CLIMATE MITIGATION STRATEGIES DROUGHT CRISIS IN IRAN

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Abstract
Islamic Republic of Iran is located in one of the world's dry areas. The mean annual precipitation, 250 mm and approximately one-third of the global average precipitation. The total area of 165 million hectares of which about 37 million hectares of fertile land, 90 million hectares of pastures, 13 million hectares of forest and other land barren, desert, mountains and lake. Due to some limitations, including lack of water, only 5.18 million hectares from 37 million hectares are already planted about 5.8 million ha of which (46%) of water and 10 million hectares (54 percent) is dry. 84 billion cubic meters from 93 billion cubic meters of irrigation water consumed in the country that more than 93 percent of available water resources. Despite the dry climate and lack of water, agriculture is one of the most important economic activity in the country. This section is about 18% of GDP, 25 percent of employment, 85 percent of food supplies, 25 percent of non-oil and 90 percent of raw materials used in the agricultural industry produces.

Keywords: arid, drought, climate Iran

1. Introduction and Statement of problem

Iran for being in the dry belt geographical and desert bar is located at 25 to 40 degrees north latitude, The climatic conditions of the arid region that is considered the world. In winter, coinciding with the subtropical high pressure system relative back under the influence of low pressure systems and Sudanese from the south West Mediterranean West will be that these systems in the context of Iran's western winds and rains put a major arena for its activities cause. At this time the Siberian high pressure system for high-pressure jets of subtropical retreat, advance, and parts of northern and central Iran under great negative impact. Of North and Northeast of the temperature drop is cold and dry with And the most important feature of this system that crosses the western air currents to form fronts, creating precipitation is remarkable. In addition, the above-mentioned system is also the primary sources to create rain in northern Iran (Azar & rajabzadeh,1391,15)

Despite being the country in the world dry belt (UNEP, 1997), severe climatic variability of precipitation is only one-third the world average. Based on the data in 1380 about 6.2 million hectares of irrigated agriculture and 4 million hectares and 1.1 million hectares of dry farming orchards have been affected by drought. The adverse effects of drought on gardens in this year amounted to 520 million dollars. The investigations in the country, the direct effect of reducing damage every 1 mm of precipitation is 98 billion rials. Assuming wet white water level difference compared with 13 billion cubic meters of drought, reducing the acreage damage caused by it is equal to 1274 billion rials (Asgar toosi,1392, 12)

In addition to being dry, drought prone country is Iran and the amount of damage accessible to the reduction in per capita water due to population growth, climate change and over-exploitation of water resources and decrease quality (salinity and pollution) is increasing.The average per capita water has decreased, so that from about 7000 cubic meters per year in 50 years ago, today has reached 1,900 cubic meters per year. Considering the rate of population growth, is expected to further reduce 2025 to 1300 cubic meters per year so mature.(Bodagh jamali,1390,9)

Water scarcity and droughts is our biggest challenges facing agricultural development in the future. And the nutritional statistics for 2021 indicate that the country's land and water resources for food needs through domestic production are available Provided that in a short time, measures aimed at promoting appropriate patterns of cropping, increasing crop yield per unit area and irrigation efficiency, reduction of post harvest losses, improve farm management and in addition to all these, drought preparedness and management strategies integrated water resources to prevent drought and water crisis to minimize damage taken. The recent drafts with different severity and duration of every year and every five years at the provincial level has occurred widely in the country. The severity of the drought is so widespread in the years 1379 1380 with different intensities over 26 provinces and more than half of

the population is affected. Fars, Kerman, Khorasan and Sistan-Baluchestan provinces suffered more than others.(Barim nejad,1388,20)

2. Research Methodology

In this study, library and field methods used to collect and gather information.

3. Findings

According to available statistics, the damage to agriculture and livestock losses due to drought, about 5.2 billion dollars in 1380 and 7.1 billion dollars respectively in 1379. Major damage in parts of rural employment as a result of its GDP from agriculture and livestock around 12 per cent. The severity of the drought, the entire economy is based on agriculture by the lack of supply of raw materials for industry and lower demand for industrial production due to decreased agricultural production and demand affecting agricultural institutions such as fertilizer, poison, flying machines, credit, and influence were. In addition, drought heavily on water resources, forests, pastures and other natural resources damage. All of this begs the need for national food security and sustainable economic development. The amount of damage to the agricultural sector due to continuous droughts is increasing. The amount of damage to non-agricultural sectors, as the macroeconomic suffer from drought, require investigation; For example, rural to urban migration caused by drought associated with the vulnerability of the rural community that's a concern.(Haghighatju,1389,13)

To develop strategies for dealing with drought preparedness

The frequent occurrence of droughts and severe damage on the economy and natural resources, creates a strategy and action plan for the management idea of drought in the country because of drought and lack of strategic planning delays in decision-making, increases costs is to reduce drought damage; For example, crisis management, risk scanner is more costly than management. Analysis of strategies available, show the weakness of the current management system of drought. The lack of monitoring and forecasting drought, lack of appropriate integration of drought risk and damage assessment, mapping vulnerability to drought and lack of coordination, lack of institutional activities, drought, are examples of such. Operational management in order to function, must deal with more droughts emphasized activities and related agencies at the local level, provincial and national coordinated. Safety procedures drought management in the agricultural sector should strengthen the ability of farmers and ranchers to themselves using appropriate technologies, sustainable agricultural principles must be observed. It should also be success or failure of procedures and systems in promoting the use of water and land and agricultural sustainability in the agricultural plains of each province or region emphasized. The assessment of appropriate technologies and management practices and expertise within the framework of a national strategy to deal with drought preparedness needs. If the strategy and action plan on drought preparedness in the agricultural sector done right, a proper coordination between various devices and the ability of institutional mechanisms that address all the relevant issues that arise. Drought management coordination mechanism in the form of a national center In collaboration with various departments and agencies to prepare drought in the country and in line with relevant recommendations for drought management can be achieved. The need for national and regional planning strategy drought following the 1379 and 1380 droughts that most of the damage was supported by various organizations. FAO's regional conference in April 1381, so as to reduce drought damage in Tehran As a priority on the national agenda ECO member states and the world's Food and Agriculture Organization. FAO drought as a priority area for multiple follow-up measures and pilot projects aimed at helping to develop national strategies for drought preparedness and mitigation of their effects in a number of countries such as Iran. Project (TCP / IP / 2003) was conducted a few years ago and preparedness strategy and national action plan, manage and mitigate drought damage in the agricultural sector presented. Meeting of senior officials of Agriculture, Economic Cooperation Organization (ECO), which was held in Tehran in 1383 following the issue and the Islamic Republic of Iran proposed the establishment of regional centers manage and mitigate the effects of drought in the ECO region will be welcomed.(Hakimipour,1386,11)

Drought management strategies available

With the advent of widespread droughts, earthquakes and devastating floods in the country, the government's proposed rescue plan. This program, which began in 1382, the legal framework for drought management by the Interior Ministry Disaster Task Force (DTF) provided. The program includes guidance, training people to deal with natural disasters, determine the duties of the various agencies in the event of an accident, to determine the role of social media. As well as finance and legal support during natural disasters will be done. To create the program, also established a High Council for Water Affairs. The council is headed by the president, including the Ministry of Agriculture, Energy, Management and Planning Organization and a number of experts. The council, tips and strategies regarding water security and water management issues, including drought events are offered. The section

of existing strategies for drought management, monitoring and prognosis in terms of strategies and appropriate mechanisms to implement the long-term is to reduce drought damage.(Arab & mehdikhani,1387,12)
Ministry of Agriculture in 1380, the National Committee for Drought and Drought under the oversight committee on drought management issues in the agricultural sector will be created. The committee consists of devices associated with the Ministry of Agriculture, Ministry of Energy, Interior Ministry, universities inside and outside of Iran Meteorological Organization, Management and Planning Organization and the Department of Environment. According to the agenda, it should be a risk management approach in their activities to reduce drought that adopt this approach, unfortunately, was not complete; Especially for one of the most important strategies for drought preparedness, monitoring and forecasting drought as it currently works is evident.
At present, drought management information from the Meteorological Organization, the Ministry of Agriculture and Ministry of Energy information is collected, while the Interior Ministry on drought disaster management through the Disaster Task Force offers. The potential involvement of other agencies in monitoring the drought, the Environment (DOE) and the Iranian Space Agency (ISA) are. Actual performance evaluation in drought management issues and prognosis shows that their job due to drought, damage assessment, drought, despite the huge potential in such activities, less than expected. Based on the mandate, relevant ministries should adopt a risk management approach in their management activities but at the moment they only do weather forecasting. Information on drought forecasting Meteorological Organization, Ministry of Energy and Ministry of Agriculture are separate and each device, network data collection, classification information for drought and provide information on its own.(Byun,2008,51)
Drought Severity monitoring is done mainly through Meteorological Organization, which in terms of monthly precipitation without taking into account other parameters such as soil moisture, groundwater levels and water supplies, river flows, snow accumulation and growth of plants is done. In addition, information available to the operationalization of remote sensing for monitoring and forecasting drought failed to evaluate the condition through plant growth by technology used satellite images.(Edwards,2007,155)

Strategies and mechanisms to reduce drought damage
Strategies and mechanisms to reduce drought damage is done under the supervision of National Disaster Task Force And more relief by providing water, food and fodder and by making loans to support water management and agricultural projects in the country. The financial resources in order to increase agricultural production and economic losses and social insurance fund is spent. Reduction of damage in crisis management is costly.(Gabriel,2002,90)
Long-term sustainable agricultural practices that minimize the effects of damage is mainly due to land erosion control, watershed management, drought-resistant plant breeding and measures to increase access to water and water productivity. Most of these issues by the Ministry of Agriculture Agricultural Research Organization study education and water resources management and planning is done by the Ministry of Energy of offices and research centers. Drought environmental issues through environmental organizations will follow.(Gautam,2006,2)
There are potential capabilities of human resources in universities and research institutes leads to drought preparedness and management of the relevant programs is more effort. For example, agricultural education and research organization, has 24 research centers that are active in different fields of agriculture and natural resources. The researchers can research the long-term drought management programs operate. There is an applied research center at the Ministry of Energy; Some of these include the Water Research Institute and its provincial centers, meteorology, atmospheric sciences Center for Atmospheric Research and the National Center for Climate and Climatology Research Institute pointed out. Set of experts on drought management, organizing a number of workshops on water use efficiency and drought management in the country have made it possible.(Mckee,2013,41)
Existing mechanisms that may contribute to the effects of drought in the national and provincial level are as follows:
* Common approach to drought management activities are directed mainly, natural relief And the economic and environmental point of view is questionable. Economic and social costs of these policies and their sustainability is questionable.
* Disaster relief operations by the headquarters of the national strategies of drought; Although relief efforts are successful in achieving their goals, But the creeping nature of drought in comparison with other disasters Disaster Task Force requires that acts only on the basis of the principles of crisis management, based on risk management principles to work.

The major weakness of drought management strategies
1) Lack of operational process of planning long-term drought that matter, short-term and medium-term Evaluation of the
2) Failure to properly integrate the drought forecasting and damage assessment
3) The lack of drought preparedness coordination mechanisms established between the devices.

Change management strategy to approach the current crisis risk comes scanner And the main prerequisite for the success of the proposed strategies form. Close cooperation between the Ministry of Energy, which is responsible for water resources management and planning at the national level and the Ministry of Agriculture responsible for agricultural water management for proper management of water resources in drought conditions will be necessary. Meteorological Organization, the second device is very important and a very good working relationship with each of the past two ministries had. Its a bit peripatetic environmental organizations and other devices, such as the Iran Space Agency strategy and action plan proposed in the form of drought preparedness must be established.

The proposed framework for the creation of a national strategy to deal with drought preparedness

The main objectives of the national strategy for drought preparedness in the agricultural sector, provides the following actions:

1) reduction of damage include disaster plans in order to minimize drought damage in the agricultural sector.

2) Aid to areas of drought-damaged

3) The revival of production systems after the drought.

As drought conditions, unexpected changes in natural conditions, the action plan related drought preparedness strategy should also runs a variety of steps taken by the respective devices for the drought conditions to show off.

The main components of the proposed framework for the creation of a national strategy to deal with drought preparedness:

* Create a National Drought Management Center
* Strategy to support drought and reducing compensation
* Increased institutional coordination mechanisms for drought management
* The development of national capacity to plan and mitigate the effects of drought

Create a National Drought Management Center

In order to operationalize drought preparedness, planning and reduce long-term effects of drought, the establishment of a National Center for Drought Management in the Ministry of Agriculture based on the model of the structure is simple and flexible in operation and rescue program is proposed under the framework of the law.Capital structure consists of three specialized working groups are as follows:

1) Group monitoring and prognosis of drought

2) to assess the damage and drought risk

3) Response Team, reduction and drought planning.

The primary function of the center is to ensure the working relationship between the Ministry of Agriculture and devices associated with drought management. Thus, the center, the establishment of a Drought Management Committee as the coordinating mechanism between devices associated with drought at the local level and the provincial and national. Centers have prepared a strategy for coping with drought a national committee and a board of trustees is the highest decision-making authorities have powers. Center Board of Trustees, responsible decision-making and coordination between agencies at all levels and approval of cost.

The National Committee for strategic center for drought preparedness, responsible for providing expert ideas center on technical, past activities and program evaluation and approval of new issues and make recommendations to the Board of Trustees is applicable. Members of the National Steering Committee, experts from relevant ministries and institutions and related organizations are Drought management in the region, province and country are examined. Members of the committee include:

Vice Interior Ministry (Chief of Staff DRM), Ministry of Agriculture (crop production), Ministry of Energy (Water), Ministry of Health and Medical Education, Vice-President of the Management and Planning Organization, the environment Meteorological Organization, the Organization of Agricultural Research & Education , Department of forests and rangelands and Watershed management, water resources management Institute (DOE), the Iranian space agency, as well as university president, R & D center and engineering companies That issues of water management and drought preparedness are working. National Committee prepared a strategy for coping with drought important role in the proposed strategy and to make recommendations for the implementation of drought management plays them.

Support strategies to compensate for drought and reducing

The proposed strategies to reduce the amount of damage to the cases be coordinated:

1) Integrated management of water and drought that include increased water use efficiency and water use
2) drought management strategy for irrigated agriculture, farming and animal husbandry
3) Participation and device support for developing drought
4) collect information about drought, education and public awareness

Table status in 2015 precipitation Iran

Area (percent)	Variability of rainfall (mm)
6	<50
45	**50-200**
40	**200-500**
9	**500-1000**

Compare population and per capita water resources in the years 2015 and 2025 in Iran

78 million	Population in 2015
120	Renewable Water Resources (billion cubic meters per year)
95	Water consumption (billion cubic meters per year)
1800	Per capita renewable water resources by 2015 (m)
1200	Renewable water resources per capita in 2025 (m^3)
Severe crisis	The severity of the water crisis, based on United States
Water stress	The severity of the water crisis based on falkenmark
Water stress	The severity of the water crisis based on WRI

4. Integrated water and drought management strategy

Related to water resources planning and management strategies to offset drought-related. Because of the close relationship between water scarcity and drought, drought management should be based on the national strategy on water resources. Water resources management, strategic planning and reduce drought preparedness and for other uses in the agricultural sector include two types of action Every 2 pre-programmed for short and long term. Long-term structural and institutional measures planned to reduce the damage to water supply systems during drought To meet the demand for drinking water, agriculture, electricity and other expenses be prepared in times of drought. Increase water storage, water saving technology adoption and reperfusion and groundwater are examples of long-term measures. Given the severity of drought, longer-term action may completely eliminate the risks associated with drought. Short-term measures during the implementation of drought disasters whole. Water resources management program to reduce the drought, with the optimal combination of short and long term measures.

Long-term and short-term measures outlined three strategies are:

1) water supply management strategy
2) water demand management strategy
3) strategies to minimize drought damage

All strategies must consider the needs of natural ecosystems and the marginal productivity issues. The aim of the actions associated with supply management, water supply, while the goal of demand management measures that are appropriate utilization of available resources and reduce water consumption.

In agriculture, soil and water conservation is a fundamental issue for the management of drought and minimize its damage. Drought preparedness strategy should be a comprehensive approach, provide continuous and integrated at all levels The ability of farmers to minimize losses in irrigated and rain fed farming systems, livestock and natural ecosystems created. Strategies to minimize drought damage in irrigated agriculture, productivity and efficient use of water increases and measures to protect soil and water. To minimize damage in dry farming, farm management is required to adopt sustainable practices. According to the system of agricultural production, watershed management, increased training and public awareness about water scarcity in drought conditions, the use of indigenous knowledge and integrated management of water resources, drought and famine in the country is necessary. Long-term and short-term actions related to each strategy is shown in Table 3. For systems of irrigated agriculture, the use of pressurized irrigation use with low water requirements Weed, weed control, reuse of wastewater, water storage pricing strategy

and other measures to maintain the water. In dry land farming systems, irrigation or the use of groundwater and precipitation increase and stabilize yield in dry land will play a vital role. According to the production system, the use of drought resistant plants, proper planting methods, techniques efficient use of water, increase performance and product quality and reduce post-harvest losses must be emphasized. Also, loan and insurance programs should be developed to enable farmers and ranchers to manage bottlenecks seasonal climatic conditions. Special assistance only when it is necessary to state that the damage is beyond reasonable limits. The success (or failure) plans or proposed measures to promote the sustainable use of land and agriculture systems in the fields of agriculture must be considered in each region or province.

The use of indigenous knowledge systems to support the sustainable use of agricultural land through government intervention at farm level should be promoted in drought preparedness strategy. In many rural areas, surface runoff water stored in reservoirs Artificial ponds. Normal years, are dry-season water storage backup.

The subterranean water system convenient way to access underground water for irrigation and drinking. Therefore, the strategy aims to encourage water conservation technologies and indigenous knowledge, important ways to reduce drought damage and to maximize the use of natural conditions and drought.

Partnership to develop drought management

Strategic Planning process water, turning to the above (supply policy, demand policy, policy to minimize the effects of) the marginal productivity issues related to drinking water, agriculture, hydropower, industry, recycling and ecosystem conservation is to count. The marginal productivity of policy priorities which should clearly be extended by experts involved in the working groups of national center for drought management. Working group will include experts on specific topics that insight and approaches to participatory methodologies used to develop the views of stakeholders Strategies and policies necessary to reduce the drought, including public information, education and public awareness are prepared and presented.

The proposed mechanism of coordination between the authorities of the National Drought Management Center is designed to offer the services of a staff prepared to deal with drought Which are central to ensuring the operational relationship between information providers and farmers at the local level, provincial and national skills through a number of working groups on several important components of a drought management strategy, drought monitoring and forecasting, impact assessment, and risk planning and response and reducing, harmonious.

Implementation of national plans of action and provincial drought

Program to define the current severe drought in different provinces as well as to determine the beginning and end of the drought is designed to continue. Stepwise implementation tasks by government agencies and authorities carried out under normal conditions or when there is a drought in Appendix D to be extended. In addition, numerous examples of drought management responsibilities and participation of stakeholders for the implementation of drought plans at local, provincial and national expressed.

The main results of the program, a continuous assessment of the development stages of drought, mechanisms for declaring drought symptoms, assess the impact and vulnerability rates, general information and information on the development of drought and authority to update the response plan is summarized in Table 8.

The continuous evaluation of drought declared by the President or by the Governor at the provincial level will be done at the national level. Then, before the politically by the Disaster Task Force examined technically by the center is open and transparent. Its official declaration of drought is a key issue that program by the indices warning, alert and emergency drought management measures as it is applied.

For effective implementation of the program, duties and responsibilities did not allow the delegation is expected to drought. When normal conditions are common, the National Center for drought management activities continues to be prepared to deal with drought issues through workgroups to monitoring and forecasting, and risk and impact assessment for drought planning is particularly expressed. In this example, functions which in normal weather conditions, drought conditions and a return to normal conditions is performed is determined. For each of these stages of the program, duties according to collect and analyze data by stakeholders involved in drought management Meteorological Organization, Ministry of Agriculture and the Iranian Space Agency. . The working group's activities in terms of the characteristics of drought and drought risk assessment, impacts and vulnerability assessment, evaluation and planning outreach programs earlier drought and update existing strategies and action plans do.

Effects of drought on water resources and planning for releases enough water is of great importance. For drinking water for human and livestock in drought conditions is a high priority. In agriculture, attention should be paid to defining priorities for the allocation of irrigation water. Orchards and expensive products such as saffron should have a priority on crops and alfalfa. Also, priority is given to farmers who use irrigation fruitful and water conservation technologies superior surface water irrigation techniques in general. In addition, communities that use traditional

planning process deserves more attention exploit innovative subterranean water are due to the maintenance and development of aqueducts, has access to safe drinking water and irrigation is valuable crops and fruit trees. Changes in crop patterns, such as ignoring the rice in a coma B and policies to encourage water conservation measures should be implemented.

The role of the National Center for Drought Management

Report Center, bonds real or map on the start, continuation and end of the drought and its effects by using information that is regularly prepared by the experts involved in the working group at the national level And describe their respective provincial coordination units to prepare. The proposed institutional arrangements in order to create the tools to make your choice And just when communication and good coordination of ministries, institutions and organizations in all sectors will do well out there. Institutional coordination and communication, particularly for those involved in planning and implementation of water and drought management policies integrated in national strategies dealing with drought preparedness is important.

An extended drought information website for replay via the Internet an important efficiencies that help very much in achieving the objectives of the Community Centre will be in the midst of his colleagues. Other important tasks drought management center to coordinate training programs, seminars and workshops on important topics prepared to deal with drought, reduction and reaction. According to the Center for Specialized Committees to support the coordination of relevant departments and offices of the relevant ministries and regional levels in the province. Technical and scientific support will be the responsibility of national research centers and programs within the framework of regional and international cooperation on drought management.

Impact of drought on agriculture and national economy

Iran's recent droughts in 1999, 2000 and 2001 broke out, and even more strongly from the severe drought in 1994 and more than half of the population affected, damaged. . In 1999, wheat production fell 3.3 million tonnes in 2000, production in 7.2 million tons, less than the amount harvested in 1998. The event led to the country, 7 million tonnes of wheat imports; So that that year, one of the world's largest importers of wheat, respectively. During the agricultural season 2001, the damage was more droughts; So that crop production compared with 10.4 million tonnes to 2.5 million tonnes average of the past five years. Wheat for the year amounted to 5.10 million tons respectively. The severity of the droughts also affected livestock production and productivity in most provinces in the country through a devastating effect on rangeland decreased And the amount of forage available, due to product residue and cereals. It should be noted that livestock production plays an important role in helping the national economy and the livelihood of many people who live in urban and rural areas as well. The most vulnerable social groups of the drought, the farmers and herdsmen are nomadic. Farmers who suffered cereal and fruit orchards are mostly manufacturers. In this classification shepherds, are considered vulnerable. . During the recent drought, agricultural communities and farmers with revenue of waste product concepts through complete damage, loss of flocks, low yield production of livestock and distortion of market prices continued to decline in pork prices, have been damaged. Three years due to continuous drought, most ranchers and farmers for feeding, watering and treatment of livestock and purchase of agricultural inputs are heavily indebted. In addition to the drought, the collapse of agricultural activities and urban water supply in the village are a lot of influence during the years 2001 1999 And implementation of water rationing, the general rule in major cities throughout the country. The negative effects of the recent drought, has led to serious economic and social problems.

Economic impacts of drought, widespread and multilateral and sub-sectors such as dryland farming, animal husbandry, pasture and forest management and in the early stages of developing, processing and complementary covers. Lack of jobs and income, sale of land and livestock, high production costs, low food supply and tax revenues and government expenditures are examples of economic impacts associated with drought. Often, these effects are not ignored unless a severe drought occur; Continuous monitoring current drought is not so practical. In addition, you tend to talk more about the effects of a direct, immediate and short-term and long-term drought due no less to the indirect effects And why the evidence and official statistics do not reflect the real effects of droughts. In the 1999 drought, the effects 000/10 Management and Planning Organization billion riyals (25.1 billion dollars) estimated More than 80 percent of the damage crops, pastures and livestock. According to the most recent estimates by Smith (2006) reported total losses to the national economy, as output totaled 000/62 droughts in 2001 and 1998 billion rials (5.7 billion dollars). It argued that having a real picture of the impact for the purpose of policy, as well as the calculation of gross domestic product in a country where most of its provinces has always been prone to drought, is essential.. The importance and necessity of methodology and equipment that are used in times of drought and other natural hazards are clearly emphasized.

Impact of drought on natural resources and the environment

The drought continues and leads to great damage to the country's water resources: Biological diversity of plant and animal species and large-scale drought, the environment. Wildlife strongly influenced by the result of shortage of drinking water, lack of food, arid badlands and erosion, wildlife habitat is located. In our marshy ground of international importance, aquatic life has disappeared as other badlands. Among the first species of animals that are herbivores due to lack of water and food is affected.

Water in the country, almost equally from surface water and groundwater extraction, which is strongly affected by the recent drought cycle. Decreases in soil water nearly up to the standard rate (excessive water about 5 cubic kilometers) of water is worrying tables are falling in many areas, such as Kerman. Continuous drop in water tables, showing extraction of groundwater resources related to other important areas of plains and valleys are some of the central intake. . Future increases in water use areas should be almost exclusively to higher utilization of surface water resources. This approach requires more investment in water storage dams. Therefore, the reduced drought in the future should be in great social and economic costs if no appropriate measures are not taken soon.

Approaches and mechanisms of evaluation at the beginning and continuing drought and its effects

The complexity of the tasks of key stakeholders, the issue of prognosis, drought and other management issues through the project is assessed.

Despite the vast potential for the performance of such activities is still involved in the monitoring, impact assessment, reduction and response to drought is lower than expected.

Although most institutions have a risk management approach in the agenda, but except for weather forecast by Meteorological Organization, have not completed their assigned duties.

Due to the drought, good quality equipment for early detection of beginning and end of the drought is still underdeveloped. The severity of the drought that monthly monitoring are carried out primarily in terms of deviation from normal precipitation, false information of soil moisture, groundwater and the water reservoirs, the rivers, the masses of snow and well presented. For the purposes of forecasting drought, processing and compiling the monthly, weekly data interval should be reduced to the point where the information required to create indexes used to evaluate the drought.

Equipment and methodologies for assessing the effects of drought and assess the vulnerability of the increasing severity of drought in terms of target groups or different economic activities developed. . To be more specific, qualitative assessments through field visits or estimate done fast. With drought stage to perform specific operations and reduction reactions identified due to inadequate equipment and poor communication between the indicators used and to evaluate the effects of drought are often unauthentic.

To coordinate the activities of drought management headquarter natural disasters (DF) in 1996 under the Interior Ministry with responsibility for Emergency Management drought through a number of committees and working groups at national and provincial level, they were created.

Currently, natural disaster headquarters said the drought preparedness directed. Any mechanism for checking in each stage of drought there is Disaster Task Force is essentially a crisis situation in the national and provincial levels based on the deviation from the normal rainfall human rights violations. Provincial Committee of disaster (PDF) of the Natural Disaster Task Force requests to declare a crisis situation in the national or provincial levels Or after the adoption of Staff natural disaster, disaster Provincial Committee (PDC), with the critical situation in the province. The Regional Disaster Committee (BDC) of the Provincial Disaster Committee (PDC) requests to declare a crisis situation in the region or province. After obtaining the approval of the Provincial Committee of disaster, disaster Regional Committee, said the critical situation in the region. Disasters also requests the Regional Committee of the Provincial Committee of Legal Affairs to declare disasters and disaster Provincial Committee of the National Committee on Natural Disaster asks the same trend. Often drought management activities by representatives of ministries in the provincial committees of national, regional and provincial disaster occurs and Working Groups.

Mainly in the committee, but needs a good system for collecting information in order to analyze the drought, decision-makers at all levels with information on developments regarding the start, continue and end the drought conditions are met. Now, just when drought occurs, some of the committees are created to fix the problem. Rather than react after a drought, the system for monitoring agricultural and hydrological droughts must be part of a system-wide in response to drought, before it is designed.

Drought management in Iran

Population growth rate of population increase in recent decades in terms of its youth to Hdvdsal 1400 will be a significant increase. . According to Iran's population was estimated in 1400 to about 129 million. Population explosion in the land of arid and semi-arid climatic conditions such as Ayrank·h 3/2 suitable atmospheric fallout

zone, it is no cause many problems. Population growth and improve living standards, demand for water increases the file size is limited And competition between water users (domestic, agricultural, industrial) underlines them. Drought is a recurrent phenomenon in our country in the past two decades, for example, 13-year drought has experience with different extents.

For the Birds (Angle, 1996) humans in the face of drought and reduced water quality impacts will be more new dimensions:

1. Lack of food resources
2. The international instability
3. environmental disasters.

All the people were more or less familiar with the drought and the effects in the event of severe droughts have touched But determining the severity of the drought and assessments in each area still remains one of the most important issues (Abbasi 1381). Khosravi (1379) states in many areas of Iran, drought for a restriction would be imminent and unavoidable. He is in a general category, of drought in Iran is described as follows:

1. The average annual rainfall of around 250 mm, which is less than the number in mean rainfall of Asia and the world is about one-third of average annual rainfall.
2. arid and semi arid climate in the country and problems associated with climate variation over the years and through the desert belt of the country.
3. The unbalanced distribution of natural spatial and temporal depth of the surface water (groundwater) in accordance with water demands.
4. fallout of atmospheric and low surface water, groundwater levels and the location of the unknown and lack of access to sea water and desert area of central provinces.
5. The lack of planning in conservation, and water use (including use of underground water-supply to different regions)

6-climatic, and cultural differences over different geographical conditions and topography across the country

Treasury et al (1389) An example of program evaluation experience in the United States as a model and guide for planning have suggested that consists of the following steps:

1. The National Commission of drought
2. Description of the objectives and policies
3. Fix the problems and possible conflicts between economic and environmental sectors
4. Determination of natural resources, human as well as to determine the biological and legal and financial constraints
5. develop drought plan
6. Identification of research needs and gaps in
7. The combination of scientific and political issues
8. Implementation of Drought
9. development of educational programs at different levels
10. methods to assess the drought plan

Disciple et al (1380) based on US experience and the needs and problems of Iran Water Resources Management for comprehensive management plan to deal with drought has recommended as follows:

1. evaluation programs include:

- Provide a comprehensive definition and selection of drought and computational methods for predicting drought
- Analysis of drought indicators are based on defined parameters
- Determine the type and manner of operation cope with drought
- Evaluation of damage caused by water shortages and determine the time and type of appropriate measures
- Assessment based on the information network monitoring requirements and provide solutions for the development and completion of the network

2. New legislation programs and evaluation of previous rules, which mainly includes the following strategies:

- Review and adjustment of the water rights for drought conditions
- The allocation of low-interest loans for farmers affected
- Review of necessary legislation in order to maintain river flow and prevent drying them
- Prevent urban development in areas that face drought
- Legislation for the savings in water consumption

3. education and extension programs in order to inform and encourage people to save while maintaining public awareness and
4. The program offers technical assistance and establish obligation to use new resources Such as changes in agricultural patterns, the use of low-consumption figures, methods of irrigation, water stress based productivity in

agriculture, recycling of industrial wastewater in the industrial sector and development programs, the exploitation of their resources under normal conditions is not affordable (Development of new sources) and changes in the type of resources such as licensing or revise emergency operations in managing the operation of dams

5. Plan to increase the efficiency and utilization of water resources utilization efficiency close to the returns anticipated or expected in agriculture, industry and urban water

6. Stormtroopers programs such as the reform of water conveyance systems and water distribution, supply drought damage, avoid unnecessary operations such as the recreational dams, , Tax breaks and emergency plans and offensive actions like buying water rights and water rights of farmers and the intensification of measures to prevent the exploitation of surface and groundwater resources

5. Offers

Drought is one of the most common changes in climate that many arid and semiarid areas of the world with high intensity once every few years in the covers. It is not clear for many years of drought for some time Therefore, identifying the drought of valuable water resources management areas such as Iran that much of the arid and semi-arid areas that will be considered. According to the literature in order to recognize the intensity and spread of droughts generally indicators has been developed, each with its own inputs and terms of use are the final touch. According to the information available meteorological variables such as climate, many of these indicators are input. Among the most important factor determining climatic variables deal of rainfall in drought. . Rainfall is the most important variable that changes directly in soil moisture and surface flows, changes in underground water reservoirs etc. to be reflected. Based on previous studies on SPI index or indices based on rainfall indices in the world and one of the most studied indices of meteorological drought is Iran. The index of rainfall data gamma distribution provides the dimensional values that have normal And can be generalized to the point information such as kriging geostatistical models of regional information is used, Using this technique on condition of normality. While data is generally not normal. This allows a drought facilitate spatial analysis. Astandarnd precipitation index at different time scales in the offending areas have been investigated and reported to the increase in index-precision long-term time scales in the literature the time base have a one-year 9 and. Browse resources, noting that due to changing climatic and physiographic characteristics in different regions of the country, drought in Iran shows the spatial expansion and different degrees of intensity. Failure to comply drought in different parts of the country is very important that it is necessary to identify the factors affecting it. Of theorizing in the history of research, we can say that elevation of these factors can be considered.

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