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ANALYSIS OF THE ECONOMIC IMPACT OF DROUGHT ON RURAL ECONOMY IN IRAN: A CASE STUDY OF HIR COUNTY

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ABSTRACT: *In recent years, in some countries, especially Iran, drought as one of the harsh climatic - natural disasters, has had severe impairment directly and indirectly on water reduction and the agricultural and economic variables. Ardabil Province as an agricultural area has not been exempted from that. The purpose of this study is to analyze the economic impact of drought on the economy of rural areas in Hir County. This study is descriptive - analytical in terms of research methods, practical in terms of nature and is a library and field kind of research in terms of the type of data collection. The statistical population consists of 35 villages in Hir County, of which eight were selected for this research using stratified sampling. The tool used in measuring the questionnaire was made by the researcher. Face validity of the questionnaire was confirmed by a panel of experts. Pilot study in area similar to the statistical population with a total of 30 questionnaires were performed and with acquired data and use of Cronbach's alpha formula, the reliability of the questionnaire was obtained at 0.87 in the SPSS software. For data analysis, factor analysis model was used. Also, the results obtained from factor analysis and studying farming and gardening products show that consecutive droughts have inflicted irreparable economic damages on the bodies of the villages in Hir County.*

KEYWORDS: Droughts, Drought Management, Rural Development, Water Resources Management, Rural Economy, Ardabil, Iran.

INTRODUCTION

Every natural unexpected and sometimes sudden event, that weakens and destroys the economic, social, physical and financial potentials such as the personal toll and destruction of infrastructure, economic resources and social employment, is perceived as natural disasters (Keshavarz and Karami, 2013:267-283). In recent decades, among natural events that have affected human societies, the frequency and severity of droughts were more than other natural disasters (white, 1993:137). This phenomenon is due to reasons such as wider extension, increase in populations, etc. The intangible and long-term impact, sustainability and extent of damage from drought have always grabbed people's attention more than any other natural phenomenon (Rahimy, Khaladi, 2013:83). However, drought is considered as a normal and reverse climate, of which some erroneously considers it a rare and random event. This phenomenon can occur in all areas, even in moist and semi-moist areas, although the features and intensity can vary from one region to another.

Iran is located in the dry geographical and desert area at 25 to 40°N of the latitude and as such it is considered as one of the low rainfall areas of the world. The rate of rainfall in Iran is third in the world (very low) and the average annual rainfall is 270 mm and it also has a dry and semi-dry climate (Hedayati, 2013:283-267). Considering the geographical situation of

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Iran, been located in dry climate with low rainfall, it should be noted that water crisis and drought is a major characteristic of the climate considered in Iran (Keshavarz et al, 2013). Although water crisis and drought is not often a country's inclusion problem; but in general, none of the regions in the country has been immune to this phenomenon, depending on their natural position, they are experiencing the devastating effects of this phenomenon (Rezaei, 2014:125-134).

A study of Nassaji Zavareh (2014), came to a conclusion that the most important economic consequences of drought are reduction of farmers' income and the agricultural sector employees, rising input prices, reducing the prices of farm lands and increase in the prices of food. Sobhani Nasab (2014), found that economic losses caused by drought in the Sistan-Baluchistan region has led to increased unemployment twice the national, and reduced crop production income in this province. Keshavarz et al (2013), in their findings of fieldwork came to a conclusion that the economic effects of drought in Fars province include the reduction of cultivated and orchard land, changes in the economic structure of villages and decline in other sources of income. A study of Gholami et al (2012), enumerated the economic impact of drought to include raising the cost of the drilling and pumping of groundwater, increasing debt to government agencies, and reducing villagers' incentives for investment in the agricultural sector. The research findings of Erfaniyan and Alizadeh's (2012), in the Golestan Province shows that the effects of drought has had a serious decline in wheat yield (130 kg/ha). Fatemi and Karami (2011), in their field findings on the impact of drought on rural areas suggest that economic impact of drought leads to increasing risk of investment in public and private sector in rural areas, increasing cost of production and reduction in the value of villagers' assets. Mohammadi Yeganeh et al (2013), found that drought has left many economic impact in rural areas in Abarkooh county including: Rising in prices of input, changes in utilization systems, increase in the cost of production and fall in the value of villagers' assets. In another study, Mohammadi Yeganeh and Hakim Doost (2014), focused on the economic impact of drought and its effects on rural instability in Zanjan province. The results indicate that between drought and rural migration rates, there was a significant positive relationship with 95% confidence level, 87% of rural migration in the study area was due to the increased trends of drought. Also, drought, on time scales of several years has had negative impact on the rural economy and agriculture and has led to altered functioning of rural land and reduction in the amount of villagers' income and employment opportunities.

Studies have shown that the average annual rainfall in Hir County is 267 mm and the average monthly temperature is 0.9°C. A review of the amount rainfall in the past few years have shown that there were 14 rainfall less than normal in Hir County. Based on the definition of drought, which is rainfall below average amounts, the city of Hir has actually been faced with drought in the past 14 years. However, it should be noted that due to climatic differences in different areas of the County, drought and therefore its impact is not the same in different regions. Such that, in some villages drought intensity was high and in some areas drought and its consequences were less important. The effects of drought have been so severe in some areas, which has led to severe unemployment and rural migration and thus haunting some of the villages (Rezai Banafsheh, et al, 2013:130-142). Due to the necessity and importance of villagers lives affected by drought, the goal of present study is to analyze the economic impact of drought on rural economy in Hir County from 2007-2014 and to answer the question on what are the economic impacts of the drought in Hir's rural areas.

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MATERIALS AND METHODS

The present study is descriptive-analytical in terms of research methods, applied in terms of nature, and is a library and field research in terms of data collection. The statistical population consists of 35 villages in Hir County, using stratified sampling, 8 villages were selected for the study. Measurement tools of questionnaire were made by the researcher. Face validity of the questionnaire was confirmed by a panel of experts. Pilot study was performed in a similar statistical population with a total of 30 questionnaires and the reliability of the questionnaire was obtained at 0.87 with acquired data and the use of Cronbach's alpha formula in the SPSS software. To identify households in each village, to complete the questionnaire of all households in the village, schematic method was used. The collected questionnaires have been formed from both personal and professional characteristics of the respondents and the respondents' views about the intensity and effects from any of the drought (15 variables). These variables have been identified and extracted through an extensive review of theoretical research in the subject area under study and also by semi-structured interviews with knowledgeable experts and Agricultural Organization of Hir County, and the regional water company of Ardabil.

Analysis of the research findings

Consequences of drought on rural economy in Hir city

In this study, respondents in gender were men with a frequency of 87.6%, and the most common age was between 45-55 with a frequency of 31%. Statistically, the study populations were literate with a frequency of 72% and the highest percentage was related to primary school with a frequency of 41.5%. The number of people in a family was 5 in the household with a frequency of 24%. Also, the majority of employment in this County was a compilation of several jobs such as agriculture - livestock and horticulture with a frequency of 41.5%. Among this statistical population, a single job was rare as the frequency of agriculture with 9% indicates.

In this study, in order to categorize the effects of drought in villages used for this study in Hir County and quantify explained variance by each variable within categories of factors, factor analysis was used. To determine the suitability of the data relating to sets of analyzed variables regarding the effects of drought, KMO index and the Bartlett's test were used. The significance of Bartlett's test at the 99% confidence level and an appropriate amount of KMO indicates variables correlation and appropriateness of the desired factors for factor analysis (Table 1).

Table 1: the value of KMO and Bartlett test

Analysis set of KMO	Bartlet Test	Sig
The effects of drought on the Hir County economy (0.559)	63.021	0.000

Source: Research findings: 2015.

In Table (1), indices were ranked according to the respondents views. It can be seen from the perspective of the respondents that indices of declining factors of production have an average of 4.5234%. Also, indices indicating the reduction in farm income; livestock products, crops yield losses and so on are subgroup of indicators decreasing production inputs and are

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respectively among the other indicators. This means that from the respondent's point of view, the decline in production inputs indicators, which was dependent on rainfall somehow forms the source of income of most residents of the village (agriculture - livestock and horticulture) which was also mentioned above. With reduced rainfall and drought; reduction in these inputs will threaten the rural economy to a very large extent. From the respondents point of view, as shown in Table 2, although reduced rainfall and drought could lead to decline in production inputs and also weakens the rural economy, it has not been able to change the employment of the villagers from agriculture - livestock and horticulture, on the one hand, it was because majority of respondents were aged between 45-55; and on the other hand, turning to another job was hard and impossible which may weaken the industrial and service basis in villages of this County. However, turning this County into an industrial County is considered as a new and fresh step in this County. Table 2 also shows that the index of inequality in the distribution of facilities and services with an average of 3-7209 has been placed. This means that in the respondents point of view, reduced rainfall and drought has only threatened the economy of this counties villages and has not been able to make serious detrimental impact on some components that are so dependent on the government and private sectors, such as distribution facilities for inputs, credit and services and because the economy of these inputs is provided by the government and villagers.

Table 2: Prioritizing economic effects of drought in the views of respondents

Initial Index	Load Factor	Rank	Average	Standard deviation
Decline in production inputs	0.62	1	4.9	0.3077
Reduction in the income of farming and gardening production	0.81	2	4.85	0.3663
Decline in income of livestock production	0.79	3	3.4	1.3917
Yield loss on farms	0.65	4	4.1	1.1652
Decline in farming and gardening yields	0.65	5	4.1	1.4109
Reduction in current and fixed assets of rural households	0.43	6	4	0.9322
Reduce employment at the village	0.64	7	3.8	1.3993
Yield reduction in Gardens	0.42	8	3.75	0.4442
Depreciation of villagers' assets (estate, etc.)	0.71	9	3.75	1.5852
Reduce wages for daily labor work	0.66	10	3.7	0.4701
Rising prices of production inputs (seed, fertilizer, pesticide, etc.)	0.63	11	3.7	0.4701
Reducing farmers incentive for investment in agriculture	0.55	12	3.6	1.0954
Price increases in production costs (the planting and harvesting)	0.78	13	3.4	0.6805
Increased debt to government agencies	0.51	14	4.45	0.8255
Undermining local institutions and organizations	0.58	15	3.2	0.9654

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Miscellaneous incomes decline	0.76	16	3.35	0.7451
Changing operation system of agricultural land	0.45	17	3.3	0.9787
Village Economic Weakening	0.48	18	3.1	1.6189
Risk increase for investment in public and private sectors in rural areas	0.49	19	3	1.3377
Reducing incentives for farmers to invest in livestock sector	0.56	20	3	1.0259
Tendency to take on false jobs	0.54	21	2.65	1.0399
Turning to non-agricultural jobs	0.53	22	2.4	1.23
Inequality in the distribution of facilities and services	0.41	23	2.4	0.94

Source: Research findings: 2015.

From Table 2, the amount of load factor of each indicator has been mentioned according to the degree of influence of drought. In this table, the effect of drought on the decline in income of farming and gardening products with a load factor of 0.81 is allocated the maximum load factor. This suggests that the county economies first and foremost has been based on agriculture and other occupations such as livestock and services and so are considered as a second job for villagers and secondly, due to the water nature of agriculture and the use of water from deep wells and flowing rivers to irrigate fields and gardens, low rainfall and droughts during this period have unbelievable effect on the loss and reduction in groundwater of this city. Loss index of income from livestock production, with a load factor of 0.79 is the second main occupation of the villagers in the second place in this County and this is a sign of the impact of drought on agriculture and natural rangelands in this city. Drought, in addition to declining production in this County has resulted in price increase and the cost of production of inputs and positioning prices increase index of production costs with a factor of 0.78 in the third place is an evidence of drought.

CONCLUSIONS

The results showed that the economic impact of drought on Hir County include decline in production inputs, loss of income from farming and gardening production, reduction of income in livestock production, farm yield loss, reduction of crops and gardening production, reduction of the current and fixed assets of rural households, reduction of employment at the village, reduction of gardens yield, villagers property devaluation, reduction of wages for daily labor work, rising prices of production inputs, increased debt to government agencies, local weakening of the association, decline in other sources of income , changes in the use of agricultural land, weakening of the rural economy, increasing the risk of public and private investments in rural areas, reduction of incentive to investments in villagers livestock sector, the tendency to take on false jobs, turning to occupations other than farming and ranching and inequality in the distribution of facilities and services. The results of these findings has correlated with studies of (Amirkhni et al, 2012; Poortahery et al, 2013; Rezai et al, 2014; Jafari et al, 2011, Saleh and Mokhtari, 2013, a Keshavarz and Karami, 2013). One of the other noticeable issues in the economic aspect, had been the change in the production and operation system in the region because of drought, the drought has led to reduction of crop

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diversity, reduction of planting yielding varieties and even in some cases changing the usage of rural lands which over the long term can make the villagers to face serious problems. Finally, according to the results of the study, it is suggested that a series of measures such as strengthening and application of scientific principles of meteorology in country's agriculture, necessity of paying attention to formulation and implementation of financial strategies to mitigate the negative effects of drought, allocation of special funds for drought in the County, application of more appropriate technology and improving management in dry land farms, development of drought insurance in various types and encouraging farmers to join and use them, codification of national plan of saving and rational use of water in various sectors of agriculture, production and distribution of publications and other promotional printed materials in rural areas, determining the crop pattern based on the severity of drought in different regions, taking advantage of new technologies and the development of long-term investments in accordance with the physical capacity, introduction of job opportunities to farmers in times of drought, creating balanced economic opportunities among different segments of farmers by establishing reserve fund, encouraging integration of land use, integrating research activities with indigenous knowledge systems, taking the proper amount of fertilizer and crop management techniques is desirable, encouraging integration of lands, integrating research activities with indigenous knowledge systems, taking the proper amount of fertilizer and desirable crop management techniques, training villagers on agricultural operations, etc should be on the agenda of planners and administrators.

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