

Potentialities of Irrigated Agriculture to Combat Desertification in Mauritania

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1. Introduction

Mauritania extends between the 15th and 27th degrees from northern latitude, with an area more than million square kilometer. In general this a flat country; the height of the mountains is almost lower than 500 meters except of Adrare Mountain, which is about 925m. This country has characterized by desertification in about 80% of the total areas. Desertification has been caused by many factors, which are more serious in dry season. The main desertification factors are (1) persistent drought, (2) non-sustainable farming practices, the clearing of lands and, (3) the deforestation due to the firewood. Total agricultural land in country is about 204×10^3 ha, with less than 20% of that area is under irrigation and the rest is rain-fed area. The irrigated area is almost under cultivation of sorghum, maize and rice, and the rain-fed area is under cultivation of some vegetables during the rainy season. In this paper we will investigate the potentialities of irrigated agriculture to combat desertification in Mauritania.

2. Material and methods

2.1 Desertification characteristics

The climate of Mauritania has changed since 1968s, as the result of drought, but still we can find four ecological zones; the Sahara zone, the Sahelian zone, the Senegal River valley, and the coastal zone. These zones are almost deserts and there is no any natural boundary, but there are some physical factures to distinguish them. The color and composition of the sand, which covers 40% of the three zones except of the Senegal River Valley which, is different. The moving dunes threatened to engulf wells, villages, and roads, in case of capital Nouakchott during 1980s, the desert was expanded southward with a rate of 6 km par year. The government helped to stabilize the sand dunes around Nouakchott and planted 250×10^3 ha trees to create barrier against the encroaching desert (SONADER, 1995).

Table 1 average of monthly/yearly meteorological factors in Nouakchott Station (1981-1990).

Meteorological	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Tmax. °C	29.2	31.1	32.6	33.1	34.0	34.4	31.7	32.6	34.9	36.0	33.7	30.0	32.8
Tmin. °C	13.8	15.3	16.7	17.9	20.0	21.9	13.6	24.8	25.0	23.0	16.7	15.0	19.6
Tmean °C	21.5	23.3	24.6	25.5	27.0	28.1	27.6	28.7	30.0	29.0	26.2	22.0	26.2
Precipitation (mm)	1.2	3.1	0.0	0.1	0.0	2.1	10.3	25.3	26.8	3.4	10.0	0.0	82.3
Wind speed (m/s)	5.5	4.4	5.0	5.4	5.7	5.2	4.6	4.3	3.7	4.5	4.2	4.3	4.7
Evapotranspiration	117.2	133.6	167.8	163.2	194	178.0	144.0	144.0	153.2	148.2	133.9	133.7	1811.0
Humidity, RH (%)	37.4	44.1	48.6	53.9	55.0	62.1	74.0	74.1	68.9	54.0	50.6	42.0	55.4

*According to Hargreaves model (1985).

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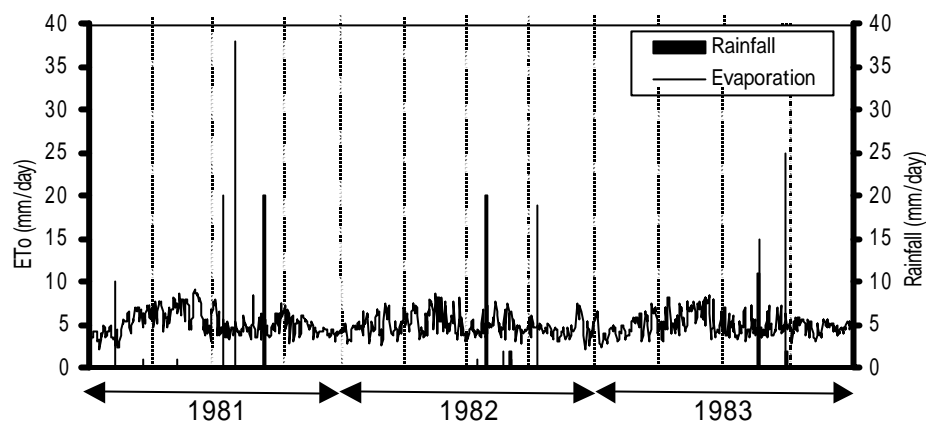


Fig.1 Daily variation of rainfall and evapotranspiration in Nouakchott Station.

3. Results and discussion

Rainfall in the Mauritania varies from less than 50 mm in the North (Tirs zemour), to more than 500 mm in the southeast country (Selibaby). **Table 1** shows the average of some meteorological factors in Nouakchott. Average minimum and maximum temperature is 13°C and 34°C, which occurred in January and September respectively. The strong wind was in the summer and rainy season, in the Nouakchott that wind fresh and wet, but never carrying rains, but they almost caring the sand during the year. The humidity on average has ranged between 37% in January to 70% in July to August. The humidity is low during the January to March and increases in rainy season. Inadequate and irregular precipitations in Mauritania have cause limitation in water resources. As show in **Table 1**, the annual rainfall in Nouakchott area is about 82 mm, which concentrated in July to September. Daily data have illustrated more detailed information about the intensity and distribution of rainfall in this area (**Fig. 1**). The rainfall in this area is concentrated in a few days of the year, which is almost less than 10 days, and in some of them the intensity of precipitation is pretty high (38mm/day). It seems that the rainfall can be one of the factors affecting desertification in Mauritania by erosion. The total agricultural area under irrigation is about 49.2×10^3 ha, of cultivated 9.6% use is ground water, and 90.4% surface water. The country should increase irrigation potential by using the technology across the Senegal basin, which involve cultivable areas about 165×10^3 ha. The main irrigation technique used in full or partial control irrigation schemes is surface irrigation. The average cost of irrigation development varies between \$US 3100/ha for small schemes to about \$US 1300/ha for large schemes (SONADER, 1995).

4. Conclusions

In Mauritania there are many Factors against stabilize the dune sand, and exploitation of the water resource and development of irrigation, these can be summarized as follows: (i) high costs of irrigation development, (ii) high costs of extraction of the ground water resources, (iii) salinizations of the soil and high evapotranspiration simultaneously (about 2000mm/year), (iv) low precipitation and high wind speed.

References

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