

Short Communication

The Effects of Old Stabilized Sand Dunes on Improving Environmental Quality: A Valuable Experience from Khuzestan Province, Iran

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Short Communication**Introduction**

Active sand dunes are part of the ecosystems of arid and post-arid regions, which are important factors threatening life and buildings in these large areas of the globe. In order to protect the adjacent lands from being bitten by these hills, these sand dunes have been controlled with oil mulch and at the same time *Prosopis juliflora*, *Tamarix*, and *Calligonum comosum* trees have been planted in the bottom part of these areas [1].

In this regard, over 250,000 hectares of land in this province has been established for about 60 years (1960 onwards). These trees were irrigated in the first years and then with the development of roots and the use of groundwater, their moisture needs were met and established. Moisture supply is provided by the side drainage of Karkheh River which is added to these sand dunes. This new ecosystem has created suitable conditions for improving the weather and softening it. The establishment of these trees and the reduction of wind speed at the ground level reduced the suspended load of dust in the region. In several studies, the effects of this new ecosystem on improving the environmental conditions of the region were investigated [2].

In these studies, the effects of vegetation establishment on improving air quality and the amount and type of suspended particles deposited in the air were studied

After collecting the initial information of these areas, field studies were conducted. For this purpose, different areas including the corners and middle parts of these areas relative to the entry of the prevailing wind into the area were studied. Also, the physical and chemical properties of sediments was determined using standard methods. Clay mineralogy were done by X-ray diffraction after pretreatments. The amount of trapped sediments was determined by the difference between the physical properties of the soil at the present time minus the time of stabilization [3].

The results showed that a significant amount of airborne sediments were water-soluble salts. Due to low rainfall in the region, these salts often remain in the surface layer and cause salinity of the surface layer. Also, the increase in soil salinity was largely a function of the type of sediment trapped. The surface layer of the marginal parts in the sand dunes had more salinity. Some of these soluble salts were transferred to the subsurface layer due to rainfall. Next, sediments the size of fine clay and silt were added to the surface layer of these soils, which caused changes in the physical properties of these soils. These added materials caused the formation of surface crust in the surface layer of soils with a long history of stabilization. The formation of surface crust played an important role in reducing wind erosion in these sand dunes. The rate of increase in wind sediments depended on the location of the measurement site. The increase in clay and silt at the edge of the hills was almost twice as high as inland. In the peripheral parts, the amount of particulate sediment was 330 g / m² per year, but in the central parts it was reduced to 155 g / m² per year [4].

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Also, the highest amount of airborne material retention occurred in the canopy part of the trees, followed by the uphill and the last time in the lower parts of the region. The material of these sediments, in addition to soluble salts and gypsum, was carbonates, quartz, palygorskite, smectite and illite. Based on these results, it was concluded that with the low-cost, sand dune ecosystems in the first 5 to 10 years (depending on plant growth conditions) from a threat to an excellent opportunity to improve the environment and the region's economy. And has greatly reduced the burden of air pollution.

The positive environmental effects of this new ecosystem are just one of the important functions of this ecosystem. The results of further studies showed that this ecosystem has played an important role in the region's economy and has a key role for forage and rangeland production in these areas. Wildlife development in the region, especially the inhabitants of these areas such as chameleons and rabbits and other creatures living in these ecosystems has played an effective role. The positive experience of this region can be used as a suitable model for improving the environmental and socio-economic conditions of other similar areas with active and destructive sand dunes. Investing in these areas will be in the long run for the national interest of each country and the economic impact of this work will be quite profitable [5].

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