



ORIGINAL ARTICLE

Orumiyeh Lake and Therapeutic Effects with Environment Protect

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ABSTRACT

Orumiyeh lake has been designated as an international park by the UN. The water of this lake, containing natural salts and muds is used by patients who suffer of dermal and rheumatic troubles. This lake is one of the largest permanent saltwater lake in the world, which is located within the catchment area of the North West of Iran. This paper aims to investigate the importance of the pond and management and planning for protection of Orumiyeh lake, with therapeutic and touristy view to lake. Orumiyeh lake is converting to a wide area of salt marsh due to natural hazards, such as drought and water scarcity, and also due to humanitarian reasons, such as running social and economic projects like construction of Shahid Kalantari highway over the lake or building numerous dams, the entrance of animal and human sewage, performing developmental activities, drilling deep wells around the lake and so on. Of course! the officials are following and performing some methods to reduce these destructions, but the drought is so high that it seems many experts cannot deal with it quickly. A recent study, demonstrated that 65% of the decline was from changes in inflow caused by climate change and diversion of surface water. However, this lake has therapeutic effects in dermatologic and musculoskeletal and other disease.

Keywords: tourism, salt, Orumiyeh lake(urmia); therapeutic effects

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INTRODUCTION

Lake urmia is one of the largest hypersaline lakes in the world and the habitat of a unique *Artemia* species (*A. urmiana*). Despite this and several other values of the lake and due to drought and increase salinity of the lake to more than 300gr/lit during recent years, management of this incomparable ecosystem should be considered to improve the current condition by fisheries research institutes. With tourism development by scientists, we can protect this lake. There are numerous beautiful islands where wild beasts and birds live.

This lake has 27 mammals species, 212 birds species, 41 reptiles species, 7 amphibians species, 26 fish species and 112 islands and it has been introduced as a biosphere reserve in humans and UNESCO program and has been recorded there since 1966 [1].

Water enters the Orumiyeh Lake is divided to three categories of underground streams, total precipitation, surface streams, and the only outlet of water from the lake is evaporation [2]. The lake catchment has an area of 51,400 square kilometers, which is limited from the east and south to the catchment of Ghezel Ozan river and from the north is limited to the Aras river catchment and from the west is limited to the Zab River catchment. Drought is a natural phenomenon that has been happened in all eras, but its effect is more obvious in recent years that the population growth and water consumption is increased significantly. The drought itself is not a disaster, so the key point is in understanding drought, natural and social arrangements which are performed [3]. Drought is related with three categories of precipitation, river flows and soil moisture. Climatic drought (weather) depends on the amount of rainfall in a region. For the separation of precipitation, usually long-term average precipitation levels are used. This means that if the precipitation amount of rainfall in a given time period is less than the long-term precipitation average, a climatic drought has been occurred. The consequences of drought are included:

reducing dry cultivation, reducing the natural flow of rivers, reducing the groundwater storage, reducing the agricultural irrigated products and reducing the lands in modern networks and reducing the pasture forage [4]. Drought has been a threat for Orumiyeh lake in the last years, but there are many years that the high level of water in the lake has threatened the coastal cities. There are many regimes of low water and high water for the lake which each of the lake's water regims has concerned the residents of those areas seriously [5]. In an article with the title of "monitoring of drought in Isfahan by using SPI and deciles index" the authors concluded that these two indexes are useful for monitoring drought [6]. In comparison and investigation of meteorological drought indices, they found that the most widespread drought year in most of indices is related to 1982 [7]. In zoning the drought in south Khorasan province by using SPI indices, they found that in the statistical studied time period, the driest and wettest years are corresponded to 1995-1996 and 1999-2000, respectively [8]. In statistical study of returning the different drought conditions in Isfahan province, they found that there is medium and severe droughts in the western part of the province and a return long term period and severe droughts in the eastern and northern parts of the province [9]. Today, the crisis condition of lake has become one of the most challenging environmental problems of the region, especially the East Azerbaijan. Despite the activities performed to recover the lake, the lake destruction still continues. Therefore, the adverse environmental, economic and human consequences of drying the lake, threatens the area and threats animals and birds and tourism industry.

Orumiyeh lake is one of the largest permanent salty lakes in the world which is located in the north west of Iran catchment between the two East and West Azerbaijan provinces. The average length of the lake is 140 kilometers and it's average width is about 50 km and it's area is 5263 square kilometers based on the satellite images. However, the average area of the lake has been estimated about 5500 square kilometers. Average depth of the lake is 5.4 meters and there is a maximum depth of 13 meters in the north of the lake and its approximate volume is 31 billion cubic meters [10].

ANALYSIS

Due to climatic conditions and soil type in Azerbaijan region, occupations such as agriculture and horticulture in the region is the highest priority for residents and water is essential for satisfying their needs, which their requirement is met by constructing many dams [11].

Effective factors on the environmental crisis of Orumiyeh:

1. Entrance of animal and human sewage and waste water: One of very effective factors which disturbs the ecosystem of the Orumiyeh lake national park is entrance of animal and human sewage and waste water. About six million cubic meters of industrial waste water and 2005 million cubic meters of wastewater containing pollutants, fertilizers and pesticides, along with large amounts of human sewage is disposed to the the Orumiyeh lake catchment [12].

2. Performing developmental activities on the lake's coast such as amusement and tourist cities in the lake area and inefficient implementation of some of the projects has caused damage to the pond habitat.

3. Drilling deep wells around the lake: In recent years which the wave of water scarcity and decrease of precipitation has shown it's effects, this forces agriculture, industry and fisheries to use the water resources in different layers inside the ground to supply water for their consumptions. The extension of the lake's catchment over 500 square kilometers and drilling legal and illegal deep wells, has reduced water intake [13].

4. Dams around the lake: The experts of environment protection organization claim that the excessive construction of dams is effective in drying of Orumiyeh lake and believe that dams construction controls flood streams and the regulated water is consumed and does not enter the Orumiyeh lake. Significant volumes of water taken from the lake is consumed in agriculture while the maximum irrigation efficiency is 34%, in other word, 66% of water taken from rivers and lakes which are used in agriculture section is wasted and evaporated [14].

MAIN FINDINGS AND IMPLICATIONS

Lake Urmia's water level has rapidly declined since the mid-1990s after having remained relatively stable over the 30 prior years. Construction of dams and diversion of surface water for agriculture, along with reduced precipitation and warmer temperatures over the basin, and to a lesser extent reduced inflow of groundwater are generally accepted as the causes (9,2,13). Reduced water volume concentrates the salts in the lake making it too saline for the brine shrimp which - being near the bottom of the simple food chain - support the very diverse bird population for which the lake provides important habitat. The surrounding brackish wetlands with a productive and diverse plant population will also dry up under current trends and conditions. As the lake retreats from its original shoreline it leaves a layer of salt - primarily sodium chloride - which leaves the land unusable for agriculture and threatens to unleash

damaging storms of wind-blown salt on the surrounding area. The lake's increasing salinity has reached near saturation at over 300 g/L and threatens to decimate the lake's brine shrimp population which is a key link in the ecology of the lake and surrounding wetlands. While effective integrated water management is called for by many, there are no easy answers. Water conservation within the basin might provide some relief. However, finding the volume of water needed to restore the lake, without going outside the watershed, would probably require allocating water away from important areas of irrigated agriculture. Water transfer from the Caspian Sea would be very expensive and time consuming and may come too late to avert damage to the ecosystem by the historically low water levels and high salinity that are already occurring. Diverting water from neighboring watersheds would be less costly and time consuming but also has some serious challenges. A comprehensive integrated water management plan would take all elements of the basin's water budget into account, balancing demands for irrigation, ecosystem preservation, social and human impact and water quality as well as operating within the national and regional political realities.

During the workshop, various stakeholder groups identified 16 benefits derived from the Lake and surrounding wetlands. These fall into three main classes:

1. Ecosystem benefits, which include climatic moderation, biodiversity support, landscape and scenery, and soil conservation.
2. Wetland products, which include Artemia, reed and salt harvesting, vegetation/livestock grazing, water bird hunting, and the use of therapeutic muds associated with health spas.
3. Services include groundwater recharge, prevention of saltwater intrusion, tourism and ecotourism, education and research, and sediment/nutrient/pollution retention.

In addition to the above benefits, two negative aspects of the lake were identified as constraints posed by the Lake to ground way transportation and saltwater intrusion. The list of stakeholder groups as well as a quantitative assessment of the benefits (scored) that each group obtained from the Urmia Lake and its surrounding areas are summarized in Table 2.

The aim of this analysis is to highlight the collective utilization and benefits received from the Lake.

Stakeholder groups receiving the most benefits are environmental protectionists and groups associated with tourism, agriculture, municipalities, and the public. Lower level benefits are received by hunters, the water resource management sector, aquaculture and fishing interests, and harvesters of Artemia, reeds, and salt.

For the Artemia and salt harvesters, it is notable that, although the number of benefits they receive is relatively low, their activities are entirely dependent on Lake resources. The stakeholder groups receiving the lowest level of benefits from the Lake are the transport and industry groups

Regarded that the aim is to develop the agriculture section in the region and also to improve the socio-economical condition of people, but destruction of ecosystem and change of ecological capacity and negative effects of changing the habitat are not considered and they have improved agriculture section without considering negative environmental effects and evaluating its consequences, which some of them include:

1. Small salt particles in the region
2. Salty soils
3. Air pollution
4. There will be destruction of plant cover in that invested agricultural area.

The Orumiyeh lake condition is critical and there is the probability of salt tsunami occurrence. So, the precipitation will decrease significantly and the water evaporation from the lake will increase due to the temperature increase in this region, so we conclude that the water level of the lake will decrease significantly.

5. Changing crisis to opportunity strategy should use all the methods to save the lake and improve tourism control and save the gained income and the funds of environmental enthusiasts in order to save the lake and use it scientifically. As such we want to save and rescue Iranian cheetah, we should prevent drying of Orumiyeh lake to keep the biological species in the lake region.

STRATEGIES

1. Create tourism therapeutic centers with protect of lake

2. According to the critical situation of Orumiyeh, the first step is opening the dams gate so that at least one billion cubic meters of water enter the Orumiyeh lake, but before this, it is essential that all rivers lead to the Orumiyeh lake be dredged to prevent sediments from entering the Orumiyeh lake, simultaneously, a mechanism is necessary to not allow to withdraw water from the water moving to the Orumiyeh lake.

3. The most important and valuable approach for controlling this problem is optimal management of water and soil resources in the region.

4. Using private section in identification and investing in the lake.
5. Establishing a committee to protect the lake and create harmony.
6. Publishing weekly or monthly newspapers or magazines to provide the news about Orumiyeh lake, and this may be effective in protecting the lake better.
7. Cloud conceiving and lead them to the studied area
8. Cloud conceiving and lead them to the agricultural areas
9. The cooperation of lawyers and officials to save the lake and have a permanent supervision on the process.
10. High exploitation of the existing salt in the lake and if it is necessary, enrich it for therapeutic properties in order to decrease the needs for additional water.

RECOMMENDATION

Some therapeutic benefits of the salt and sludge of the lake are in Vit-D3 deficiency, thin body and appetite, romatism, dermatologic problems such as psoriasis and musculoskeletal disease. We have many patients that they say over benefits of salt and sludge of this lake but we require a great statistic study about these benefits.

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