

**Investigating the Main Causes and Impacts of
Desertification in Northwest Gezera state – Sudan**

Dr.Nassrelddin Mohammed Zien Ahmed.

Faculty of Natural Resources and Environmental Studies- Sinnar University.

Introduction:

Abstract:

Desertification is considered as a major environmental problem affecting arid, semi-arid and dry sub humid areas of the world and causing substantial reduction in agricultural production and income of many farmers. The study was conducted to evaluate the socio-economic impact of desertification on rural livelihood in Abu gota, North West of Gezira State. A total of two hundred (200) respondents (farmers) were interviewed using purposive and random sampling techniques. The results of socio-economic characteristics of the respondents (farmers) are presented in Table 1. On the causes of desertification, the respondents (60%) indicated that the main causes of desertification were human activities, 25% due to changes in the climate, while 15% of the respondents are ignorant of causes., 50% of the respondents indicated that there was reductions in the amount of rainfall received each year, 35% pointed out that there was increase in temperature, and 15% maintained that they noticed drying of water. There was a diverse response concerning the impact of desertification on farmer's agricultural activities. 45% of the respondents pointed out that they recorded poor harvest as result of desertification in the previous years, 30% maintained that they notice an increase in wind erosion, 15% showed that the situation was tending towards a decrease in the availability of pasture for livestock, while 10% revealed that there was a drastic reduction in soil fertility as observed on their farmlands. The results of this study shows that majority of the farmers in the study area are aware about the causes, effects and impact of desertification as it's seriously affects their agricultural productions in negative ways. At the same time, 55% of the respondents indicated that forestation is one of the best strategies for combating desertification, 35% believed that the practice of proper irrigation will be a good strategy, while 10% maintained that establishment and maintenance of shelter belts will reduce the impact of desertification in the study area. An important issue is how to support the rural poor to use the soils, the biota and other natural resources without destroying those resources, and without affecting the climate adversely.

Keywords: Desertification, impact, farmer, socio-economic

Introduction.

Desertification is "the intensification or extension of desert conditions leading to reduced biological productivity, with consequent reduction in plant biomass, land carrying capacity for livestock, crop yields and human wellbeing (World Map of

Desertification, UNCOD 1977). According to UNCED (1992) desertification is "land degradation in arid, and semi-arid and dry sub humid areas resulting from various factors including climate change and negative human activities". Even though, desertification is an old age phenomenon, Thomas and Middleton (1994) pointed out that, it affects countries and people over the world over either directly or indirectly., It is accompanied by reduction in the natural potentiality of the land and a decrease in surface and underground water resources and has negative repercussion on the living conditions and economic development in the affected areas. Worldwide, desertification affects about two thirds of the countries of the world and one third of the earth's land surface (about 450 million hectares) which is inhabited by approximately one billion people (FAO, 2006). One of the main important causes of desertification is deforestation. Which is the removal of trees in vast areas illegally for horizontal agricultural expansion and for - wood consumption. Other factors causing desertification include wood extraction for fuel and construction, bush burning which emits carbon dioxide, over cultivation of marginal land.. The demand for fuel wood in the Sahel Zone is high because of the increasing population and rapid urbanization. Wood collection for domestic use is the main cause of deforestation, and this leads to desertification (Thomas and Middleton 1994, NAP, 2000). The second cause is over-grazing, which occurs when the number of livestock is increased beyond the carrying capacity of the range-land, leading to the desertification and the compaction and erosion of the soil. In Sudan, over-grazing is caused by the enormous increase in livestock, deterioration of range-land, and settlement of nomads so as to be provided with improved services and development of water points (de Boom, 1990).. Natural and cultivated vegetation plays an essential role in protecting the soil, particularly trees and shrubs which due to their long life and their capacity to develop strong root systems, guarantee effective protection against soil degradation (FAO, 2006).

Statement of the problem:

During the periods of drought many trees were lost as a result of moisture stress, and due to crop failure large areas were cut for fuel wood and as a source of income. These factors have led to removal of vegetation and accelerated desertification. Consequently, many of the previously stabilized dunes have become destabilized. Loose sand has encroached upon farmer's fields and villages especially around Abu gota (the study area). These dune areas have been the most environmentally sensitive and marginal parts of the study area with negative socio-economic impacts on the local population.

Materials and Methods:

The study was carried out in Abu gota Gezira State area which located in the North West part of Gezira State (32 22' to 43 20' N to 32 22' E) the area lies between the Blue Nile and White Nile in the East- central region of Sudan and located 200 km South of Khartoum. It has a population of about 2,715,605. The area has a semi-arid

tropical climate, with an annual rainfall ranging between 300-400 mm, in June to October, the mean annual temperature of the study area is 30 C. the major economic activity in the area is agriculture, Food crops grown in the area includes Maize, Sorghum, and cash crops such as Ground nut and wheat. Major livestock raised in the area are Cattle, Sheep's and Goats.

Data were collected from people involved in agricultural activities. A total of two hundred (200) respondents (farmers) were selected and interviewed using purposive and random sampling techniques. Information gathered includes: age, gender, marital status, and educational level years of farming experience, and major occupation and farm size of the respondents. Other information's include causes of desertification, impact, of desertification government policies and programs in combating the impact of desertification on rural livelihoods. Data was sorted, coded and analyzed subjected to descriptive statistical analysis and then presented in tables.

Results and Discussion:

Table 1: Age Distribution of Respondent

Age	Frequency N0= 200	Percentage %
30-40	40	20
41-50	100	50
51-60	40	20
61-70	20	10
Total	200	100

50% of the respondents are within the age range of 41-50 years, representing the active part of the population engaged in agricultural activities while, 20% are within the age range of 30-40 and 51-60 years and 10% between 61-70 years respectively. This suggested that agricultural practices in the study area is mostly associated with the married individual where they can engaged their family members in farming activities.

Table 2: Educational Qualification.

Education	Frequency No= 200	Percentage %
Informal Education	30	15
Adult Education	30	15
Primary Education	10	5
Secondary Education	40	20
Tertiary Education	90	45
Total	200	100

The educational level of the respondents varied from in formal education to tertiary education. 45% of the respondents had tertiary education, while 20% had secondary education, 15% non-formal education, 5% of the respondents had primary and 13% neither attended formal no non formal education respectively. This indicates that agricultural activities in this area are mostly dominated by the respondent who had

formal education. Steian (2003) pointed out that education is one of the most important human capitals which play important role in determining status of the society. Education is expected not only to contribute to people's ability to read and understand instructions but also help them to adopt new techniques. Education lead to more direct employment generation, better economic empowerment and wellbeing of the rural communities.), the literacy level of farmers is reflect the mechanism of ad adoption of improved technology to increase productivity. Also, Adekunle (2009) pointed out that the level of education of farmers will directly affects their ability to adapt to changes and accept new ideas.

Table 3 occupation

occupation	Frequency No= 200	Percentage %
Farming	110	55
Trading	20	10
Civil service	70	35
Total	200	100

it can be seen that 55% of the respondents are farmer's while 35% are civil servant and 10% are work in trading farmers are full times, which may indicate that that they do not have other sources of incomes.

Table 4: Farm size (ha)

Farm size (ha)	Frequency No= 200	Percentage %
1-2	120	60
3-5	50	25
6-10	20	10
11 and above	10	5
Total	200	100

The farm size varied from 1 to >10 ha with the majority (60%) having a farm size between 1 and 2 hectares. This implies that the respondents are a typical small scale farmer use to produce what they need for their own consumption with little extra being offered for sale. 25% of respondents have a farm size of between 3 and 5 hectares.

Table 5: Causes of Desertification.

Causes	Frequency No= 200	Percentage %
Human activities	120	60
Change in climate	50	25
I don't know	30	15
Total	200	100

In Table 5 (60%) of the respondents indicated that the main causes of desertification due to human activities, 25% were of the opinion that this was cause by changes in the climate, while 15% of the respondents are ignorant of what causes desertification.

Table 6: Effects of Desertification.

Effects of desertification	Frequency No= 200	Percentage %
High temperature	100	50
Low rainfall	70	35
Drying of water bodies	30	15
Total	200	100

When asked about the effect of desertification on their livelihoods, 43.3% of the respondents indicated that there was reductions in the amount of rainfall receive each year, 40% pointed out that there was increased in temperature, and 16.7% maintained that they noticed drying of water bodies.

Table 7: Impacts of Desertification on Rural Livelihood

Impacts of desertification	Frequency No= 200	Percentage %
Poor harvest	90	45
Lack of pasture for L/S	30	15
Increase in wind erosion	60	30
Reduction of soil fertility	20	10
Total	200	100

There was a diverse response concerning the impact of desertification on farmer's agricultural activities. 45% of the respondents pointed out that they recorded poor harvest as the result of desertification in the previous years, 30% maintained that they notice an increase in wind erosion, 15% shows that the situation was tending towards a decrease in the availability of pasture for livestock, while 10% revealed that there was a drastic reduction in soil fertility as observed on their farmlands. The results of this study shows that majority of the farmers in the study area are aware about the causes, effects and impact of desertification as it's seriously affects their agricultural productions in diverse ways.

Table 8: Strategies for Combating Desertification.

Strategies	Frequency No= 200	Percentage %
Establishment of shelter	110	55
Practice of irrigation	70	35
Afforestation	20	10
Total	200	100

Table 8 reveals that 55% of the respondents indicated that a forestation is one of the best strategies for combating desertification, 35% believe that the practice of proper irrigation will be a good strategy, while 10% maintained that establishment, and maintenance of shelter belts will reduce the impact of desertification in the study area.

Conclusion

Desertification has negatively affected agriculture and the living conditions of the people in the Northern parts of Gezira State in different ways. The results of this

study revealed that farmers and other land users are aware of desertification and the status of land as a result of human activities, and that their understanding of climate variations, desertification and qualitative changes in land are similar to those of scientific findings. On the whole, they perceive that the climate is getting drier due to reduction in rainfall, increase in temperature and land degradation through soil erosion. The need for efficient management of land is the more urgent in the face of an ever-increasing population and the growing demands in all the various activities based on land. Land resources and the processes of their development and use, however, have varying consequences on the environment and specifically land becomes more vulnerable as a result of misuse, which subsequently affects productivity of the land. An important issue is how to support the rural people to use the soils, the biota and other natural resources without destroying those resources, and without affecting the climate adversely.

Recommendations

Based on the findings, the following recommendations were made.

1. Government should re-introduce tree planting programs annually.
2. Extension Workers should be motivated by the government to educate rural farmers of some important strategies on how to reduce the menace of desertification in their areas.
3. Forest nurseries should be established in each Local Government Area to enable them raise enough seedlings for planting in the area.

Acknowledgements

The author would like to thank all the respondents who availed us their time during field data collection for this study.

References

1. Adekunle, V. A. (2009). Contributions of agroforestry practice in Ondo State, Nigeria, to environmental sustainability and sustainable agricultural production.
2. De Boom, C. J. (1990). Environmental problems in Sudan (part 1). The Netherlands: Institute of Social Studies (ISS).
3. FAO (2006). Desertification and drought: extent and consequences. Rome: FAO agriculture department.
4. NAP (2000). The National Action Program to combat Desertification and mitigate the effects of drought. Federal Ministry of Abuja, Nigeria.
5. Solesbury, W. (2003). Sustainable Livelihoods: A case study of the Evolution of DFID policy. Working paper 217. London: Overseas Development Institute. Afrika Focus -Volume 22, Nr. 2, 2009 -pp. 27-40.
6. Thomas, D. and Middleton, N. (1994). Desertification Exploding the Myth. New York. John Wileyand Sons.
7. UNCED (1992). Earth summit 92. London the Regency press.