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**Original Article**

# Analysis of the Impact of Environmental Unsustainability on Social Unsustainability in Iran: Tensions and Social Damages Caused by Drought in Rural Areas

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## Abstract

**Purpose-** Social sustainability, especially in rural areas, is one of the most important goals of policymakers, planners and managers. However, social sustainability in local communities, such as villages, can be challenged through environmental instabilities. Accordingly, the purpose of this study is to analyze the tensions and social dangers in rural areas of Neyshabur, one of the provinces of Iran.

**Design/methodology/approach-** In order to measure the relationship between the independent variable of drought and the dependent variable of social tension, 24 variables were identified in the context of drought, existing tensions and social damage caused by water scarcity in the study area. The required information was collected from documentary studies and also through interviews and questionnaires. One-sample t-test, Pearson correlation, single-variable regression, and VIKOR model were used to analyze the data .

**Findings-** The results show that there is a relationship between water deficit deduced from drought and 22 social unsustainability variables. Based on the results of the regression test and the amount of obtained beta, respectively, the greatest effects of water shortages deduced from drought was on intensifying rural poverty (0.932), increasing living expenses (0.931), and the destruction of small crop and small cultivation (0.924). Also, the results of the VIKOR model showed that there is a difference between the studied villages in terms of the severity of social tensions.

**Originality/value-** This study has been promising to focus on the effects of drought and water scarcity as an environmental unsustainability in shaping and exacerbating tensions and social injuries. Therefore, the results of this study can be effective in recognizing the social impacts of environmental changes in geographical areas and countries facing environmental changes .

**Keywords-** Environmental Crisis, Environmental Changes, Social Unsustainability, Social Stress, Drought, Rural Communities

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## 1. Introduction

Environmental unsustainability and climate change have become a major issue today (Hoekstra and Wiedmann, 2014). There are various forms of environmental unsustainability, based on geographical location and environmental conditions, where drought is one of the most important. Drought is a dangerous natural hazard that causes complex effects in societies; these effects are not only damaging in one country, but also the effects of drought on the globe can also be spread (Wilhite, et al., 2007). This phenomenon is also one of the climatic anomalies that has adverse effects on plants, animals and ecological environments, and ultimately on human populations (Wilhit and Wood, 2001). The damages and effects of drought are so much that some of them are wider and more persistent than other natural disasters, such as floods and earthquakes (Wilhit, 2000), as if decreasing agricultural production deduced from drought is the costliest natural disaster (Fontain et al., 2009). In fact, drought as a global issue is a serious threat for food production and security (Jalleel et al., 2009); This crisis is one of the main factors limiting the development of countries (Ceccarelli and Grando, 2004). It can be said that drought-induced vulnerability is a complex concept that includes both environmental and socio-economic impacts (Brooks et al., 2005; Adger, 2006; Fussel 2007; O'Brien et al., 2007). Droughts therefore have many negative economic effects on farmers and local economies. These effects have been highlighted in numerous sources (Diersen et al., 2002, Horridge et al., 2005, Edwards et al., 2009). But social impacts of drought have been less widely considered (Fritze et al., 2008). The social effects of drought are visible on several forms; For example, indirect economic effects such as suffering and stress caused by productivity reductions, population declines, social disruption as a consequence of the negative economic effects of agricultural drought and psychological damage caused by livestock losses, destruction of soil and native vegetation are examples of this. (Berry et al., 2008). But it should be noted that the degree of drought effects on societies and human groups is different. So that the inhabitants of the rural areas have the most impact from the drought in different aspects because of their greater connection with the environment and economic activities related to the environment (agriculture and animal husbandry). Drought in rural environments has significant social effects in addition to economic and environmental impacts (Armenski et al., 2014). Drought, for example, leads to the migration of villagers. Most villages experience dwindling population or loss during the drought years (UNESCO, 2015). On the other hand, it can be said that another social impact of drought on rural farmers is psychological harm, resulting in a decrease in crop production (Edwards et al., 2009). Because the occurrence of drought has a very serious impact on the reduction of water resources in rural areas and, on the other hand, because most of the villagers are dependent on water, so the reduction of water has many negative effects, one of these effects is the conflict between farmers over water (Gleick, 2014). Based on the discussed issues, it can be admitted that droughts and water resources decrease through intensification of poverty, the creation of conflict and struggle among villagers, migration, mental harm in farmers, and reducing the quality of life has led to social unsustainability and the weakening of social cohesion in Villages (Malik, 2018). Objective examples of social unsustainability due to drought and water scarcity in Iran can be seen. For example, water conflicts between two farmers from the village of Chalsara, located in Ilam, were mentioned, which resulted in the murder of one of the farmers (http://jamejamonline.ir). Also, the disagreement between the villagers of Ahar for agricultural water can be noted. In this conflict, four villagers were killed (https://www.yjc.ir). In the past 40 years, 27 different drought phenomena have occurred in Iran; Accordingly, droughts should be regarded as a common phenomenon in Iran (Hatef et al., 2009). In general, Khorasan Razavi province in Iran, especially its northern part, which Neyshabur is located in it, is part of the arid and semi-arid regions of Iran (Mesgaran & Azadi, 2018). The water crisis in Neyshabur is a serious crisis. It can be said that in the last year 150 cases of water disagreements have been reported among the villagers of the city. So far, 80 percent of the Qanats and fountains in the city have been dried or severely damaged. So that the current process of harvesting water from underground resources put 700 villages in the city under drought siege and, of course, the agricultural and livestock

production and related products will not be immune from drought and its damages. (https://www.mehrnews.com). Since the number of villages in this city is high and the activity of most villagers is depended on agriculture and its products, Therefore, the effects and damages caused by drought in most cases are noticeable for rural farmers. Among the damages in the social dimension we can mention immigration, conflicts and internal conflicts over water. In the long term, these conditions can lead to unsustainability and the loss of social cohesion in villages. Accordingly, the present study is aimed to analyze the effects of water shortages deduced from drought on social tensions and social damages in rural areas of Neyshabur. Because the results can help rural planners and managers to create a practical management of drought crisis and also to understand its social impacts among villagers. So the basic question of the research is: What is the relationship between social tension and water shortages caused by drought? And the greatest impact of the water shortage deduced from drought in the region is on the formation of which social unsustainability?

## 2. Research Theoretical Literature

In general, there is no coherent definition of social unsustainability (Ahman, 2013). Even Grieller and Littig acknowledge that choosing sustainability indices does not have a definite theory (Griessler and Littig, 2005). Nonetheless, social unsustainability can be lead to a situation in which the employment, level of life and welfare in a community will be difficult. Several factors influence the formation of social instabilities (Moench, 2002), one of the most important items is environmental instabilities. Environmental unsustainability occurs as a result of natural disasters such as drought, flood, climate change. These instabilities can have many economic, social and environmental impacts on human societies. It can also disrupt the lives and activities of the inhabitants of these societies. (Mawle, 2010). Particularly in rural areas, because rural activities are more dependent on environment and natural resources, it can create many challenges.

***Environmental unsustainability and social unsustainability***

There are complex interactions between global and local environmental changes, which are strongly associated with the possible occurrence of natural disasters affecting communities, their interactions, human activities, and land use changes (Arias et al., 2016). In many cases, the effects of environmental changes are on communities and humans (FAO, 2000). Therefore, it can be said that environmental changes can lead to catastrophic events and challenges for societies. These changes can create multiple social crises in different areas. Especially in rural and poor areas, which are highly dependent on the environment and environmental resources (Huppert, Sparks, 2006; Mertz et al., 2009). Therefore, environmental changes are important because of their impacts on society. If such changes impede the access of societies to basic needs such as livelihood, access to water, food and energy, it will lead to social crises in different areas. Therefore, environmental changes are one of the important factors that have main rule in social crises (Tresman, 2004). Environmental changes in some regions, such as South American countries and countries around the Caribbean Sea, have created significant social crises such as social inequality, conflict, population displacement, poverty, and lack of job opportunities (Basher, 2006).

Therefore, social sustainability can be disturbed and became unstable through environmental factors, natural hazards, and climate changes (Eizenberg and Shilon, 2016). As a result, this factor often leads to disagreements and conflicts between villagers, poverty and mental-psychological damage, multiple diseases, and also disruptions in social cohesion. Therefore, the quality of life of people decreases, and after that people leave their homes and migrate to other places. In addition, creating inequalities caused by environmental unsustainability in societies can also exacerbate social unsustainability (Vinthagen, 2013). Therefore, challenges such as class divisions, rising poverty levels, disagreements and conflicts among communities, natural disasters and environmental changes are signs of social unsustainability (Jabareen, 2015).

Due to the importance of natural resources, including water in the economic, social and environmental life of local communities, so far, numerous studies have been done directly and indirectly on droughts and social instabilities. Jülich (2011) has explored the effects of drought on the rural population in the state of India. It has come to the conclusion that as a result of the

drought, many villagers are temporarily migrating from the village. In fact, rural families have left their home and workplace to migrate to other places in order to cope with the effects of drought. Traore & Owiyo, (2013) examines drought-related damages in the north parts of Burkina Faso. The results of the research indicate that this area is very vulnerable to drought. In the aftermath of the drought, the livelihood of the people has been lost, and many residents of this region have lost their jobs. The drought has initially led to a shortage of water, which has disrupted the irrigation of the products and reduced the yields of the products. As a result, access to food for people and animal has also been disturbed. Gleick (2014) has studied the impact of drought on water conflict in Syria. The findings suggest that climate change and drought in the country's villages led to water shortages and inefficient irrigation, resulting in conflict between people on water. All of this has had a huge impact on the movement and migration of people. Vins et al., (2015) investigated the psychological and mental health problems caused by drought on farmers. The results show that attention to the relationship between drought and mental health is very important. Because droughts can affect the mental health of farmers through issues such as reducing or losing family livelihoods, unemployment and reducing social protection. Among these mental health problems, we can point to mood disorders, violence and suicide in the United States. Arias et al. (2016) studied the impact of environmental changes and natural disasters on social crises. The results of this research show that one of the most important social challenges in different societies is the management of natural disaster risk and environmental change. In areas where environmental changes such as droughts and floods have occurred, social cohesion and social sustainability of communities have also encountered problems. katalakute et al. (2016) investigated drought-related injuries in one of the states of India. The results of the study showed that with increasing drought severity, people migrate to urban places and other areas for finding employment facilities. In these areas, drought disrupts agricultural production. So that the balance between supply and demand disappears and leads to higher inflation. Also, after drought, the highest number of suicides has been reported in those states. Muyambo et al., (2017) investigated the social dangers of drought in a state in South Africa. The results of this study indicate that drought can have a significant effect in the formation of stress, mental and psychological illnesses. It also leads to undermining cultural values, changing lifestyles, reducing social dependency, and losing food security. De Silva & Kawasaki (2018) studied the impact of drought and flood on villagers' poverty in Sri Lanka. They conclude that those villagers whose livelihoods are highly dependent on natural resources are more vulnerable to drought. Farmers who have a high dependence on natural resources have suffered from severe poverty, and this has led to a sort of class gap in the rural community.

A total survey of studies has shown that most studies have focused more on socio-economic issues or that only one dimension of social impacts from droughts and water scarcity has been taken into consideration. But in the present study, we try to examine the various dimensions of social unsustainability caused by droughts and water shortages in villages and on villagers' lives. And eventually, tensions and social unsustainability, will be analyzed.

Based on previous studies, natural factors play a decisive role in the social development of societies. So that the dynamics of rural communities are strongly influenced by natural potential and social sustainability of villages which is directly related to natural potentials such as suitable soil, smooth land, desirable climate and running water, which ultimately provides a framework for strengthening social cohesion (Gautam, 2017). In general, environmental capabilities provide a proper basis for social development in societies (Coats et al., 1977). Because natural factors have increasing effects on the livelihoods of villagers and have always directly and indirectly affected the lives of villagers (Barbier, 2010). In some cases, environmental bottlenecks hamper the arena for villagers, create rural immigration and social unsustainability and threaten social cohesion in villages (Zahran et al., 2008). As previously mentioned, one of the most important environmental instabilities affecting the creation of tension, the challenge and unsustainability of local societies, is drought and also the reduction of sources which is one of the biggest results of it. Therefore, migration, distractions, conflict, poverty, and mental health damage (as a verifiable

social unsustainability) can be exacerbated by drought as a natural hazard (Malik, 2018).

**Drought and rural migration:** In general, immigration is a creeping phenomenon and its effects on villagers are happening step-by-step (Reuveny, 2007). In the first step, droughts reduce the food supplies in village, and with the prolongation of drought years, the effects of it increase and ultimately the last resort for villagers will be immigrant. (Tiscar et al., 2018). During the drought years, the motivation for the migration of the villagers is significantly increased; Indeed, we can say the most important and perhaps most convenient anti-drought response strategy for villagers against drought is immigration (Jülich, 2011). Droughts, through reducing soil fertility and desertification, leading to the migration of rural populations. Thus, during a severe period of drought, a village may lose its entire population. But it should be noted that for villagers who enters the city; At first, living conditions in the city will be encouraging, but over time, the social identity of the villagers and the urban social stability are threatened (UNESCO, 2015).

**Drought and Rising Rural Poverty:** The effects of drought on the lives of people in different regions, including rural places have various aspects; Because people in some areas have more flexibility than other areas. Usually people who are less capable of adapting to the drought phenomenon may suffer extreme poverty as a result of drought (Fujii, 2016). After drought, families whose livelihoods are more dependent on natural resources (e.g, agriculture, livestock, etc.) often confront several problems and their income will be reduced and also they find it difficult to meet the needs of their families (Barua et al., 2014; Leichenko and Silva, 2014). In this situation, due to water shortages, some agricultural land will be uncultivated, which will result in job losses in the rural places. As a result, poverty is aggravated in rural areas and the number of poor villager's increases (Alam, 2017).

**Drought and local conflict:** Some analysts claim that drought-related factors, such as water scarcity and failure in agriculture, play an important role in destroying social structures, provoking domestic violence and conflict between villagers (Femia and Werrell 2013; FAO 2012) In particular, when several severe drought periods occur, products and economic returns will be reduced which leading to conflicts and serious problems in rural areas. These factors often help to increase unemployment and economic disturbances and social chaos (Gleick, 2014).

**Drought and Health Damages:** Drought affects human health in many ways. In fact, drought has a very important impact on human health (Dinkelman, 2015). Droughts all over the world have a major negative impact on human health. These effects are related to nutrition, respiratory diseases caused by suspended ingredients and effects on mental health (Stanke et al., 2013; Vins et al., 2015). One of the most important negative effects that drought can have on human health is the impact on mental health (Edwards et al., 2015). Considering that the negative financial effects of drought have the greatest impact on farmers, (Edwards et al., 2009) Therefore, it can be said that some farmers are losing their jobs as a result of drought. The mental health of this group is most affected by drought. (Edwards et al., 2015). In fact, the drought-induced unemployment stress has a profound negative effect on the mental health of farmers (Petkova et al., 2017). Also, in drought conditions, there is limits in access to freshwater which lead to diseases that endanger the health of individuals (Kim et al., 2014).

Accordingly, social unsustainability caused by droughts and water shortages in the dry and semi-arid parts of the world is becoming a major challenge. Accordingly, identifying the type of tensions and social damages associated with drought and water scarcity as environmental unsustainability is one of the most important issues that we have addressed in this study.

## 3. Research Methodology

### *3.1 Geographical Scope of the Research*

Based on the purpose of the study and the research questions, in the next step for the operationalization of the study, the sample area was selected in order to analyze and determine the statistical society. Mian Jolge is one of the parts of the city of Neyshabur in Khorasan Razavi province. In almost all villages in the study area, most people's income is from farming, gardening and animal husbandry. As the region has a warm and dry climate, the problem of water scarcity and the increasing need for this life resource in the rural areas of this city become more acute and more sensitive each and every day. Due to the large number of villages in this city and because the

economy of most villages is dependent on water and land; the growing population and rising demand for water, and the recent occurrence of droughts in recent years has expanded the problem of water scarcity in rural areas of this city. Accordingly, the sample population includes farmers and gardeners residing in 9 villages in the Mian Jolge division, which is often confront with the problem of drought. In order to determine the size of the sample population, firstly, the number of reported disagreement among farmers about water supplies was collected according to Table 1. Then, due to the fact that in the Mian Jolge, the number of these differences is more than the other sections, so the villages of this section were selected as the study area.

**Table 1. Number of disagreements over water in 2018**
Source: Archives of Police in Neyshabur, 2018

| Rural section | The number of disagreements |
|---|---|
| Zebarkhan | 40 |
| Sarvelat | 25 |
| Markazi | 30 |
| Mian jolge | 53 |

To determine the sample size of the villages of the Mian Jolge section according to population, first, according to Table 2, villages were divided into 3 classes, then from each section the place with highest population was selected. In the following, using Cochran method and based on error 0.1, 94 samples were selected for study and distributed among the villages. In villages where the number of samples was less than 10, at least 10 samples were added to increase the power of the extending the results. So, in the whole study, 121 farmers were interviewed. Therefore, for collecting questionnaires, random-stratified sampling method was used (Table 2).

**Table 2. Village classification and sample size**
Source: Statistics Center of Iran, 2018

| Percentage of the total village population | The number of samples | population | The name of village | The number of villages in each class | Classification of villages based on their population |
|---|---|---|---|---|---|
| 3.37 | 10 | 297 | Maroos | 20 | 100- 300 |
| 3.85 | 10 | 260 | Eshrat Abad | | |
| 3.94 | 10 | 254 | Dehno | | |
| 2.04 | 10 | 489 | Golshan | 20 | 301-600 |
| 1.99 | 10 | 503 | Samadie | | |
| 2.99 | 10 | 335 | Pirgaz | | |
| 1.40 | 34 | 2421 | Ardame | 26 | +601 |
| 1.36 | 14 | 1031 | Raeesi | | |
| 1.33 | 13 | 978 | Fath Abad | | |
| 1.82 | 121 | 6568 | 9 | 66 | Total |

Data collection was done through a researcher made questionnaire with 64 questions in terms of Likert spectrum and based on identified indicators. the questionnaire was designed based on variables and it was pre-tested by several experienced experts and also it was edited according to their corrective comments. In order to reach the reliability of the questionnaire Cronbach's alpha coefficient was used, which is 0.835 for the whole questionnaire. Therefore, the reliability of the questionnaire in this research is high, which indicates its trustiness. In the process of analyzing the data, Shannon's entropy model was used to determine the weight of the indicators (Shannon, 1948) and the VIKOR multi-criteria model was used for ranking the villages (Huang et al, 2009) in terms of social unsustainability. Also, SPSS and single-sample t-tests, correlation and regression were also used for statistical analyzes. It should be noted that in this study, we have encountered some restrictions on the dispersal of samples at the district, like the weakness of information and administrative data about the social disparities and tensions between villagers due to drought and water scarcity.

***3.2. Methodology***

This study is descriptive-analytic and the purpose of this study is practical. This research seeks to

identify and investigate the drought tensions and social damages in rural areas of Neyshabur. Therefore, based on our research question, we can provide the following hypothesis:

**Hypothesis 1**: There is a correlation between the social tensions in the studied villages with the problem of water shortages and droughts.

**Hypothesis 2**: Water shortage and drought affect the creation and exacerbation of tension and social damage in rural environments.

To achieve the purpose and assumptions of this study, data and information were collected from library and field practices methods. The theoretical part of the study was conducted based on library and documentary methods. So, based on review of theoretical literature, and also for studying the problem in the study area, 24 items have been identified to measure the tensions and social damages caused by drought and water scarcity in the studied area (Table 3). Independent variable of the research includes the levels of water loss through drought that the average of size of water loss in each village was obtained from the local management, and dependent variable is tensions and social damages of villagers. Therefore, the independent variable in the whole study was considered as a representation of environmental changes and the dependent variable as social unsustainability. In the analytical section, data was collected through interviews and questionnaires.

**Table 3. Variables for assessing tensions and social damages caused by droughts and water scarcity**
Sources: Alston & Kent, 2004; Leichenko & Silva, 2014; Gray & Mueller, 2012; Horton et al, 2010; Stain et al, 2011

| **Indicators** | |
|---|---|
| Decreasing the level of income satisfaction | Increasing the motivation to migrate from rural areas |
| intensification of contrast and conflicts among villagers | Feeling of inequality in facilities and distribution of supportive loans among the villagers |
| Reducing the interest of youth in living in the countryside | The attitude and tendency of villagers towards inappropriate and false jobs |
| Creation and intensification of issues in the family of farmers | Reducing the level of traditional beliefs and trust in society |
| Reducing interactions and cooperation among villagers | Increasing psychological damages in farmers |
| increasing poverty in rural areas | Destruction of small cultivation and agricultural activities |
| Decreasing the feeling of belonging to the place and durability and persistence of villagers | Despair about the future |
| Reducing the level of health | Reducing social cohesion among villagers |
| Reduction in the amount of rural producers | Reducing the level of happiness and welfare |
| Increasing the population who are under the protection of supportive organizations | Public dissatisfaction toward governmental section |
| Increasing unemployment and reducing job opportunities | Reducing in the level of entertainment and leisure time |
| Competition for accessing water resources among villagers | Increasing living expenses |

## 4. Research Findings

Descriptive findings show that 40% of respondents aged 41 to 50 years old and 47% have graduate degrees. Also, the annual income of 32% of the respondents is 12-20 million, and 81% of respondents do not have income from horticultural activities. Also, 42% of respondents stated that the average annual income from farming activities was $ 600 to $ 1,200. 35% of the respondents did not have rain fed land and 45.5% of the respondents had 3-5 hectares of lands with water supplies. According to the study cases, due to recent droughts, the amount of rain fed lands has fallen sharply. 99% of respondents also pointed out that over the past 10 years, the level of groundwater used to irrigate their products has fallen around 10 to 30 meters. Also, due to the survey results, the number of water disagreements among the studied samples in the study area showed that 44% of respondents stated that there have been at least 3-5 discords between villagers. Of course, it should be noted that little disagreements about water resources in the village, with the intervention of elders and other rural residents, are solved (Table 4).

**Table 4. Descriptive findings of the research**

| percentage | Frequency | Most responsive | Component |
|---|---|---|---|
| 40 | 48 | 41-50 years old | Age |
| 47 | 57 | Graduated from high school | Education level |
| 32 | 39 | 12-20 million | Average income from agriculture |
| 81 | 98 | Don't have | average income from gardening |
| 42 | 51 | 6-12 million | Average income from nonagricultural productions |
| 45.5 | 55 | 3-5 hectares | The level of lands with water supplies |
| 35 | 42 | Don't have | The level of rain fed lands |
| 45 | 54 | 1-5 people | The amount of people who have migrate |
| 99 | 120 | Between 10-30 meters | the level of reduction in underground water |
| 44 | 54 | 3-5 times | The number of disagreements about water |
| 65 | 78 | Don't have | Having legal record |

In the following, we investigate 24 social unsustainability instances that can be caused by drought and water scarcity. According to Table 5, the results show that the average of the 22 indexes is higher than the average of whole samples; it means that, all of these 22 cases became exacerbated by the occurrence of drought and can lead to social unsustainability in rural areas in the long periods. It can also be said that drought does not have much effect on reducing the level of health and reducing the rural productive population.

**Table 5. Evaluation of the quantity and quality of social unsustainability indicators of drought**

| indicators | Very low | low | avarage | high | Very high | avarage | Standard deviation |
|---|---|---|---|---|---|---|---|
| Increasing the motivation to migrate from rural areas | 6.6 | 9.9 | 43.8 | 19 | 20.7 | 3.37 | 1.12 |
| Feeling of inequality in facilities and distribution of supportive loans among the villagers | 1.7 | 5.8 | 26.4 | 38 | 28.1 | 3.85 | 0.95 |
| The attitude and tendency of villagers towards inappropriate and false jobs | 0 | 19.8 | 34.7 | 25.6 | 19.8 | 3.45 | 1.02 |
| Reducing the level of common beliefs and trustiness in society | 8.3 | 15.7 | 23.1 | 23.1 | 29.8 | 3.50 | 1.29 |
| Increased psychological damages in farmers | 0 | 4.1 | 14 | 50.4 | 31.4 | 4.09 | 0.78 |
| Destruction of small cultivation and small agricultural activity | 0 | 4.1 | 32.2 | 21.5 | 42.1 | 4.01 | 0.95 |
| Despair of the future | 0 | 5.8 | 26.4 | 33.1 | 34.7 | 3.96 | 0.92 |
| Reducing social cohesion among villagers | 5.8 | 11.6 | 19.8 | 41.3 | 21.5 | 3.61 | 1.12 |
| Reducing the level of happiness and welfare | 5 | 9.1 | 17.4 | 38 | 30 | 3.80 | 1.12 |
| Public dissatisfaction against governmental sector | 0.8 | 3.3 | 9.1 | 55.4 | 31.4 | 4.13 | 0.77 |
| Reducing recreation and leisure time | 0 | 5.8 | 21.5 | 21.0 | 51.2 | 4.18 | 0.96 |
| Increasing living expenses | 2.5 | 4.1 | 39.7 | 24 | 29.8 | 3.74 | 1.01 |
| Decreasing in income satisfaction | 8.3 | 11.6 | 28.1 | 26.4 | 25.6 | 3.49 | 1.22 |
| Exacerbation of conflicts and disagreements among villagers | 13.2 | 18.2 | 22.3 | 41.3 | 6 | 4.18 | 0.97 |
| Reducing the interest of youth in living in the rural places | 6.6 | 25.6 | 33.9 | 33.9 | 0 | 3.95 | 0.93 |
| Creation and intensification of issues in the family of farmers | 14.1 | 15.7 | 45.4 | 12.4 | 12.4 | 3.11 | 1.10 |
| Reducing interactions and cooperation among villagers | 0.8 | 0.8 | 20.7 | 43.8 | 33.9 | 4.09 | 0.80 |
| increasing poverty in rural areas | 0 | 4.1 | 26.4 | 32.2 | 37.2 | 4.02 | 0.89 |
| Decreasing the feeling of belonging to the place and durability and persistence of villagers | 7.4 | 10.8 | 43 | 23.2 | 15.7 | 3.57 | 1.07 |
| Reducing the level of health | 45.5 | 30.6 | 14.9 | 8.3 | 0.8 | 1.44 | 0.51 |

| indicators | Very low | low | avarage | high | Very high | avarage | Standard deviation |
|---|---|---|---|---|---|---|---|
| Reduction in the amount of rural producers | 10.7 | 35.5 | 22.3 | 20.7 | 10.7 | 2.87 | 1.18 |
| Increasing the population who are under the protection of supportive organizations | 7.4 | 5.8 | 19 | 31.4 | 36.4 | 3.83 | 1.19 |
| Increasing unemployment and reducing job opportunities | 1.7 | 11.5 | 28.9 | 47.9 | 9.9 | 3.78 | 0.83 |
| Competition for accessing water resources among villagers | 4.1 | 3.3 | 22.3 | 52.9 | 17.4 | 3.76 | 0.92 |

Also, although the data and information were normal, t-test, which was a theoretical average of 3, was used to compare the gotten averages (Table 6). The results of the test indicate that the significance level of all indices except for the two indicators of reducing the level of health and reducing the population of rural producers is less than 0.05. It can be said that drought and water scarcity affect all indices of research except for reducing the level of health and reducing the rural population. Therefore, it can be said that drought as an agent of environmental unsustainability can affect social unsustainability indices.

**Table 6. Single sample t-test for indicators**

| Indicators | T | Sig. | Mean Difference | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| Increasing the motivation to migrate from rural areas | 3.656 | 0.000 | 0.372 | 0.171 | 0.573 |
| Feeling of inequality in facilities and distribution of supportive loans among the villagers | 13.461 | 0.000 | 1.099 | 1.260 | 0.938 |
| The attitude and tendency of villagers towards inappropriate and false jobs | 4.880 | 0.000 | 0.454 | 0.270 | 0.639 |
| Reducing the level of common beliefs and trustiness in society | 4.293 | 0.000 | 0.504 | 0.271 | 0.737 |
| Increasing psychological damages in farmers | 15.281 | 0.000 | 1.09 | 0.949 | 1.232 |
| Destruction of small cultivation and small agricultural activity | 11.681 | 0.000 | 1.016 | 0.844 | 1.189 |
| Despair of the future | 11.544 | 0.000 | 0.967 | 0.801 | 1.133 |
| Reducing social cohesion among villagers | 6.002 | 0.000 | 0.612 | 0.410 | 0.813 |
| Reducing the level of happiness and welfare | 7.855 | 0.000 | 0.801 | 0.599 | 1.003 |
| Increasing Public dissatisfaction against governmental sector | 16.092 | 0.000 | 1.132 | 0.992 | 1.272 |
| Reducing recreation and leisure time | 13.456 | 0.000 | 1.182 | 1.007 | 1.356 |
| Increasing living expenses | 8.080 | 0.000 | 0.744 | 0.562 | 0.926 |
| Decreasing in income satisfaction | 4.451 | 0.000 | 0.496 | 0.275 | 0.717 |
| Exacerbation of conflicts and disagreements among villagers | 9.234 | 0.000 | 0.818 | 0.993 | 0.643 |
| Reducing the interest of youth in living in the rural places | 33.148 | 0.000 | 0.049 | 0.217 | 0.118 |
| Creation and intensification of issues in the family of farmers | 12.148 | 0.000 | 0.116 | 0.083 | 0.315 |
| Reducing interactions and cooperation among villagers | 14.884 | 0.000 | 1.091 | 0.946 | 1.236 |
| increasing poverty in rural areas | 12.543 | 0.000 | 1.024 | 0.863 | 1.187 |
| Decreasing the feeling of belonging to the place and durability and persistence of villagers | 5.857 | 0.000 | 0.570 | 0.378 | 0.763 |
| Reducing the level of health | 0.587 | 0.558 | 0.533 | 0.346 | 0.468 |
| Reduction in the amount of rural producers | 1.378 | 0.171 | 0.148 | 0.362 | 0.065 |
| Increasing the population who are under the protection of supportive organizations | 7.654 | 0.000 | 0.835 | 0.619 | 1.05 |
| Increasing unemployment and reducing job opportunities | 10.328 | 0.000 | 0.785 | 0.634 | 0.936 |
| Competition for accessing water resources among villagers | 9.096 | 0.000 | 0.760 | 0.594 | 0.926 |

The findings of the study and analyzing correlation between drought-induced water shortage and disagreement between villagers over water show that there is a significant relationship between variables at alpha-0.05 level. Therefore, with decreasing water in rural areas, the conflict and

disagreement over water among villagers has been increased (Table 7).

**Table 7. Relationship between drought-induced water deficit and the water deficit index**

| Indicators | Pearson correlation | Significance level |
|---|---|---|
| Disagreement with neighbors about water shortage | 0.764* | 0.01 |

*Correlation is significant at the 0.05 level (2-tailed)

In the following, due to the normal distribution of data, Pearson test has been used to investigate the correlation between water scarcity deduced from drought and social unsustainability indexes. The results show that there is a significance level between the groundwater deficit and the indexes of reducing the level of health and reducing the rural population, upper than alpha-0.05. Therefore, the findings indicate that there is a significant relationship between groundwater reduction and other indicators presented in the table. Indeed, with happening groundwater loss as an environmental unsustainability, social unsustainability will happen too. Therefore, the first hypothesis of the research is confirmed (Table 8).

**Table 8. The Relationship between Drought Water Deficit and Social Unsustainability Indicators in Villages**

| Indicators | Pierson correlation | Significance level |
|---|---|---|
| Increasing the motivation to migrate from rural areas | 0.863 | 0.003 |
| The attitude and tendency of villagers towards inappropriate and false jobs | 0.915 | 0.001 |
| Reducing the level of common beliefs and trustiness in society | 0.754 | 0.019 |
| Increasing psychological damages in farmers | 0.769 | 0.015 |
| Destruction of small cultivation and small agricultural activity | 0.924 | 0.000 |
| Despair of the future | 0.734 | 0.024 |
| Reducing social cohesion among villagers | 0.790 | 0.011 |
| Reducing the level of happiness and welfare | 0.792 | 0.010 |
| Increasing Public dissatisfaction against governmental sector | 0.727 | 0.027 |
| Increasing living expenses | 0.934 | 0.000 |
| Decreasing in income satisfaction | 0.826 | 0.006 |
| Exacerbation of conflicts and disagreements among villagers | 0.707 | 0.033 |
| Reducing interactions and cooperation among villagers | 0.829 | 0.006 |
| increasing poverty in rural areas | 0.932 | 0.000 |
| Increasing the population who are under the protection of supportive organizations | 0.684 | 0.042 |
| Increasing unemployment and reducing job opportunities | 0.753 | 0.019 |
| Competition for accessing water resources among villagers | 0.804 | 0.009 |
| Feeling of inequality in facilities and distribution of supportive loans among the villagers | 0.713 | 0.030 |
| Reducing the interest of youth in living in the rural places | 0.893 | 0.001 |
| Decreasing the feeling of belonging to the place and durability and persistence of villagers | 0.675 | 0.040 |
| Creation and intensification of issues in the family of farmers | 0.906 | 0.001 |
| Reducing recreation and leisure time | 0.890 | 0.000 |
| Reducing the level of health | 0.064 | 0.871 |
| Reduction in the amount of rural producers | 0.187 | 0.629 |

### *4.1. Analysis of the effects of water shortage deduced from drought on social unsustainability in rural places*

Single variable regression was used to explain and analyze the effects of drought-induced water shortages on social unsustainability. As shown in Table 9, correlation coefficient and modified coefficient of determination between groundwater reduction as an indicator of environmental unsustainability and social unsustainability indicators presented in the research are higher than 0.50.

**Table 9. Correlation coefficient between variables of drought-induced water deficit with rural social unsustainability**

| Model Summary | | | | |
|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** |
| 1 | .984 | .968 | .963 | .085 |

Also, the results of single-variable regression test showed that the significance level was smaller than alpha-0.05. Therefore, it can be said that there is a meaningful linear relationship between the drought-induced water deficit variable and social unsustainability. Therefore, the findings of this study indicate that water shortage and drought have had an impact on the creation and exacerbation of tension and social damage in rural environments and among villagers in the studied area. Therefore, it can be said that the second hypothesis of the research is accepted (Table 10).

**Table 10. Significance level of drought-induced water shortage with rural unsustainability**

| ANOVA[a] | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| 1 | Regression | 1.505 | 1 | 1.505 | 208.543 | .000 |
| | Residual | .051 | 7 | .007 | | |
| | Total | 1.556 | 8 | | | |

Table 11 also explains the impact of the independent variable (water deficit caused by drought) on social unsustainability. Therefore, considering the obtained beta values, social unsustainability in the studied villages occur more than 60 percent as a result of the occurrence of drought.

**Table 11. The Effectiveness of Water Deficit deduced from drought on Social Unsustainability in Villages**

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
| | | **B** | **Std. Error** | **Beta** | | |
| 1 | (Constant) | .714 | .214 | | 3.338 | .012 |
| | Social Unsustainability | .923 | .064 | .984 | 14.441 | .000 |

In order to rank the villages in terms of social unsustainability, VIKOR multi-factor model was used to determine the difference between the studied villages in terms of social tensions and social instabilities. It should be noted that the weight of the using indicators was also determined by the Shannon entropy method based on the opinions of 17 experts (Table 12).

**Table 12. Weight of research indicators**

| **Indicators** | **$h_i$** | **$d_i$** | **$w_i$** |
|---|---|---|---|
| Increasing the motivation to migrate from rural areas | 0.997 | 0.003 | 0.013 |
| The attitude and tendency of villagers towards inappropriate and false jobs | 0.992 | 0.008 | 0.037 |
| Reducing the level of common beliefs and trustiness in society | 0.994 | 0.006 | 0.029 |
| Increasing psychological damages in farmers | 0.991 | 0.009 | 0.038 |
| Destruction of small cultivation and small agricultural activity | 0.989 | 0.011 | 0.051 |
| Despair of the future | 0.991 | 0.009 | 0.038 |
| Reducing interactions and cooperation among villagers | 0.991 | 0.009 | 0.040 |
| Reducing the level of happiness and welfare | 0.994 | 0.006 | 0.027 |
| Increasing Public dissatisfaction against governmental sector | 0.990 | 0.010 | 0.045 |
| Increasing living expenses | 0.997 | 0.003 | 0.013 |
| Decreasing in income satisfaction | 0.995 | 0.005 | 0.021 |
| Exacerbation of conflicts and disagreements among villagers | 0.988 | 0.012 | 0.053 |
| Reducing interactions and cooperation among villagers | 0.989 | 0.011 | 0.047 |
| increasing poverty in rural areas | 0.991 | 0.009 | 0.041 |

| Indicators | $h_i$ | $d_i$ | $w_i$ |
|---|---|---|---|
| Increasing the population who are under the protection of supportive organizations | 0.983 | 0.017 | 0.074 |
| Increasing unemployment and reducing job opportunities | 0.996 | 0.004 | 0.017 |
| Competition for accessing water resources among villagers | 0.993 | 0.007 | 0.029 |
| Feeling of inequality in facilities and distribution of supportive loans among the villagers | 0.994 | 0.006 | 0.027 |
| Reducing the interest of youth in living in the rural places | 0.994 | 0.006 | 0.029 |
| Decreasing the feeling of belonging to the place and durability and persistence of villagers | 0.989 | 0.011 | 0.050 |
| Creation and intensification of issues in the family of farmers | 0.991 | 0.009 | 0.040 |
| Reducing the level of happiness and welfare | 1.000 | 0.000 | 0.002 |
| Reducing the level of health | 0.948 | 0.052 | 0.232 |
| Reducing the productive population in rural places | 0.994 | 0.006 | 0.029 |

Note. $h_i$: entropy; $d_i$: degree of diversification; $w_i$: indicators' standard weight.

The results from the ranking of villages indicate that the village of Maroos and the village of Samadiyah ranked in first and second places in terms of social unsustainability. In fact, it can be concluded that in these two villages, drought as an environmental unsustainability has the greatest impact on social unsustainability and has shaped many tensions and social damage (Table 13).

**Table 13. Ranking of studied villages in terms of the severity of social unsustainability caused by droughts**

| villages | s | R | S- | S+ | R- | R+ | Q | Rank |
|---|---|---|---|---|---|---|---|---|
| Maroos | 0.24 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1 |
| Eshrat Abad | 0.42 | 0.23 | 0.27 | 0.14 | 0.98 | 0.49 | 0.63 | 5 |
| Dehno | 0.45 | 0.23 | 0.31 | 0.16 | 1.00 | 0.50 | 0.66 | 4 |
| Golshan | 0.27 | 0.08 | 0.04 | 0.02 | 0.25 | 0.12 | 0.14 | 8 |
| Samadiyeh | 0.73 | 0.17 | 0.75 | 0.37 | 0.66 | 0.33 | 0.70 | 2 |
| Pirgaz | 0.47 | 0.23 | 0.35 | 0.17 | 1.00 | 0.50 | 0.67 | 3 |
| Ardame | 0.39 | 0.23 | 0.23 | 0.11 | 0.97 | 0.49 | 0.60 | 6 |
| Raeeisi | 0.89 | 0.20 | 1.00 | 0.50 | 0.85 | 0.43 | 0.93 | 9 |
| Fath Abad | 0.42 | 0.21 | 0.27 | 0.13 | 0.86 | 0.43 | 0.56 | 7 |

Overall, it can be said that the study of the mentioned issue in the studied area shows that in recent years, due to the occurrence of drought, rural farmers who do not have any share from the water of aqueduct, have been digging deep wells for accessing to water. This has led to a reduction in the water of the aqueducts and has led to a disagreement between the owners of the wells and the shareholders of the rural aqueduct. Also, through recent drought, the relevant government agencies have set a certain amount for each rural farmer to control and manage water collecting from wells by farmers. In case of using more water than the quota Farmers will be fined. In some villages, this causes conflict and struggles between villagers. Because in some cases, farmers who take more than the decisive amount will be introduced by other villagers to the relevant organization. This is another factor in the conflict between the villagers. Another government's strategies for managing water resources and controlling groundwater loss is to sale excess water to farmers. If the villagers need more water to irrigate their fields, they should buy water by paying a large amount of money. This has led to a severe increase in water competition. Also, in certain seasons of the year, using the water of rural wells is prohibited for villagers, which is determined without consultation with them and the lack of attention to the irrigation season of certain products in each village has also led to villagers' dissatisfaction. Considering the problem of water shortages caused by droughts in the area, wells constructed in recent years, compared with the wells created several years ago, have fewer water permits. Therefore, inequalities in groundwater harvesting for agriculture also cause disparities and tensions between villagers. On the other hand, drought has also led to a change in agricultural patterns and time of cultivation

among some farmers. so, some farmers in the villages of the region are trying to save their agricultural water quota in spring and summer and use it for the autumn and winter crop. But during using stored water, irregularities in water quotas happened and it became another factor in the formation of tension and challenge among the villagers.

## 5. Discussion and Conclusion

Drought is one of the natural hazards that can be seen in different climates and can have many effects. The continuation and intensification of the drought period can affect the level of unemployment and job losses, increasing conflict and struggles over the water, dissatisfaction with government agencies, causing psychological damage such as stress, rural migration and other social problems. Therefore, drought as an environmental unsustainability can have the greatest impact on rural communities whose lives are directly related to environmental resources such as water. Therefore, we analyzed the social stress deduced from drought in rural areas in this study. The results of one-sample t-test indicated that the level of significance of all social unsustainability indicators, except for two indicators of reducing the level of health and reducing rural population, has been less than α-0.05, And so other indicators of social unsustainability have been exacerbated by droughts and the water shortages deduced from that. The two indicators of reducing the level of health and reducing the rural population have not been affected by environmental unsustainability. Because in recent years the health of the villages in Iran has been given special attention and in many villages there is a facilitated home for health care in each village. Therefore, it can be said that the drought has not have any role in the decreasing the level of health in rural places. Also, since villagers are not specialized in other fields except agricultural and animal husbandry, Therefore, even if the conditions are not appropriate, they are forced to do these activities. Another reason to point out in this regard is that crops are usually divided among the children of the family according to the law of inheritance in Iran, which also leads to an increase in the rural producer's quantity. The results of Pearson correlation also showed that the significance level of reducing health level in rural places and decreasing rural population was higher than alpha-0.05. Therefore, these two indicators are not affected by drought unsustainability. However, the significance level of other indicators was less than alpha-0.05, which indicates the relationship between environmental unsustainability aggravation deduced from drought with social unsustainability indices. In Pearson correlation, the indicators of increasing poverty in rural areas (0.932), increasing living expenses (0.931), and the destruction of small cultivation and small agricultural activities (0.924) have the highest correlation coefficient with water shortage due to drought in the studied villages. Also, according to the results of the regression test, it can be said that all 22 social unsustainability indicators affected by water shortages due to drought as an environmental unsustainability. Based on this test, poverty reduction indices in rural areas with a correction coefficient of 0.869, increasing in living expenses with a correction coefficient of 0.867, and the destruction of small crops and agricultural works with a modified coefficient of 0.853 have the most impact from water shortages deduced from drought. Also, the village-based ranking on the basis of the VIKOR model indicates that in the village of Maroos, social unsustainability indicators have had the greatest impact from environmental unsustainability. In fact, in comparison with other villages, this village is the most unstable one in social situation. And Raeisi Village in terms of social status is in more stable conditions than other villages. In general, environmental unsustainability in this village has had less impact on the rise of social unsustainability indicators. Generally, it can be admitted that drought as an environmental unsustainability has a significant negative effect on the social unsustainability of rural communities. Therefore, we can generally say that our research results are consistent with the results of studies conducted by researchers such as Vins et al. (2015) and De Silva & Kawasaki (2018). Generally speaking, due to the results of research in the study area, it can be said that the occurrence of long-term droughts in rural areas can be directly affect the reduction of rural income, rising unemployment, decreasing job opportunities and eventually exacerbating poverty in these areas. In the event of these problems, villagers prefer to migrate to urban areas in order to achieve better living conditions. In general, the aggravation of poverty and its consequences as a result of drought, with the findings obtained in the research of Katalakute et al. (2016) is convergent. Also, according to the results, another major drought effect in rural areas is the increase in living costs. so, the persistence of droughts leads to a reduction in income and unemployment in the villages, which in the long term can be a problem for the villagers in their livelihood costs. These factors, therefore, increase social tensions that lead to multiple

tensions in rural areas, including tensions that can be attributed to increase family issues among farmers as a result of rising living costs. Another result of the drought occurrence in the villages is the disappearance of small crops (especially rain forest lands), whose irrigation is strongly dependent on annual rainfall. Field study indicates that in many studied villages, the decline in groundwater levels and the decrease in access to water resources by villagers has been one of the factors influencing the destruction of small crops. All of this things have great effect on the intensification of competition for access to more water and also in increasing rural dissatisfaction against government agencies. Also, as it has been mentioned through disappearing small crops and the reduction in crop yields due to reduction in rain levels and water loss throughout the year, it can have a great impact on appearing psychological illnesses, including stress, according to the research of Muyambo et al., (2017). As a result, it can be admitted that one of the important effects of exacerbating environmental instabilities, especially droughts in rural environments, is to reduce the quality of life of villagers and increasing dissatisfaction in different fields. Hence, some of the suggestions that can be offered to deal with social instabilities include:

- Provide government facilities and services to reduce the cost of living of villagers and also reduce the pressure of villagers on environmental resources, especially groundwater;
- Facilitate how to receive support loans in the field of agricultural by villagers;
- Avoid digging deep wells that are unlicensed;
- More attention of government agencies to villages that suffer from social and environmental instability more than other villages such as Maroos and Samadiyeh.

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**Authors' contributions**

The authors equally contributed to the preparation of this article**.**

**Conflict of interest**

The author declare no conflict of interest.

**References**

1. Adger, W. N. (2006). Vulnerability. *Global environmental change*, *16*(3), 268-281. https:// doi.org/ 10.1016/j.gloenvcha.2006.02.006
2. Åhman, H. (2013). Social sustainability–society at the intersection of development and maintenance. *Local Environment*, *18*(10), 1153-1166. https://doi.org/10.1080/13549839.2013.788480
3. Alam, G. M. (2017). Livelihood cycle and vulnerability of rural households to climate change and hazards in Bangladesh. Environmental management, 59(5), 777-791. https://doi.org/10.1007/s00267-017-0826-3.
4. Alston, M., & Kent, J. (2004). Social impacts of drought. *Centre for Rural Social Research, Charles Sturt University, Wagga Wagga, NSW*.
5. Archives of Police in Neyshabur, (2018). The number of disagreements in Neyshabur County. Razavi Khorasan Province, Iran.
6. Arias, P. A., Villegas, J. C., Machado, J., Serna, A. M., Vidal, L. M., Vieira, C., ... & Mejía, Ó. A. (2016). Reducing social vulnerability to environmental change: Building trust through social collaboration on environmental monitoring. *Weather, Climate, and Society*, *8*(1), 57-66. https://doi.org/10.1175/WCAS-D-15-0049.1.
7. Armenski, T., Stankov, U., Dolinaj, D., Mesaroš, M., Jovanović, M., Pantelić, M., & Ćosić, Đ. (2014). Social and economic impact of drought on stakeholders in agriculture. *Geographica Pannonica*, 18(2), 34-42. https://doi.org/10.5937/GeoPan1402034A
8. Barbier, E. B. (2010). Poverty, development, and environment. *Environment and Development Economics*, 15(6), 635-660. https://doi.org/10.1017/S1355770X1000032X
9. Barua, A., Katyaini, S., Mili, B., & Gooch, P. (2014). Climate change and poverty: building resilience of rural mountain communities in South Sikkim, Eastern Himalaya, India. *Regional environmental change*, 14(1), 267-280. https://doi.org/10.1007/s10113-013-0471-1
10. Basher, R. (2006). Global early warning systems for natural hazards: Systematic and people-centred. *Philos. Trans. Roy. Soc.*, 364A, 2167–2182, https://doi.org/10.1098/rsta.2006.1819.
11. Berry, H., Kelly, B., Hanigan, I., McMichael, A., Welsh, J., & Kjellstrom, T. (2008). *Rural mental health impacts of climate change*. paper commissioned for the Garnaut Climate Change Review (interim report to the Australian, state and territory governments of Australia), Garnaut Review Secretariat, Melbourne.

12. Brooks, N., Adger, W.N., & Kelly, P.M. (2005). The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change* 15: 151–163. https://doi.org/10.1016/j.gloenvcha.2004.12.006
13. Ceccarelli, S., & Grando, S. (2004). Drought as a challenge for the plant breeder. *Plant growth regulation*, *20*(2), 149-155. https://doi.org/10.1007/BF00024011
14. Coates, B., Johnston, J., & Knox, P. (1977). *Geography and inequality*. oxford university press.
15. De Silva, M. M. G. T., & Kawasaki, A. (2018). Socioeconomic Vulnerability to Disaster Risk: A Case Study of Flood and Drought Impact in a Rural Sri Lankan Community. *Ecological Economics*, *152*, 131-140. https://doi.org/10.1016/j.ecolecon.2018.05.010
16. Dinkelman, T. (2015). *Long run health repercussions of drought shocks: Evidence from South African homelands* (No. w21440). National Bureau of Economic Research. https://doi.org/10.1111/ecoj.12361
17. Edwards, B., Gray, M., & Hunter, B. (2009). A sunburnt country: The economic and financial impact of drought on rural and regional families in Australia in an era of climate change. *Australian Journal of Labour Economics*, 12, 109–131. http://hdl.handle.net/1885/51134
18. Edwards, B., Gray, M., & Hunter, B. (2015). The impact of drought on mental health in rural and regional Australia. *Social Indicators Research*, *121*(1), 177-194. https://doi.org/10.1007/s11205-014-0638-2
19. Eizenberg, E., & Shilon, M. (2016). Pedagogy for the new planner: Refining the qualitative toolbox. *Environment and Planning B: Planning and Design*, *43*(6), 1118-1135. https:// doi.org/ 10.1177/0265813515604477
20. *FAO. (*2000). New Dimension in Water Scarcity, Water Society and Ecosystem Service the 21st Century. *Food and Agricultural Organization of the United Nations*, Land and Water Development Division, Rome.
21. FAO. (2012). Syrian Arab Republic Joint Rapid Food Security Needs Assessment (JRFSNA). FAO Rep., 26 pp. [Available online at http://www.fao.org/giews/english/otherpub/JRFSNA_Syrian2012.pdf.
22. Femia, F., & Werrell, C. (2012). Syria: Climate change, drought and social unrest. *Center for Climate and Security*, 29, 2-5. https://climateandsecurity.org/wp/syria_climate-change_drought-and-social-unrest.pdf
23. Fontain, F. J., Wilcock, W. S., Foustoukos, D. E., & Butterfield, D. A. (2009). A Si-Cl geothermobarometer for the reaction zone of high-temperature, basaltic-hosted mid-ocean ridge hydrothermal systems. *Geochemistry, Geophysics, Geosystems*, *10*(5). https://doi.org/10.1029/2009GC002407
24. Fujii, T. (2016). Climate change and vulnerability to poverty: An empirical investigation in rural Indonesia. In *The Asian 'Poverty Miracle'* (pp. 118-146). Edward Elgar Publishing. https://doi.org/10.4337/9781785369155.00012
25. Gautam, D. (2017). Assessment of social vulnerability to natural hazards in Nepal. *Natural Hazards and Earth System Sciences*, *17*(12), 2313-2320. https://doi.org/10.5194/nhess-17-2313-2017
26. Gleick, P. H. (2014). Water, drought, climate change, and conflict in Syria. *Weather, Climate, and Society*, *6*(3), 331-340. https://doi.org/10.1175/WCAS-D-13-00059.1
27. Gray, C., & Mueller, V. (2012). *Drought and population mobility in rural Ethiopia*. World development, 40(1), 134-145. https://doi.org/10.1016/j.worlddev.2011.05.023
28. Griessler, E., & Littig, B. (2005). Social sustainability: a catchword between political pragmatism and social theory. *International Journal for Sustainable Development*, *8*(1/2), 65-79. https://nbn-resolving.org/ urn:nbn:de:0168-ssoar-5491
29. Hatef, B., Ghafari, A., Daneshkhah, SH., & Emani, R. (2009). Providing and Distributing Drinking Water in Rural Areas Due to Earthquake and Drought Crises with the Viewpoint of Fars Province Survey. *National Conference on Water Crisis Management*, Islamic Azad University of Marvdasht Branch, March 2009. [In Persian] https://www.sid.ir/FileServer/SF/1591388068.pdf
30. Hoekstra, A. Y., & Wiedmann, T. O. (2014). Humanity's unsustainable environmental footprint. *Science*, 344(6188), 1114-1117. https://doi.org/10.1126/science.1248365
31. Horton, G., Hanna, L., & Kelly, B. (2010). Drought, drying and climate change: emerging health issues for ageing Australians in rural areas. *Australasian Journal on Ageing*, 29(1), 2-7. https:// doi.org/ 10.1111/ j.1741-6612.2010.00424.x
32. http://jamejamonline.ir/online/1959620869374424291
33. https://www.mehrnews.com/news/2562086/700

34. https://www.yjc.ir/fa/news/5305345/
35. Huang, J. J., Tzeng, G. H., & Liu, H. H. (2009). A revised VIKOR model for multiple criteria decision making-The perspective of regret theory. In *Cutting-Edge Research Topics on Multiple Criteria Decision Making* (pp. 761-768). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-02298-2-112
36. Huppert, H. E., & Sparks, R. S. J. (2006). Extreme natural hazards: population growth, globalization and environmental change. *Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, *364*(1845), 1875-1888. https://doi.org/10.1098/rsta.2006.1803.
37. Jabareen, Y. (2015). "*The risk city"*: *Cities Countering Climate Change: Emerging Planning Theories and Practices around the World*. Springer: Dordrecht, the Netherlands.
38. Jülich, S. (2011). Drought triggered temporary migration in an East Indian village. *International Migration*, 49, 189-199. https://doi.org/10.1111/j.14682435.2010.00655.x
39. Katalakute, G., Wagh, V., Panaskar, D., & Mukate, S. (2016). Impact of Drought on Environmental, Agricultural and Socio-economic Status in Maharashtra State, India. *Natural Resources and Conservation*, 4(3), 35-41. https://doi.org/10.13189/nrc.2016.040301
40. Kim, K. H., Kabir, E., & Ara Jahan, S. (2014). A review of the consequences of global climate change on human health. *Journal of Environmental Science and Health, Part C*, *32*(3), 299-318. https:// doi.org/ 10.1080/10590501.2014.941279
41. Leichenko, R., & Silva, J. A. (2014). Climate change and poverty: vulnerability, impacts, and alleviation strategies. *Wiley Interdisciplinary Reviews: Climate Change*, 5(4), 539-556. https:// doi.org/ 10.1002/ wcc.287
42. Malik, A. (2018). The main driver of social unsustainability and its remedy. *International Journal of Social Economics*, *45*(6), 973-988. https://doi.org/10.1108/IJSE-01-2017-0005
43. Mawle, A. (2010). Climate change, human health, and unsustainable development. *Journal of public health policy*, 31(2), 272-277. https://doi.org/10.1057/jphp.2010.12
44. Mertz, O., Halsnæs, K., Olesen, J. E., & Rasmussen, K. (2009). Adaptation to climate change in developing countries. *Environmental management*, 43, 743–752. https://doi.org/10.1007/s00267-008-9259-3.
45. Mesgaran, B., & Azadi, P. (2018). *A national adaptation plan for water scarcity in Iran*. working paper 6, Stanford Iran 2040 project, Stanford University. Available from: https://watercm.ir/
46. Moench, M. (2002). Water and the potential for social unsustainability: livelihoods, migration and the building of society. In Natural Resources Forum (Vol. 26, No. 3, pp. 195-204). Oxford, UK and Boston, USA: Blackwell Publishers Ltd. https://doi.org/10.1111/0165-0203.00021
47. Muyambo, F., Jordaan, A. J., & Bahta, Y. T. (2017). Assessing social vulnerability to drought in South Africa: Policy implication for drought risk reduction. *Jàmbá: Journal of Disaster Risk Studies*, 9(1), 1-7. https://doi.org/10.4102/jamba.v9i1.326
48. O'Brien, K., Eriksen, S., Nygaard, L.P., & Schjolden, A. (2007). Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy* 7 (1): 73–88. https:// doi.org/ 10.1080/14693062.2007.9685639
49. Petkova, E. P., Celovsky, A. S., Tsai, W. Y., & Eisenman, D. P. (2017). Mental Health Impacts of Droughts: Lessons for the US from Australia. In *Climate Change Adaptation in North America* (pp. 289-304). Springer, Cham. https://doi.org/10.1007/978-3-319-53742-9_18
50. Reuveny, R. (2007). Climate change-induced migration and violent conflict. *Political geography*, 26(6), 656-673. https://doi.org/10.1016/j.polgeo.2007.05.001
51. Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal*, 27(3), 379–423. https://doi.org/10.1002/j.1538-7305.1948.tb01338.x
52. Stain, H. J., Kelly, B., Carr, V. J., Lewin, T. J., Fitzgerald, M., & Fragar, L. (2011). The psychological impact of chronic environmental adversity: Responding to prolonged drought. *Social Science & Medicine*, *73*(11), 1593-1599. https://doi.org/10.1016/j.socscimed.2011.09.016
53. Stanke, C., Kerac, M., Prudhomme, C., Medlock, J., & Murray, V. (2013). Health effects of drought: a systematic review of the evidence. *PLoS currents*, *5*. https:// doi.org/ 10.1371/ currents. dis. 7a2cee9e 980f91ad7697b570bcc4b004

54. Statistics Center of Iran, (2018). *Birth certificate of the settlements of the country, in 2018*. Tehran: Iran Statistics Center. Available from: https://www.amar.org.ir
55. Tiscar, P. A., Lucas-Borja, M. E., & Candel-Pérez, D. (2018). Lack of local adaptation to the establishment conditions limits assisted migration to adapt drought-prone Pinus Nigra populations to climate change. *Forest Ecology and Management*, 409, 719-728. https://doi.org/10.1016/j.foreco.2017.12.014
56. Traore, S., & Owiyo, T. (2013). Dirty droughts causing loss and damage in Northern Burkina Faso. *International Journal of Global Warming*, 5(4), 498-513. https://doi.org/10.1504/IJGW.2013.057288
57. Tresman, M. (2004). *Environmental Change Social Vulnerability and Conflict* (Doctoral dissertation, Master‟ s Thesis, LUMES, Lund University International, Sweden).
58. UNESCO. (2015). Socio-economic consequences of desertification. United Nation, Educational, Scientific and Cultural Organization. Available from: http://www.unesco.org/mab/doc/ekocd/chapter12.html
59. Vins, H., Bell, J., Saha, S., & Hess, J. J. (2015). The mental health outcomes of drought: a systematic review and causal process diagram. *International journal of environmental research and public health*, *12*(10), 13251-13275. https://doi.org/10.3390/ijerph121013251
60. Vinthagen, S. (2013). Ten theses on why we need a" Social Science Panel on Climate Change". *ACME: An international e-journal for critical geographies*, *12*(1), 155–176.
61. Wilhite, D. A., Svoboda, M. D., & Hayes, M. J. (2007). Understanding the complex impacts of drought: A key to enhancing drought mitigation and preparedness. *Water Resource Management*, (21), 763–774. https://doi.org/10.1007/s11269-006-9076-5
62. Wilhite, D. A. (2000). Drough a global assessment. *Planning for drought*, Vol. I: 131-144. http://digitalcommons.unl.edu/droughtfacpub
63. Wilhite, D. A., & Wood, D. (2001). Revisiting drought relief and management efforts in the West: have we learned from the past? *Journal of the West*, 40(3): 18-25. http:// digitalcommons. unl.edu/ droughtfacpub/52
64. Zahran, S., Brody, S. D., Peacock, W. G., Vedlitz, A., & Grover, H. (2008). Social vulnerability and the natural and built environment: a model of flood casualties in Texas. *Disasters*, *32*(4), 537-560. https:// doi.org/ 10.1111/j.0361-3666.2008.01054.x

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**Original Article**

# تحلیل تاثیر ناپایداری محیطی در ناپایداری اجتماعی در ایران: تنش ها و آسیب های اجتماعی ناشی از خشکسالی در مناطق روستایی

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## چکیده مبسوط

### ۱. مقدمه

امروزه ناپایداری های محیطی و تغییرات اقلیمی به یک مساله اساسی تبدیل شده است. براساس موقعیت جغرافیایی و شرایط محیطی، ا شکال مختلفی از ناپایداری های محیطی وجود دارد که خ شک سالی یکی از مهمترین آنها می باشد. خشکسالی یک مخاطره طبیعی خطرناکی است که باعث ایجاد اثرات پیچیده‌ای در جوامع می‌شود؛ این اثرات به گونه‌ای می‌باشد که نه تنها در یک کشور منجر به آسیب می شود بلکه ممکن ا ست اثرات نا شی از خشکسالی در سطح جهانی نیز گسترش یابد. اما باید توجه داشت که میزان اثرگذاری خشکسالی بر روی جوامع و گروه های انسانی متفاوت از یکدیگر می باشد. بطوری که ساکنین نواحی روستایی به دلیل ارتباط بیشتر با محیط و داشتن فعالیت های اقتصادی مرتبط با محیط(کشاورزی و دامپروری) بیشترین تاثیرپذیری را از خ شکسالی در جنبه های مختلف دارند. از این‌رو خشکسالی اثرات اقتصادی منفی بسیاری بر کشاورزان و اقتصاد محلی برجای می گذارد این تاثیرات در منابع متعددی مورد تاکید قرار گرفته است. اما تاثیرات اجتماعی خشکسالی کمتر مورد توجه قرار گرفته است.

### ۲. مبانی نظری تحقیق

ناپایداری اجتماعی به‌وجود آمدن شرایطی است که در آن زمینه ا شتغال، زندگی و رفاه برای مردم یک اجتماع د شوار می شود. عوامل متعددی بر شکل گیری ناپایداری های اجتماعی تاثیرگذارند که یکی از مهمترین آنها، ناپایداری های محیطی می باشد. ناپایداری های محیطی در نتیجه بلایای طبیعی مانند خشکسالی، سیل، تغییرات اقلیمی رخ می د هد. این نا پا یداری ها می توا ند تاثیرات متعدد اقتصادی، اجتماعی و زیست محیطی بر جوامع انسانی داشته باشد. به گونه ای که زندگی و فعالیت ساکنان این جوامع را دچار اختلال نماید. به خصوص در نواحی روستایی به دلیل اینکه فعالیت روستاییان وابستگی بیشتری به محیط و منابع محیطی دارد، می تواند چالش های متعددی را ایجاد کند. تغییرات محیطی در برخی از مناطق مانند کشورهای آمریکای جنوبی و کشورهای اطراف دریای کارائیب بحران‌های اجتماعی قابل توجهی از قبیل نابرابری اجتماعی، درگیری، جابه‌جایی جمعیت، فقر، فقدان فر صت‌های شغلی ایجاد کرده ا ست. نابراین، بعد پا یداری اجتماعی می توا ند از طریق عوا مل محیطی، مخاطرات طبیعی و تغییرات آب‌وهوایی دچار اختلال شده و ناپایدار شود. در نتیجه این عامل در اغلب موارد منجر به نزاع و درگیری بین روستاییان، فقر و آسیب های روانی- ذهنی و بیماری های متعدد شده و انسجام اجتماعی دچار اختلال می‌شود. لذا کیفیت زندگی مردم کاهش می‌یابد که به دنبال آن مردم محل سکونت خود را ترک کرده و به مکان‌های دیگر مهاجرت می‌کنند.

### ۳. روش‌شناسی تحقیق

این مطالعه از نظر روش توصیفی–تحلیلی و از نظر هدف، کاربردی است. این پژوهش به‌دنبال شناسایی و بررسی تنش‌ها و آسیب های اجتماعی نا شی از خشکسالی در مناطق رو ستایی شهرستان نیشابور می‌با شد. به منظور سنجش ارتباط بین متغیر مستقل خ شکسالی و

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وابسته تنش های اجتماعی، به شناسایی ۲۴ متغیر در زمینه تنش ها و آ سیب های اجتماعی نا شی از خ شک سالی و کمبود آب در منطقه مورد م طالعه ا قدام گرد ید. اطلا عات مورد ن یاز علاوه بر م طالعات ا سنادی از طریق م صاحبه و پر س شنامه جمع آوری شده ا ست. در تحلیل داده ها نیز از آزمون های تی تک نمو نه ای، همبســتگی پیرسون، رگرسیون تک متغیره و مدل وایکور استفاده شده است.

## ۴. یافته‌های تحقیق

نتایج به دســت آمده بیانگر وجود ارتباط بین کمبود آب ناشــی از خ شکسالی و ۲۲ متغیر ناپایداری اجتماعی می با شد. نتایج به د ست آمده از همبســتگی پیرســون نیز نشــان داد که ســطح معناداری دو شــاخص کاهش ســطح بهداشــت و کاهش جمعیت تولید کننده روســتایی تحت تاثیر ناپایداری خشــکســالی قرار نگرفته اند. در همبســتگی پیرســون شــاخص های تشــدید فقر در نواحی روســتایی (۰,۹۳۲)، افزایش هزینه‌های زندگی(۰,۹۳۱) و از بین رفتن کشــت و کارهای زراعی کوچک (۰,۹۲۴) دارای بیشترین ضریب همبستگی با کمبود آب نا شی از خشکسالی در رو ستاهای مورد مطالعه می با شد. همچنین با توجه به نتایج آزمون رگرســیون نیز می توان گفت که کمبود آب ناشــی از خشــکســالی شــاخص ناپایداری اجتماعی را در نواحی روستایی مورد مطالعه به شدت تحت تاثیر قرار داده‌است. نتایج مدل وایکور نیز نشان داد بین روستاهای مورد مطالعه به لحاظ شدت تنش های اجتماعی تفاوت وجود دارد. به طورکلی می توان اذ عان نمود که خشــکســالی به عنوان یک ناپایداری محیطی اثرات منفی بسیاری در ناپایداری اجتماعی جوامع روستایی برجای می گذارد.

## ۵. بحث و نتیجه‌گیری

به طورکلی وقوع خشــکســالی های طولانی مدت در نواحی روســتایی می تواند به طور مســتقیم در کاهش درآمد روســتاییان، افزایش بیکاری، کاهش فرصــت های شــغلی و در نهایت تشــدید فقر در این نواحی تاثیر داشته است. در صورت وقوع این مشکلات، روستاییان به منظور د ستیابی به شرایط زندگی بهتر مهاجرت به نواحی شهری را ترجیح می دهند. یکی دیگر از مهمترین اثرات خ شک سالی در نواحی روســتایی افزایش هزینه های زندگی می باشــد. لذا تداوم وقوع خشکسالی ها منجربه کاهش درآمد و بیکاری در روستاها می شود که همین عامل در بلندمدت می تواند رو ستاییان را در تامین هزینه های معیشت شان دچار م شکل کند. بنابراین افزایش تنش های اجتماعی منجر به تنش های متعدد در نواحی روســتایی می شــود که از جمله این تنش ها می توان به ایجاد و تشــدید مســائل خانوادگی در بین کشاورزان به دلیل افزایش هزینه های زندگی ا شاره کرد. در بسیاری از روســتاهای مورد مطالعه افت ســطح آب های زیرزمینی و کاهش میزان د ستر سی رو ستاییان به منابع آب یکی از عوامل تاثیرگذار در کاهش میزان و از بین رفتن زمین های زراعی کوچک بوده اســت. تمامی این موارد در ت شدید رقابت بر سر آب به منظور د ستر سی به آب بیشتر برای آبیاری مزراع و افزایش نارضایتی روستاییان از سازمان های دولتی تاثیر دارد. لذا می توان اذعان نمود که یکی اثرات مهم تشدید ناپایداری های محیطی به خصوص خشکسالی در محیط های روســتایی، کاهش کیفیت زندگی روســتاییان و افزایش نارضــایتی در زمینه های مختلف می باشد.

**کلیدواژه‌ها:** بحران محیطی، تغییرات محیطی، ناپایداری اجتماعی، تنش اجتماعی، خشکسالی، جوامع روستایی.

**تشکر و قدردانی**

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