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ROLE OF FORESTRY IN COMBATING DESERTIFICATION IN NORTHERN NIGERIA

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Abstract

Desertification is the major ecological challenge facing drylands the world over. The dryland region of Nigeria (Northern Nigeria) is not an exception. Desertification renders once fertile lands unfertile, once occupied environments unoccupied. This paper is a review of various forestry practices used in combating desertification and those that have the potential of revising and restoring desertfields with particular reference to Northern Nigeria. It is evident from this review that forestry plays a vital role in combating desertification. Forestry offers an all encompassing approach towards the fight against desertification, it does not stop with proffering solution to the ecological components of desertification. It helps in solving some of the causes and symptoms of desertification in form of poverty through the provision of substitute and source of income from the sale of non timber forest products which goes a long way in reducing the pressure on natural resources.

Keywords: Desertification, Forestry, Northern Nigeria

INTRODUCTION

Desertification is the conversion of fertile or vegetated land to desert like land. Soil degradation occurs everywhere, it is however called desertification when it occurs in drylands. Drylands include all terrestrial regions where water scarcity limits the production of crops, forage, wood, and other ecosystem provisioning services (Millennium Ecosystem Assessment, 2005). Various factors such as climatic variation and human activities are responsible for desertification (United Nations Convention to Combat Desertification (UNCCD), 2014). Human activities includes deforestation for industrial purpose and fuel wood, urbanization, bush burning, agro-activities on marginal lands and other unsustainable agricultural activities. Desertification renders lands barren and unproductive for crop and food production as well as other agricultural activities. People become refugees, internally displaced people and forced migrants or they turn to radicalization, extremism or resource-driven wars for survival as a result of desertification (Nwokocha, 2015).

Desertification is the major ecological challenge affecting northern Nigeria, particularly the arid region. Although desertification phenomenon has been reported in Northern Nigeria since 1920's, it was during the famine period between 1971 and 1973 that its effect became recognisable (Olagunju, 2015). Fifteen

Northern states in Nigeria are affected by desertification (Jaiyeoba, 2002). The frontline states include; Borno, Yobe, Gombe, Bauchi, Katsina, Jigawa, Sokoto, Kebbi, Zamfara, Adamawa and Kano. Soil type, vegetation cover, topography, climatic conditions and poor land management are some of the major causes of desertification in Northern Nigeria(Abdulrashid and Yaro 2014)

Combating desertification involves the integration of all activities aimed at the development of arid, semi arid and dry sub-humid zones towards sustainable development with the objective of preventing and/or reducing land degradation, repairing partially degraded lands, and at restoring desertfied lands (Yafong, 1997). Forestry has a major role to play in combating and reversing desertification trends,italso has capacity for maintaining soil and water shed for food production through shelterbelts, windbreaks, and scattered trees as well as through soil enrichment. It contributes to livestock production through silvipastoral systems, particularly the creation of fodder reserves or banks in the form of fodder trees or shrubs, to cushion the effect of drought. It produces fuelwood, charcoal, and other forest products through village and farm woodlots. It contributes to rural employment and development through cottage industries based on raw materials derived from wild plants and animals and the development of wildlife-based tourism. It provides food from wildlife as well as from plants in the form of fruits, leaves, roots, and fungi (Pachauri and Kanetkar, 1997)

Although there is a plethora of literature on the role of forestry in desertification control, most of them are focused on shelterbelts and windbreaks, neglecting the potential of some forestry practices in reversing and restoration of desertfields. This paper therefore, reviewed the various forestry practices/techniques used in combating desertification and those that has the potential of revising and restoring desertfields with particular reference to Northern Nigeria. This will help in creating awareness on the role of forestry in combating the threat of desertification.

Forestry practice for desertification control in Arid-zone

The major forestry practices used in desertification control in drylands is afforestation projects. The dominant afforestation practices in Northern Nigeria are shelterbelts and windbreaks Other forestry practices that have been successful in combating desertification in drylands of other African countries and those that has the potential of reversing and restoring degraded lands are discussed.

Shelterbelts

Shelterbelts are long rows of trees planted at right angle to break the impact of prevailing winds. Shelterbelts prevent desert encroachment mainly by stabilizing soils and reducing winds. It helps in restoration of marginal lands and enhances crop yield. It has been adjudged as one of the effective ecological means of countering the effects of desertification in arid environments (Adesina and Gadiga, 2014). Over 236,500 hectares of shelterbelts were reported to be established between 1963 and 1989 in the States threatened by desertification in Nigeria (Igugu and Osemeobo 1991). Common tree species used for shelterbelt are *Azadirachta indica* and *Eucalyptus camaldulensis* because of their ease of establishment, fast growth rate and resilience to dry environment. Indigenous tree species such as *Acacia senegal* has

also been used to combat desertification and restoration of desert land but one of the major factor affecting the use of indigenous tree species is their perceived slow growth rate. The use of shelterbelt to fight desertification and restoration of degraded lands has been reported to be successful in many countries such Mali (Yafong, 1997; Ja'afar-Furo, 2014). For example in Yobe State which is one of the frontline state, shelterbelts have been shown to be effective in slowing the tide of desertification, enhances soil fertility, protects soil against wind erosion and improves water percolation in the soil(Adesina and Gadiga, 2014).In 1989 Sokoto, Katsina and Kano States in collaboration with the Federal Government, had massive achievements in shelterbelt development. These shelterbelts are now satellite beacons in the zone which are immensely appreciated by the rural farmers that testify that the shelterbelts have enhanced crop yields(Gadzama and Ayuba, 2015). However, the success of shelterbelt programmes is limited by increasing agricultural intensity and livestock populations, combined with upsurge in demands for fuelwood (United Nations Environment Programme (UNEP), 2008)

Windbreaks

Windbreaksare synonymous with shelterbelt,they are often used interchangeably to mean the same thing but the major difference lies in the number of rows of tree planted. Windbreaks have few number of tree rows in comparison to shelterbelts. They are usually used in desertification control in situations where lands for arable cropping are scarce (Medugu, *et al*., 2009). Historically, windbreaks were planted for a single purpose, such as protecting homes from cold winds or soil from erosive winds,today, windbreaks are being used to address numerous other problems and provide a variety of other benefits (United State Department of Agriculture (USDA) 2012).Windbreaks help in fighting desertification as well as providing other benefits such as wood for domestic energy, building, and increased crop yield. Good design (orientation) and proper management is importantfor effective result. Orientation at right angle to troublesome wind is most effective in breaking wind(USDA, 2012). The most common tree species used in shelterbelt are fast growing species such *as Azadirachta indica* (Neem) and *Eucalyptus species*.



Fig. 1. Picture of *Azadirachta indica* (Neem) trees planted for Windbreak
Source: Medugu *et al*., 2009

Agroforestry systems

Agroforestry is a sustainable land used system which involves the integration of trees with arable crops/ and or animals over space and time. The incorporation of trees and other components in agroforestry is usually associated with ecological and economic interaction (Alao and Shuaibu, 2013). The main aim of agroforestry practice is for the efficient and sustainable utilization of land while yielding many benefits. The commonly agroforestry practice used in Northern Nigeria is the retention of multipurpose trees on farmlands. Even though it is difficult to quantify the role of multipurpose trees retained on farm lands in Nigeria in fighting desertification because of lack of information it has the potential to checkmate the menace of desertification and restored degraded lands.

CONCLUSION

Forests (Trees) have a vital role to play in reversing and restoring desertfields. Shelterbelt, windbreaks and agroforestry are the major forestry practiced employed in combating desertification. Their benefits are not only environmental or ecological but cuts across social and economic benefits. Trees used for shelterbelts provide fodder for livestock, fuelwood for domestic use, herbs for medicinal purpose and fruits for food. Some of the tree species commonly used includes; *Azadirachta indica*, *Eucalyptus species*, *Acacia senegal*. However, the major challenge is the gestation period of trees, the growth and survival rate of arid or savanna trees are generally low. The introduction of fast growing exotic trees has been the general practice in desertification control in savanna, while this practice has yielded some positive results, for sustainability and conservation, attention should be focused on appropriate silvicultural methods of selection and improvement of indigenous tree species which are fast growing and adaptable to

the savanna region in afforestation and reforestation programmes.

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Table 1: Front line States of Nigeria affected by Desertification Land area Population

State	KM^2	% of Nigeria	Number	Density/KM^2
Bauchi/Gombe	64,605	6.99	4,294,413	66
Borno	70,890	7.67	2,596,598	37
Yobe	45,502	4.93	1,411,481	31
Kano	20,131	2.18	5,632,040	280
Jigawa	23,154	2.51	2,829,929	122
Katsina	24,192	2.62	3,878,344	160
Sokoto/Zamfara	65,735	7.12	4,392,391	67
Kebbi	36,800	3.98	2,062,226	56
Adamawa	42,159	4.56	2,124,049	51
Total/Average	393,168	42.56	29,221,47	97

Source: Federal Republic of Nigeria (FRN) (1999).