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Reasons of Desertification in the Middle Of Aras River Basin (Nakhchivan AR & Turkey) and Measures of Combating Against Desertification

Fatih Muzaffer İMAT

Nazim BABABEYLI

Abstract

Nakchıvan autonomic republic is a blockaded autonomous region that is dependent on Azerbaijan between Persia and Turkey. The most important relief of this region is consisted of middle Aras river basin. At the same time some part of the land in this region belongs to Turkey. In this area the blockade condition, dry climate effects of humans and etc. situations spoiled the ecological balance and it increased the desertification process. As a result the middle Aras river basin is turned to desertificated regions (lands). In this article measures that can be applied in this region are presented to stop this danger

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Fatih Muzaffer İmat *is a PhD candidate of Geography Department at Nakhchivan State University, Azerbaijan*
Nazim Bababeyli *is a associate professor and Head of Geography Department at Nakhchivan Stat University, Azerbaijan*

Introduction

Desertification and other related problems are important problem of civilization, modern geographical study and ecology. One of the most important studies of modern geography is to make predictions for future. The increase of industry, the negative effects of people on nature, the 0.5 C increase of temperature at atmosphere and etc. factors destroyed ecological balance and caused desertification to increase more. The destruction of ecological balance has an effect on the increase of desertification, the destruction of living creature and catastrophe.

The global warming, changes in the interaction of heat and humidity, disturbance of internal environmental balance causes the acceleration of desertification in the regions (their effects on desertification are cited below).

According to the Memmedov Q, Halilov M.(Mamedov, Halilov, 2004) desertification is the ruining of earth ecosystem as result of decrease or destruction of biological potential of land, human activities and the change of climate.

The territory of Nakhchivan Autonomic Republic covers the Araz hollow and the southern slopes of Zengezur and Dereliez. Republic includes Nakhchivan, Julfa, Ordubad cities and Babek, Julfa, Ordubad, Sherur, Kengerli, Sederek and Sherur regions. The area is about 5400 km2.

The physico-geographical condition of Nakhchivan AR differs from other regions of Azerbaijan. The height changes from 600m to 3904 m. 60% of the area of the republic is in more than 1000m height. The essential part of area is over the Araz plain. At the same time Araz plain is both a part of Turkey and Nakhchivan AR. Due to the fact that the land settles down in the valley (sürmeli) tropic air flow causes temperature to increase in the area and it increases desertification. The current study of the possible reasons of process of desertification in the republic is based on basis of climate factors and changes of biosensors. Biosensor: it is a group of animal, vegetable and microorganism that improves close connection with each other in any land. The destruction of ecological balance weakens the connection between this group and it creates a potential danger of desertification.

Reasons of Desertification in the Middle of Aras River Basin

The climate of Araz river basin is strong continental. Area belongs to sub tropic climate zone. The winter is cold and summer is dry hot. Climate is semi-desert. The average of annual Temperature is more than 20-22C . The annual fall-out is about 200-300 mm. Minimum and maximum temperatures were observed in Julfa and were -32 C and +44 C, accordingly (Budaq and Qəribli, 2005).

The humidity deficiency is observed. The humidity coefficient is less than 0,3 mm This factor increases the potential of desertification. The mountain of Middle Araz river basin areas are characterized by dry cold climate, which stimulate the acid denudation process and potential of desertification. As we mentioned above the main reason of desertification in the region is climate factors..

The climate plays an important role in the formation of landscape over the Araz river basin. Let us consider some aspects of climate condition in the region.

-The annual sunny hours changes in the internal of 2700-2840 (Caucasus, 1966). Solar radiation is equal to 165 kcal/3m2 per year (Mirzəyev, 1972). These parameters are more than in Turan lowland desert. According to the last parameters (2005-2009) monthly temperature average of july and august in Julfa is equal to 28.6C. and daily maximum temperature reaches to 44 C for sometimes in July

- The average temperature is equal to – 4,9 in Julfa and –3 in Igdir in January. For comparison, it should be noted that annual solar radiation is equal to 155 kcal/sm2, average monthly temperature 26-29 C in July in Kizilkum desert in Middle Asia. Annual fall-out is 215 mm in Julfa and 210 mm in Kizilkum desert. As we see, the basic climate indicators over Araz are the similar indicators in Kizilkum desert (Budaqov, 2004).

According to Ozgur (2001) soil erosion in lands over Araz river increases desertification. The landscape zone in Nakhchivan differs from other areas of the republic. This is especially in the main forest landscape. Total area of forest is 20.000 ha in Nakhchivan, the blockade of area and deficiency of fuel increases the destruction of forests zone. All plains of

Nakhchivan are covered by the semi-desert vegetables. The semi-desert landscape predominates in heights of 700-900m. Weak vegetable cover stimulates the process of desertification in this area.

These areas were cleaned from forestry and shrubbery, when was it prepared to sow in 1960-1970 years. This caused the erosion of lands and accelerated the process of desertification.

As we mentioned above – the reasons of desertification in Nakhchivan AR are very different. All kinds of erosion exist here. The surface slopping plays an important role in arising of erosion. As a result of people's negative effect on nature forests and vegetables weakened. There is a linear relationship between erosion and slope. Erosion processes increases in the areas where the slope increases in the basin. The parameters are cited below.The studies of national Academy of geography department show that areas with the slopping degree of 5˚ are only 1,5% of total area (of republic). The areas with sloping 5˚-10˚ are in Sherur and southeastern part of Nakhchivan and is about 19,2% of total area. The areas with slopping 10-12˚ is about 42,5% from total area and are in Julfa, Ordubad, Babek and the main part of Shahbuz. The areas with slopping 20-30˚ is about 17,3% from total areas. The areas with slopping more than 30˚ is about 18.5% from total area (Babayev, 1999).

The river set is not developed. Waters of rivers in Nakhchivan AR are formed from snow, fall-out (53%) and underground sources. Rivers are the main sources of water resources and lakes. Rivers are used in irrigation. The irrigation channels are made from Araz and Arpachi water resources.

One of reasons of desertification is the developing of irrigation erosion, because of uncontrolled organization of irrigation. In this area modern irrigation system is not used and the usage of old irrigation system accelerates desertification. This brings to washing of soil surface and negative affect to agricultural vegetables. Related to this according to Q. Memmedov and M. Halilov the agricultural areas also undergoes to erosion process (Memmedov, 2004).

The studies of national Academy of geography department show that 250-300-cube meter of soil from per ha is destroyed in the period of irrigation. The calculations show that 200-300 kg of humus, 20-30 kg of nitrate, 50-100kg of phosphor and other bio-elements are escaped from soil

in year as of irrigation. This brings to loss of soil quality and changes the physical, water-physical structure of properties of soil and as a result of which, to the development of desertification process.

One of the reasons of desertification is the developing of valley erosion. The valleys are developed as a result of precipitation. The desertification process is caused also by the streams. Because of downpours and swelled snow in May, June, July and August months.

An other reason of desertification is wind erosion. This kind of erosion occurs more where soil vegetables are weak.

The development of desertification occurs also around the village pastures. Over excessive grazing causes acceleration of desertification. So this weakens vegetables. The productivity of pastures is very low and is about 1,5 – 1,7 s per ha.

The development of mountain –mine activity, including the salt production and copper-molhdenium mines is also one of reasons for desertification process in Nakhchivan. Since the thrown waste materials are not cleaned from the soils animals and micro organisms can not live in these areas. Situation is characterized for area in Gumushlu, Agdere and Julfa. The similar landscape is in stone quarries in Sherur and Shahdag.

The measures of combating against desertification.

The measures of combating against desertification in Nakhchvan AR include the following:

- Ways of rational usage of soil.

- To prevent soil erosion the following precaution should be applied. The alternative sowing should be applied. 3 years of clover, 2 years of wheat and 2 years of sugar beet must be sowed in erosion soil. 3 years of clover, 2 years of wheat and one year of sugar beet recommended to be sowing in soil with week erosion. 3 years of clover, 1 year of wheat and 1 year of sugar beet are recommended for soils with middle erosion.

Other vegetables can be used after these measures, when fertile and structure will be established.

- First of all, the measures of combating against irrigation erosion must be applied for irrigated soils, water consumption must have 0,3-0,5

sm. For slopping of soils with 0,00750-0,015 and 0,15-0,25 sm. for slopping with 0,015-0,025. For the soils with slopping 0,025-0.055 the water consumption will be equal to 0,1-0,8 sm. So the washed volume of soil must be no more 2.0-2,5 t. These parameters are the best rate to grow vegetables in the middle Araz river basin.

The length of small channels plays an important role in combating against desertification process. This factor affects humidity of soil, during of irrigation and productivity of vegetables. The length must be equal to 50-150 m. for high water absorption ability, 60-180 sm. for middle water absorption ability and 90-250 m, for week water absorption ability (Babayev, 1999).

One of the methods of combating against desertification is to take action towards decreasing of wind erosion. The forest zone must be constructed for this purpose.

The perennial herbs must be restored in wide areas. The forests must be constructed around the water reservoirs.

The graze of cattle in pastured lands must be regulated so, the number of cattle must be decreased to 50-70% where the soil productivity is equal to 50-70%.

The rational application of agricultural methods at plants improves erosion of soils and increase productivity, which prevents desertification process.

In the cold winter to prevent destruction of forest; besides the environmental pure energy sources, as solar and wind energy must have been applied in Nakhchvan AR.

One of the important ways of combating against desertification is rendering conscious by giving conferences to the public, giving information about this on media, publishing books and magazines and etc. (Imat, 2003).

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