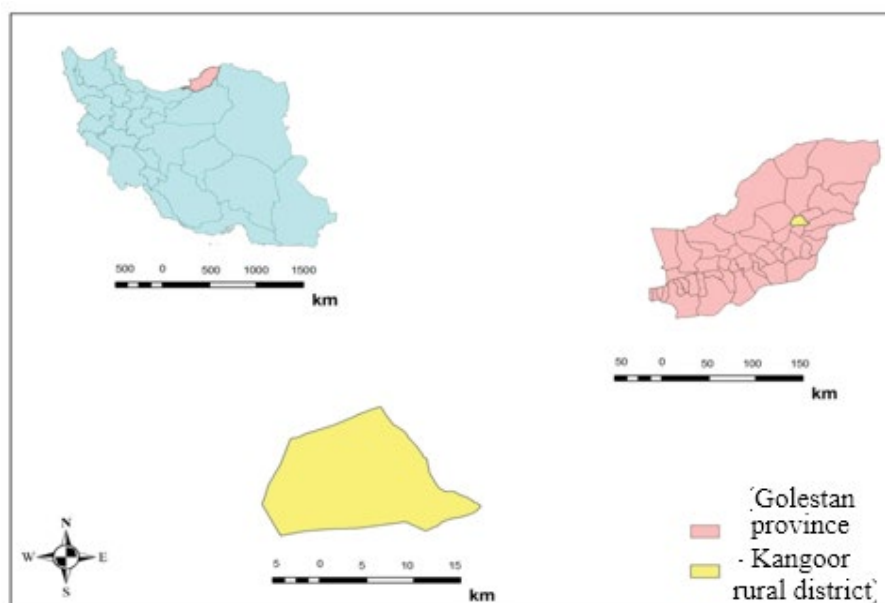


Figure 3 The spatial position of the study area.

seen from the 86 samples, 49 patients (57%) have insurance and 37 (43 percent) are uninsured. Also, 40 patients (5/46 percent) had permanent jobs and 46 patients (5/53%) have temporary jobs.

Then chi-square test to assess the implementation of drought risk management in the study area (rural district of Kangoor) is used. The results show a significant rate at 1% for some components, such as technical irrigation methods (pressurized irrigation, drip, etc.), using tolerate varieties against drought, construction of reservoirs and small ponds on farms , providing insurance for agricultural products (insurance of drought) and reducing external threats. In fact, with regard to components of the basic measures is conducted to manage the risk of droughts in the study area. The result is not significant in relation to other components so that has been done small actions (Table 2).

The main effects of droughts risk management can be seen in an economic situation of the villagers, especially rural farmers. Information contained in Table 3 represents the realization of the economic component of risk management in a village after the rural district of Kngvr using Chi-square test was obtained.

As can be seen in relation to some components, such as the diversification of rural products, maintaining rural pastures,

Table 1 Employment and Insurance of study sample in a Kangoor rural district.

Component	Insurance		Job	
	Yes	No	Permanent	Temporary
Abundance	49	37	40	46
Percent	57	43	May-46	May-53

References: The research findings, 2014

Table 2 Evaluation of droughts risk management program using nonparametric Chi-Square.

Row	Component	Significant coefficients	Coefficients Chi-Square	Degree of freedom
1	Technical irrigation methods (pressurized irrigation, drip, etc.).	002/0**	02/17	4
2	Use species resistant to droughts	000/0**	86/20	4
3	Construction of reservoirs and small ponds on farms	000/0**	18/23	4
4	Water needed for irrigation scheduling products	390/0NS	11/4	4
5	Training farmers to cope with droughts	021/0 NS	55/11	4
6	The estimated time of droughts and information to farmers	007/0*	11/14	4
7	Providing insurance for crops (droughts insurance)	000/0**	15/45	4
8	Create Alarm Systems	913/0NS	977/0	4
9	Reducing external threats	001/0**	46/19	4

References: The research findings, 2014. Significant 1%** . Significant 5%. NS lack of Significant.

Table 3 Evaluation of the realization of the economic situation of rural farmers after the droughts risk management using nonparametric Chi-Square.

Raw	Component	Significant coefficients	Coefficients Chi-Square	Degree of freedom
1	Reduce the damage to agricultural production	044/0 NS	81/9	4
2	Development of products with low vulnerability	008/0*	76/13	4
3	Increase product quality	857/0 NS	32/1	4
4	Increase rural income	007/0*	11/14	4
5	Diversification to rural products	000/0**	23/24	4
6	Maintenance of rural pastures	000/0**	37/52	4
7	Sustainable agricultural economy	003/0**	20/16	4
8	Diversification of agriculture-related jobs	074/0NS	53/8	4

References: The research findings, 2014. Significant 1%** . Significant 5%. NS lack of Significant.

economic stability agriculture and rural poverty reduction in vulnerable groups was obtained significant relation at 1% level. Table 4 shows the influence of high frequency obtained by the droughts risk management program execution on mentioned components. In conjunction with other components, such as the development of products with low vulnerability and increase rural income significant coefficients in the level of 5% was obtained, which represents a relatively large impact on droughts risk management program execution on mentioned components.

Finally, it must be acknowledged that droughts risk management as a relatively high could reduce economic vulnerability of the agricultural sector in the city of Kalaleh in Kangoor rural district. In this context, we can say that government investments in some areas such as training farmers, investment in agricultural research including drought-resistant varieties can reduce the vulnerability of farmers in the rural economy. The use of modern irrigation systems such as drip irrigation system under pressure is including the medium-term solutions to the economic stability of rural farmers in the rural district of Kangoor.

Conclusion

- Droughts as the most dangerous natural disaster have a wide range of climates and ecosystems affected and influenced by its geographic areas have greatly increased in the last four decades. Thus droughts occur in almost all climate regimes. Drought creates problems in the many different areas of social, economic and environmental. In fact, droughts have the long-term and widespread consequences and affect all aspects of human life. Rural communities and agriculture are the first communities that incur the highest losses. The vulnerability of the drought is affecting the management (risk management or crisis

Table 4 Frequency of realization of the economic situation of rural farmers after the droughts risk management.

Row	Component	Very high	High	Average	Low	Very low
1	Reduce the damage to agricultural production	23	7	19	22	15
2	Development of products with low vulnerability	14	18	22	26	6
3	Increase product quality	21	16	16	15	18
4	Increase rural income	30	11	18	16	11
5	Diversification of rural products	29	27	13	11	6
6	Maintenance of rural pastures	32	35	5	9	5
7	Sustainable agricultural economy	20	28	15	18	5
8	Diversification of agriculture-related jobs	19	14	14	27	12
9	Reducing rural poverty in vulnerable	29	27	12	13	5

management), so that in a many poor countries of the world, drought led to famine and economic consequences that for farmers as vulnerable groups have more important. The purpose of this study was to assess the role of droughts risk management to reduce vulnerability of rural farmers economy in Kalaleh city of Kangoor rural district, for that Purpose method cross - sectional and field surveys have been used. The population of study was Kangoor rural distinct using Cochran method were selected 86 persons by simple randomization between them. Results obtained from the questionnaire were analyzed by SPSS software. The findings obtained from the chi-square test indicated that the

implementation of droughts risk management practices in the study area. Some of these methods can be technical irrigation methods (pressurized irrigation, drip, etc.), using varieties tolerate drought, construction of reservoirs and small ponds on farms, providing insurance for agricultural products (insurance droughts), and significant coefficient at 1% level was obtained. Also, the implementation of drought management plans in rural district of Kangoor such as farmers' economic condition of farmers in some areas such as diversification of rural products, maintaining rural pastures, agriculture economic stability and poverty reduction in rural vulnerable groups are improved.

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