SCIREA Journal of Environment

http://www.scirea.org/journal/Environmental

March 24, 2022

Volume 6, Issue 1, February 2022

https://doi.org/10.54647/environmental61274

Impact Review of Climate Change on Regional Transformation and Environmental in Iran

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Abstract

According to the predictable results about future climate change, the most important challenge of climate change in the world is increasing the temperature due to the emission and increase of greenhouse gases as a result of enormous population displacements at different scales. The increase in temperature has caused the rainfall pattern to change throughout the earth in terms of type, regional and temporal dispersion. This process has the greatest negative effects on the reduction of freshwater resources, which in Iran has produced wide - scale changes in different scales. According to the global model of climate changes, Iran is one of the countries that are experiencing phenomena such as rising temperature, decreasing rainfall levels, reduction of freezing conditions, reduction of water resources, and groundwater. All of these factors have different effects on the unbalanced distribution of population, migration due to climate change, increasing water consumption processes and eventually poor storm water management, which

causes the drying of lakes and the impact of these changes on people. In addition, agricultural activities in Iran depend on atmospheric conditions, especially the amount of rainfall and temperature changes, particularly as more than 50 percent of Iran's agricultural land is cultured. Due to this, climate change has caused significant negative effects on the conditions of life, environment, supply of drinking water, but on food security and climate migrations.

Keywords: Climate Change, Environment, Regional Transformation

1. Introduction

Environmental crises can be attributed to the change of human attitude from tradition to extreme modernism, and some consider it due to natural inevitable climate change. The first group of human and modernism and human delight of human life is the cause of the increasing environmental crises today [1- 2]. But the reality is that climate change has different causes (natural and unnatural). Natural causes, which are usually slow but long term processes, include the way the earth orbits, movement of continents, the eruption of volcanoes and the movement of hot and cold ocean waters. The long term climate change has been attributed to the earth and the movement of the continent, which show their effects in the long term.

Unnatural or human causes are caused by harsh and short - term processes. The rate of human causes is so rapid that natural phenomena don't even have the opportunity for natural disasters, and the environment is worsening day by day. These processes include excessive consumption of thermal energy, increasing greenhouse gases, increasing the temperature of the earth, expanding industrial and urban spaces and creating heat islands, destruction of forests and green spaces, increasing evaporation and reducing water resources.

This short term climate changes can be caused by excessive consumption of thermal energy due to increasing greenhouse gases and thus increasing the temperature of the earth. The increase in urban spaces and deforestation has led to the reflection of the sun rising at the surface and to create thermal islands. This is the factor of increasing evaporation in the ground. Increasing the evaporation will also reduce water resources and causes higher water resources decrease, the surface of the land is drier and hot[3-4].

However, what is occurring is not a short term phenomenon of the kind of weather fluctuations (not only global warming) but rather a relatively long term climate change. these changes not only affect the climate of the earth but also affect the natural and human ecosystems and even human civilization.

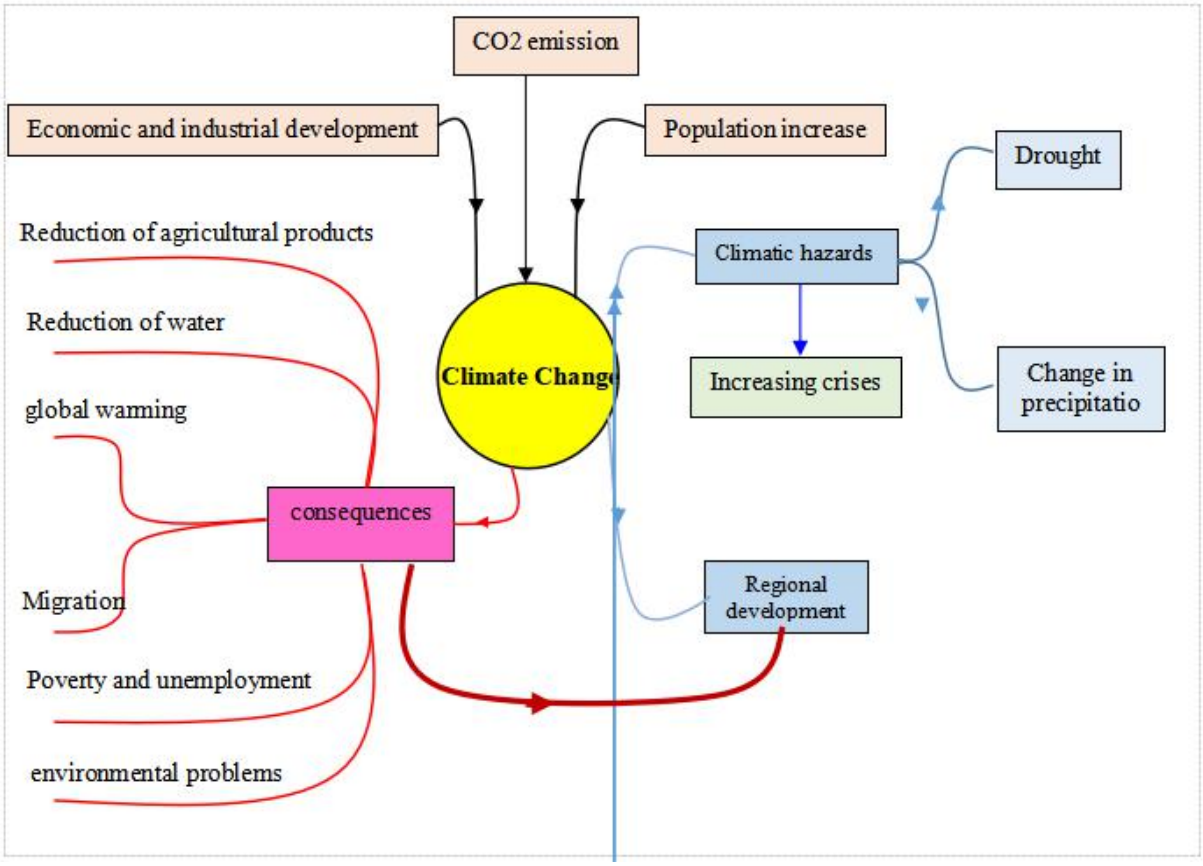
The changes are so effective on the planet Earth that scientists have suggested the beginning of a new geological age called (Anthropocene) as a modern geological age. That is the beginning of the major impact of human activities on the planet and the geological structure of the planet. The dilution of the ozone layer, extinction of coral species, extinction of biological species, climate changes and global warming are the evidence of this new geological age. In the Anthropocene period, all the capabilities of the land have been consumed, and if one fails to revive the conditions like dinosaurs and other creatures that have come to earth and not abide by the earth, it will be doomed [5-6].

Climate change and environmental degradation have a significant impact on the movement of people around the world. Various estimates of the volume of climate refugees have been estimated in 2009, 15 million in 2009 and 38 million refugees in 2013 [7-8]. But notice that these are not exactly accurate, While scientific studies of reasoning for climate change are increasingly being offered with confidence. The consequences of climate change on human population distribution are not known and predictable.

According to the existence of many other social, economic and environmental factors, it is difficult to build a linear relationship between climate change agents and migration. Severe weather events such as flooding, cyclone and tide waves, drought and heat waves as well as the gradual effects of climate change, such as salinity or river erosion, cause climate migration. Climate refugees are formed due to global warming and the consequences of it due to the real cause of mass migration(Causes and effects of climate change: Figure 1), and this event demands the necessity of global attention and responsibility [9].

On this basis, the lack of compatibility and the required capacity for climate change is one of the most important factors causing human damage. Studies show that climate refugees migrate in two main patterns: Either they migrate immediately after extreme incidents of climate change or they will eventually leave the site during erosion and long term processes[10-11]. The perspective of climate change in the world has become so important that in addition to the world's scientific centers, the United Nations has established a special department for monitoring and evaluating it in the Change Panel. The present paper is based

on this report and related to Iran and the iranian government regarding climate change and population displacenents.



Figer1: Causes and effects of climate change

2. The Impact of Climate Change on the Environment in Iran

Climate change has effects on the global and on national level on all countries including Iran. A country like Iran is more vulnerable to climate change due to environmental degradation.

These changes can be assessed at the macro level of the country and the region. The amount of influence also varies in different parts of the country, for example, in areas where the irrational growth of population and poverty, such as Sistan and Baluchistan is also more severe. The whole country is not affected by the dearth of rain and dust phenomenon, while the average rainfall is decreased and the average temperature has increased at all levels of the country, for example: In the east and south east of the country, water shortages and local dust are two fundamental challenges of the country's environment. While the west and south of the country are more affected by the phenomenon of external dust (less internal). According to

the results of simulations carried out by the International Institute for Climate Change (IPCC), climate change in Iran will follow the following outcomes by 1976 - 2005 [5-3].

According to forecasting models during these years, the average precipitation will decrease by 9 percent. In the last 50 years, an average of 50 mm of rainfall was seen in Iran. The average rainfall of Iran from April of last year was ranging from 98 to 175 mm, while the average rainfall was 210 mm during the last year. The worst year in the Iran was 2007 - 2008 in the last ten years; This year the average rainfall in the country was about 140 mm. The situation shows that we have already experienced the worse conditions this year(Figure 2)[3-4-15].

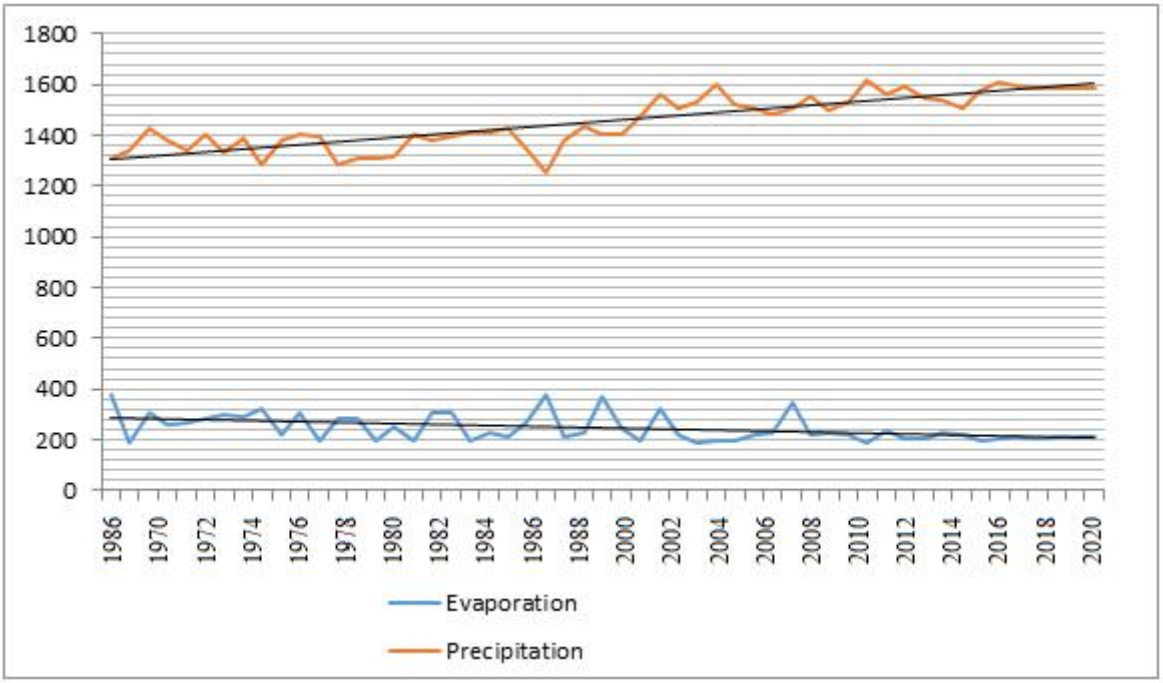


Figure 2: The decrease of precipitation and the rise of potential evapotranspiration and Iran during the period (2020 - 1968)from the national center of the year's draught and crisis management[4]

During these years, the average temperature of Iran has increased about 1 ° C. In the last 50 years, Iran has an average of about 1.5 to 2 degrees Celsius, which is higher than the average global amount. Since vegetation is low in Iran, the heat feels more than the actual temperature. Evaporation will also rise by increasing the temperature and the number of hot days in the country. The rate of evaporation in Iran has increased by 0.5 mm annually during the past 50 years, according to official statistics. The increase in temperature has caused severe climate changes in Iran, increasing the number of heavy rainfall and floods to 40 percent (floods in Sistan & Baluchistan and Lorestan province in 2020). The number of hot days (temperature of over 30 'c)rises in most parts of the country and this increase in south east of the country (Sistan and Baluchistan and kerman provinces)is more than other parts of Iran.

The number of frosty days in most parts of the country will decrease and the highest decrease in the northwest of Iran (eastern Azerbaijan, west Azerbaijan and Ardabil)is. The number of dry days in most parts of the country has increased and the western regions (Ilam provinces, Kurdistan, Lorestan and Kermanshah)and south east (Sistan and Baluchistan and kerman provinces)have experienced the most dry days. The increase in dry days has caused drought in most parts of the country. For example, according to Iran meteorological organization studies, 5.5 percent have mild drought, 28.5 percent have average Draught, 50 percent have severe drought and 13 percent have severe drought and about 3 percent have normal conditions. The fall of 2017 in the last 67 years has been in Iran in the last 67 years, and statistics show in 2013 this country has experienced such conditions (Figure 3)[4_11_16].

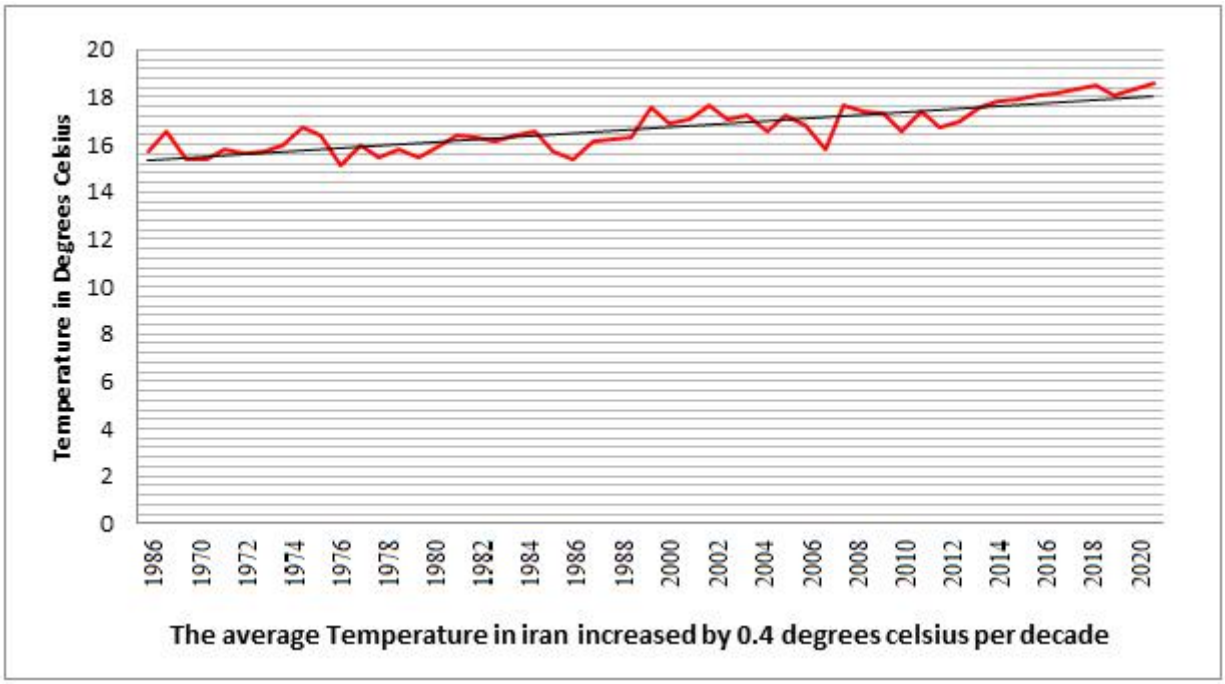


Figure 3: The annual average temperature increase in the country's annual temperature (1968-2020)from the National Center of Drought and Crisis Management [4-16]

2-1-*Effects of Climate Change on Water Resources of Iran*

The country's freshwater resources are among the sectors that will be seriously affected by climate change, including water and groundwater resources, water structures, water drainage networks, pumping stations and water sector structures with significant implications, including the following items[6-15].

During these years, Iran's per capita annual rainfall decreased by about 1,300 cubic metres. In 1956, it was equivalent to 6900 m3 per person. In 2006, it has been around 1,700 cubic meters, and now this per capita has dropped to 1,500 cubic meters. This year the level of water

(rainfall and trans-boundary rivers)has been negatively compared to consumption and by increasing a degree, the temperature of it is equivalent to 13 billion cubic metres of water resources of the country through evaporation, which is a great threat to Iran's water pit sources. The quantitative and qualitative diet will change the level of water resources and the deposits of snow and the glacier, which will lead to increased runoff in the winter and its decline in the spring. The security of the country's water structures will face greater risk by increasing the number of heavy rains and flooding[6].

In Iran, there are about 3450 permanent and seasonal rivers, most of which face runoff. The maximum runoff decrease in the basins is Karkheh (38 %)and Karun .(36 %) However, the runoff of Talesh and Anzali catchment has increased 12 percent. The province is located in the province of Khuzestan, Fars, Chaharmahal and Bakhtiari, kohiluyu and Boyer Ahmad. Considering that 90 percent of the hydroelectric power is carried out in the basin such as the Karun and Karkheh, reducing rainfall and runoff in this basin is to reduce (and even zero in summer)generation of hydropower stations in the next 25 years.

2-2-*Effects of Climate Change on Iran's forests*

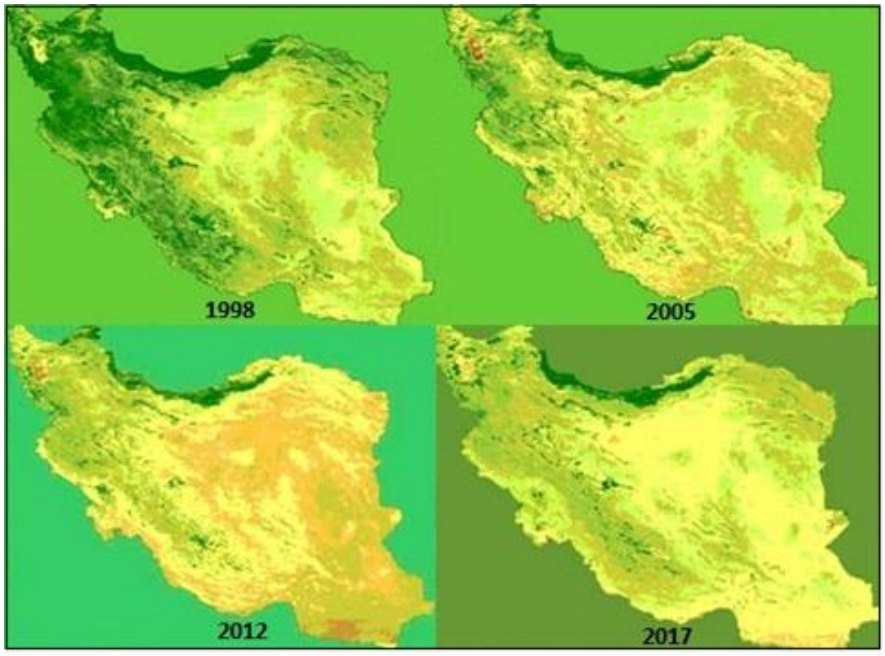
The destruction of green space also makes Iran more vulnerable to climate change and rain reduction. In 1320, there were 20 million hectares (about 12 %)of the forest, which in 1977 reduced to 17 million hectares. Official statistics in 2018 show that this amount has fallen to 14 million hectares. It shows that about 8.5 % of the total area of the country has forests. According to the extent of the country and its climatic conditions, the area is very low.

According to international criteria, each country with an area of less than 25 percent of the forest is in the environmental crisis situation. It is to be noted that the environmental value of forests and pastures is greater than their economic value. The level of the Iranian pastures at present is 84.7 million hectares and the share of pastures from the total area of the country is 52 %. rangelands, of course, are mostly poor and degraded fields. The decline of rain will have considerable adverse effects on the grasslands and forests, especially in the northern forests and especially on forest species such as old Adler and old consistent forests. By reducing the vegetation covers due to rain reduction, evaporation and occurrence of torrential rainfall in these fields, soil erosion has increased and will increase the poverty of pasture vegetation. By decreasing rainfall and increasing the temperature in the western regions and western neighbours, the dust increases and the destruction of western forests and pastures will be increased.

2-3-*Effects of Climate Change on Iranian agricultural activities*

Agricultural activities in Iran depend on atmospheric conditions, especially the amount of rainfall and temperature changes, especially as more than 50 percent of iran's agricultural land is cultured. Due to this, climatic changes will have significant effects on the agricultural sector [4].

During these years, rains, rising temperature and evaporation have contributed to increasing salt marshes and reducing arable land. decrease of rainfall and rise in temperature and evaporation in most parts of the country, particularly in western and south-west regions, has shown considerable decrease in vegetation cover and yield of dryland products according to the current culture pattern and agricultural production trends of Iran by 2020decreace by 10 percent and 2080 will decrease by 30 % by 2080 to 30 % [15].



Map 1: assessment and breakdown of the drought - based scenario based on NOAA's satellite data[17]

2-4-*Effects of climate change on the natural environment of Iran*

One of the most important consequences of climate change is the area of biodiversity. In Iran, there are 250 large mounds with an area of about 5.2 million hectares which are currently being subjected to drying. This is the natural habitat of species of animal and plant species. The climatic changes on biodiversity will have the following effect[4].

The reduction of rain and rising temperature in most parts of the country, especially in Alborz and Zagros, faces most of the country's wetlands as reductable and will threaten the lives of

animals, birds, and plant species living in this mangroves. Another important point in the depletion of mangroves will lead to the creation of new desert basins and increasing dust production. Nowadays, due to the extreme depletion of our wetlands in Sistan province, we are suffering from the dust. The extreme depletion of Khuzestan's wetlands caused the temporal and regional resonance of the local population. The severe lack of lake water and Qom salt lake is one of the future threats of salt dust to the regions of Azerbaijan and Tehran.

2-5-*Effects of Climate Change on the Human Environment of Iran*

As mentioned above, two effects of climate change index in Iran are increasing the temperature and decreasing water resources. Since Iran is considered a hot zone, the use of cooling detectors will increase. The most important effect of these devices is the increase in consumption of electricity in the country. To provide electricity required, more power plants have to be put into orbit. Nowadays, the most important power plants in Iran are using fossil fuels. This process will push a lot of carbon dioxide into the air in Iran. In 2015, about 643 million tonnes have been produced in Iran, mainly of plant activity. This year it will reach 800 million tons this year. Such a process is projected to reach 1,700 m tonnes in 2030. This means that greenhouse gases in greenhouse gases and air pollution will be added[4].

The second negative effect of climate change in Iran is also decreasing rainfall and increasing water consumption. during these years. It is expected to increase by 10 percent to the current consumption and on the other hand the country's water resources per capita decrease from the current 1700 s to 1,300 cubic metres. The depletion of water resources causes the rise of the country's desert surfaces, and thus the depletion of the mangroves will lead to the loss of vegetation. The result of the process is the accumulation of dust, the kinds of dust, the sand storm which will be followed in large parts of the country.

3. Regional Transformation and Climate Change in Iran

The occurrence of natural threats is increasing the activity of individuals and the intensity of their propagation and rapid proliferation in the world. In addition, the indirect effects of these factors can cause enormous economic losses regionally or at the whole world. One of the main areas of these natural and new threats are hazards and environmental threats[18].

On the other hand, the country's population will reach 106 million people on the basis of the plan and perspective adopted by the country's population to the horizon of 2041. Therefore,

about 32 percent of inhabitants of land area will be increased, which will significantly increase the population changes in Iran due to climate change situation in Iran and increase in temperature and carbon dioxide emissions.

The climate change will decrease from 130 billion cubic metres to 70 billion cubic metres, and agricultural output will be reduced by 15 % [19], while the country's population growth is 32 %. Therefore, the management of water supply and consumption, food and energy in the future will be very important in the region and especially in Iran, which will be necessary to address and determine the path to address the problems caused by shortages.

One of the most important effects of climate change is the issue of forced migration. Indeed, natural disasters caused by climate change such as flooding, river flooding, drought, heavy storms, tsunamis and … caused many people to homeless, some of which have to remain complex to protect their lives from region to region where it becomes a complex problem [20]. The stress induced by climate change is likely to increase the cost of access to public infrastructure such as water resources, services such as education and reduction of government revenues. Climate change may lead to a reduction in the government's ability to create opportunities and immigration and may cause tensions or conflicts before migration or after migration, thus challenging regional equilibrium. Due to the damage caused by climate change, migration can be attributed to the social and cross-sectional tension in the region [21]. The migration wave can have serious consequences in the social and biological fields for the origin and purpose of migration.

But notice that these estimates are not exactly accurate, while scientific studies of reasoning for climate change are increasingly being offered with confidence. The consequences of climate change on the change of human population distribution are not knon. According to the existence of many other social, economic and environmental factors, it is difficult to build a linear relationship between climate change agents and migration.

Considering all the factors mentioned in relation to Iran, climatic factors such as food shortages, reduction of freshwater resources, increased drought and dust storms and migration are scattered across Iran. These events have caused environmental degradation in different regions of the country which has a direct impact on the economic foundations of the environment and the population of these regions. It creates a vicious circle. The new emigrants, affected by climate change directly or indirectly, have been forced to leave their homes in the new areas without citizenship and regional identity, and create new challenges in the destination, mostly in provincial capitals, such as Tehran, Mashhad, Shiraz, or Isfahan.

The south, west, sout and east and central areas of Iran are the primary destinations for climate migration. Climatic migrants have chosen sites that have the proper economic and environmental conditions to create appropriate conditions for the economy, which is the main reason for migration. There are shortages of resources, deserts, risks of drought and floods and water resources reduction which can force thousands of people to flee.

This pre-warning appears to the primary victims of climate migrants in Iran which residents of small and sparsely populated villages where their economy is dependent on water and agriculture. The major climatic migrants in Iran are of this spectrum. There is a long term process for this process, which may affect the global warming that affect the health or survival of individuals and the continuation of social activity. Climatic models show an increase in drought and climate disasters for Iran which is one of the most important consequences in the short term and long term of human displacement.

4. Conclusion

On the global scale, global warming due to the increase in greenhouse gases and development of industrial activities and urbanization has led to climate change in the planet. These changes affect the sources of sweet water, the population, the biodiversity of the world, on reducing the amount of forests and pastures, and even on the production of crops and … tremendous effects. It may lead to destruction of human life. These changes will have more adverse effects in countries like Iran due to the vulnerable environment. Another factor that causes Iran to be more vulnerable to climate change is the reduction of surface water resources and groundwater.

Population growth and urbanization have also led to abstract climate change which affect environmental and non-climatic variables such as socio-economic factors, migration and increase them. The effects of climate change in human habitation are direct and indirect. Direct effects can be pointed to increasing heat stress on humans and severe drought and indirect effects have been pointed to the reduction of freshwater resources, agricultural productivity, migration and migration of rural settlements.

Three main effects of climate change in Iran are population displacement and decreasing water resources and increasing temperature. The final result of these three works on the one hand increasing electricity consumption, increasing the amount of air pollution, greenhouse gases and regional developments as a result of enormous displacement of labour in Iran, has

produced a wide region imbalance. On the other hand, increasing water consumption and reducing water resources is increasing the desert and desertification. The decrease of the average rainfall rate of 9 percent causes increase of a temperature of the country, 40 percent increase in heavy rainfall, decrease of the number of frosty days and increasing rainfall and reduction of agricultural production.

Enormous population displacements affected by these phenomena is one of the most important features of the Iranian climatic eye by 2040.Tthe amount of grain production in Iran is expected to decrease by 30 percent by 2020, 10 percent by 2050 and 30 percent by 2080. Wheat production by 2025 will be reduced 20 % by 2025 and 33 % by 2050. Reduction of precipitation will have significant impacts on the northern forests of Iran, changes of land use in these areas due to population displacement and the need for agricultural land. With precipitation and increase in temperature, most wetlands in the country have been reduced and in this way, many species of animal and plant species are threatened.

In the next few years, climate change will lead to significant and significant damage in the agricultural and environmental sectors and decrease production capacities in this sector and Iranian environmental crisis, which have been an increasing process in recent years. In such situations, the monitoring and management of outcomes and impacts of climate change can reduce the damage to some extent and prevent complete destruction of production capacities. Thus, the changing and reformation of agricultural products to low water products, reformation of consumption patterns and agricultural products to optimal consumption and reduction of waste, management and control of soil erosion, improving the efficiency of production resources, management of water structures, and … not as a choice but as a inevitable necessity in facing and managing consequences and damages of climate change in Iran.

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