O 129. THE WIND EROSION SEEN IN KARAPINAR

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ABSTRACT: Karapınar which is located in Konya Closed Basin is area to prone to erosion with a cause such as being salty, calcareous and dune of soil structure, lack of rainfall, having sparse vegetation due to failure to comply the rules of pasture management in their rangelands which previously had good a pasture. 23% of farmland in town is a matter of wind erosion with different reasons. In Karapınar, fighting wind erosion was started hat 1962 for the first time. In the first step, the prevent erosion studies got off the ground by hedging round 160,000 decares of in this area. The reed curtain was established on dune hill in this land on the purpose of firstly decreasing wind speed and then preventing sand movement. Then, the between reed curtains was made a place green with plants like crested wheatgrass, tall wheatgrass, etc. Planting works to decrease soil movement was used plants which belong to the region and being drought-tolerant species such as silverberry, false acacia, Fraxinus, black pine, etc. In this review, information about the wind erosion occurring in Karapınar.

Keywords: Karapınar, Rangeland, Wind Erosion

1. INTRODUCTION

Erosion is one of the significant environmental problems in terms of polluting in water and ecosystem; moreover, erosion reduces in yield and quality by causing limited of production on agriculture. In Turkey, 89% of the soil having problems is seen the erosion, and the wind erosion occurred in Turkey is about 465.900 ha. This wind erosion seen in our country comes up to 1.5% of total agricultural land (Acar and Dursun 2010, Kirtiş 2014, Çarkacı 2019).

69.2 % of all wind erosion area in Turkey occurs in Konya (Table 1). Karapınar, Sarayönü, Kadınhanı, Çumra, Cihanbeyli, and Ereğli are mostly affected by wind erosion in Konya. On 103.000 ha areas of Karapınar occurred wind erosion composed of 22.1% all wind erosion in Turkey (Anonymous 1986, Kirtiş 2014).

Table 1. The Wind Erosion Severity in Turkey and Konya (Anonymous 1986, Kirtiş 2014).

Erosion Severity	Wind Erosion Area in Turkey (ha)	%	Wind Erosion Area in Konya (ha)	%
Slight	165,664	35,6	124,521	26,7
Moderate	231,041	49,6	138,794	29,8
Severe	64,385	13,8	56,678	12,2
Very severe	4,823	1,0	2,481	0,5
Total	465,913	100,0	322,474	69,2

The underside soil layer on the wind erosion area in Karapınar have sandy structure while the surface layer has a loamy structure (Anonymous 1986). The soil in this area abounds with lime and potash, and organic matter and phosphorus in this soil are scarce. Total area in the town has about 296.900 (i.e., agricultural land of 150.000 ha, rangeland about 130.444 ha), and 23% of these areas in Karapınar have occurred to wind erosion (Anonymous 2014).

In our country, wind erosion has occurred commonly arid and semi-arid regions. The climate of the region can be defined as semi-arid continental. The summers are dry and warm, and the winters are usually cold. Average annual precipitation in the area is about 270 to 280 mm, about 40% falls in winter.

The average temperature is 11 C. The nights are cold in winter. In time the temperature drops below -20 C or lower. In summer the heat is often between 30 and 35 C and is occasionally above 35 C. The dominant winds are commonly from the south-western corner, mainly from the south, south-west, and rise to dust storms that are disagreeable and destructive. Stormy days are standard, and wind attains speeds of 20 to 25 m/sec or more. The average relative humidity is between about 40 % in summer and is 80 % in winter (Anonymous 1986, Anonymous 2019).
The Reasons for Wind Erosion severely seen in Karapınar (Anonymous 1986):

1- Karapınar was lake bed in the past
2- Having hot and dry continental climate
3- Overgrazing by sheep in the region
4- Locals ripped off the soil –protecting plant such as *Astragalus microcephalus, Marrubium parviflorum, Alhagi cemalorum,* etc. from pastureland.
5- Using extremely soil working machinery and equipment
6- Be located on an intense wind course

2. THE COMBATTING EROSION SEARCHES IN KARAPINAR

Problem broke out in 1960 in Karapınar. In the first step, the prevent erosion studies got off the ground by hedging round 160,000 decares of in this area. In these areas were surveyed at hydrologic, geologic, soil and topographic surveys. After, the improvement studies were continued on 130.000 da. In that research, regions were divided into quarters and were carried out improvement studies regarding the situation of areas. The research conducted for improvement between 1962 and 1973 and being a model at today are summarized in Table 2. The improvement studies were gone on during decades, and after the protection, control, research, and production studies were stated in these areas (Anonymous 1986).

Table 2. The research conducted for improvement between 1962 and 1973 and the areas of the situation at that time (Derived Anonymous 1986, Anonymous 2019)

Area of Name	**Area (da)**	**The case in the 1960s**	**The Research Conducted for Improvement *(Between 1962 and 1973)***
Sand Extruders Field (Kum Bars)	43.000	View a desert; there wasn't a vegetation cover	a- Physical Precautions: Firstly, it was decreased wind speed by using a reed screen (Figure 3-6) b- Cultural Precautions: 1- Covering with grass: It was used weed seed collected from locale pasture and drought tolerant plant such as sand ryegrass, crested wheatgrass, tall wheatgrass (Figure 7-8) 2- Forestation: The drought-tolerant trees belonging region such as *Elaeagnus sp., Fraxinus sp., Robinia pseudeaccucia, Ulmus sp., Acer sp., Amygdalus sp., Prunus mahalep*, black pine, cedar trees, were planted, and nursery garden established in the field (Figure 9-10)
Moving Sand Dune	40.000	Overgrazing, Damaged varying reasons like ripped of some shrubs, etc.	Firstly it wired to the field, and in these areas were supplied covered with vegetation of square by using the natural seed of plants belongs in the regions.

Sensitive to Erosion, flat and soil field	32.000	There weren't vegetation cover, in the beginning, dry agriculture was done, be left owing to erosion	Fallow –Cereal Crop rotations were applied in 10.000 da fields. In 2.000 da was grown horticultural crops. The production facility of pasture and rangeland crops were established in the remainder area. Band seeding method was applied in these areas.
Ketir Hill	15.000	The area covered with trees before erosion. In the 1960s there weren't any tree	These areas were done forestation study with pine, cedar, blackthorn, wild almond and blackberry when stopped moving sand, and planted 7 million almond.

In combating erosion is essential continuity for being sensitive erosion region due to having climate and soil structure in Karapınar. Nowadays, combating erosion in these areas are used forage shrubs such as *Atriplex canescens, Kochia prostrata*, *Haloxylon aphyllum*, etc. (Acar and Dursun 2010), and in the research, the institute is grown the lavender which is medicinal plant and nectar source plant (Çarkacı 2019) (Figure 1-3).

Figure 1. *Atriplex canascens* in Karapınar in 2018 (Org.)

Figure 2. *Kochia prostrata* in Karapınar in 2018 (Org.)

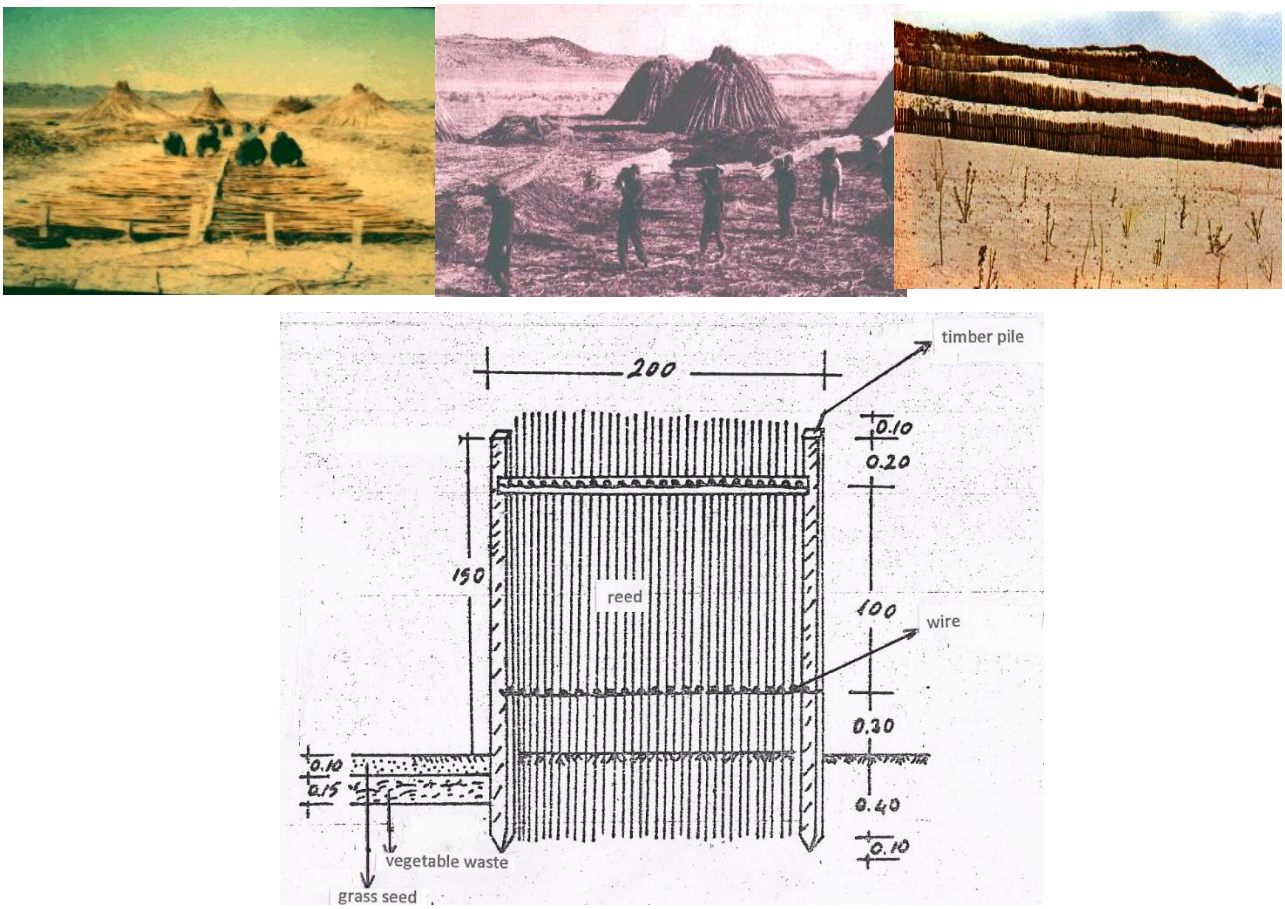

Figure 6 Physical Precautions: Structure and shape of the reed screen in Karapınar (Acar and Dursun 2010)

Figure 7-8. The first step in Cultural precaution: covering with grass in Karapınar in the 1960s (Acar and Dursun 2010)

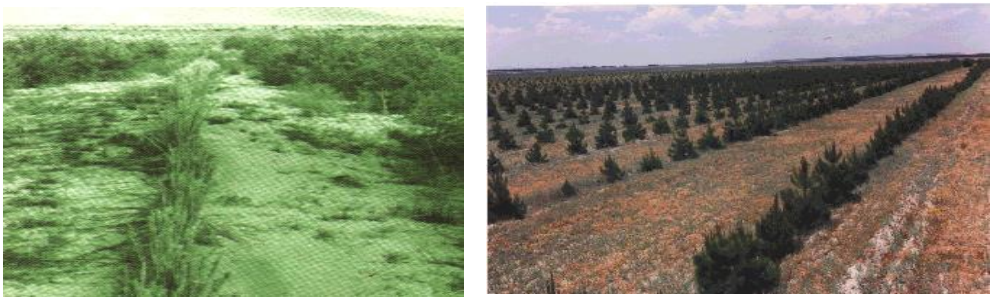

Figure 9-10. The second step in Cultural precaution: Forestation studies in Karapınar in the 1960s (Acar and Dursun 2010)

3. CONCLUSION

The rangeland areas about 130.444 ha located in Karapınar are sensitive to erosion due to overgrazing. For this reason, plant composition of rangeland in Karapınar should be determined with vegetation etude studies, and to start the rangeland improvement researches is a necessity with improvement methods such as natural seeding, overseeding by using shrub species according to meadow situation to increasing pasture yield.

Agricultural land in the region is recommended to strip farming method decreased to the speed of wind erosion. We believe to decline in the effect of wind erosion to include plants which are used the water economically instead of fallow, spud plants in rotation system in the region.

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