



Original Research Article

Unpleasant Environmental Impact due to Disappearance of Khartoum Green Belt

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ABSTRACT

Khartoum, Omdurman and Khartoum North are major cities in the Northern part of Sudan. In response to serious problems caused by windblown dust. Shelterbelts will be designed to serve as the main measures to control windblown sand and dust towards the cities every winter and autumn. The objectives of the study are to encourage the decision makers to take urgent decisions to re-establish three shelter belts round the three cities, to minimize the adverse effects caused by the removal of Green Belt on the population, to solve the serious problem of drainage, the sewage water of the three cities and to provide the necessary needs of the population from fuel wood and building materials. The data were collected through different methods such as interview of the official staff of forestry and soil conservation in addition to the population who have settled there for long time around the green belt. The questions concentrated on the benefits of the green belt before cutting down of its trees and the negative impact of the removal of the green belt from the area. The data are also supported by the report of senior government officials, booklets and published papers. The main results are: all the respondents agreed that the disappearance of Khartoum green belt creates environmental problems. These problems can be represented by emission of nasty odors from sewage water that harms the people when the wind blows during the winter and autumn. However the area becomes breeding ground for insects such as flies, mosquitoes and worms. On the other hand these insects cause disease to the peoples.

Keywords

Khartoum state,
Sewage water,
Shelter belt,
Soil erosion and
Windblown dust

Introduction

A windbreak or shelterbelt is a plantation usually made up of one or more rows of trees or shrubs planted in such a manner as to provide shelter from the wind and to protect soil from erosion. They are commonly planted around the edges of fields on farms. If designed properly, windbreaks around a home can reduce the

cost of heating and cooling and save energy. Other benefits of windbreaks include: providing habitat for wildlife and in some regions the trees are harvested for wood products (Wikipedia, 2015-06-24). Windbreaks designed to help tackle odor mitigation, build habitat for pollinators and other critters, support organic agriculture,

augment biofuel production and make landscapes more resilient to climate change. Uses of windbreaks are still just as important today (Andy Mason, 2011). One of the biggest problems on the Great Plains during the drought was the power of wind erosion that decimated exposed soil. In some places wind blew away three to four inches of topsoil, sending it into the air in dust storms that darkened the sky, drifted against barns and houses, choked people and caused dust pneumonia.

Windbreaks systems play an active role in improving the quality of the natural environment, accelerating the development of agriculture, forestry and animal husbandry, and increasing ecological, social and economical benefits. In a vast reclaimed land, where detrimental dusts are of enormous concern, windbreak's main purpose can be exclusively to control soil erosion, dust generation and diffusion (Bitog *et al.*, 2009). However, the generation of dust from the ground surface and its diffusion to nearby surrounding areas has become an emerging concern. This usually happens during the very dry months from late February to May where the wind velocity ranges from 2.0 to 7.0 m/s (Bitog *et al.*, 2009). He added the dusts also contains significant amount of sodium chloride (NaCl) and fine particles which are very harmful to plants and people. To minimize these problems, for long term protection, natural windbreaks such as trees are strongly recommended.

Khartoum Green Belt in 1962

Khartoum Green Belt (K.G.B) was established in 1962 by Forest Department under supervision of the Ministry of Irrigation and Hydro electric Power. It was located between the Blue and White Nile South of Khartoum Town. It extended from Soba west to Blue Nile East to petroleum reservoirs near White Nile West. The total

area was about 2954.7 hectares, 15 km long and 3 km wide. There were five roads passing through the green belt in addition to rail way that runs from Gezira to Khartoum. The whole area was fenced by metal wires (Musand and Kamel, 1964). The green belt was a reserved forest, gazette No.978, 15-12-1962 and free from rights and privileges, free from natural obstacles. Its land is level with slight slope at North-west; the soil is sandy silt and clay poor of organic matters, azotes and nitrogen. The climate is semi-desert; North east dry wind is prevailing in winter and south east wet wind prevailing in autumn. The annual rainfall is 77mm starts from June to August. The maximum temperature ranges between 29^o C and 35^o C the minimum temperature ranges between 21^o C and 28^o C (Musa, 2004). The population settled around the green belt in Mayo, Salama, Ed husein, Soba Aradi and Elkibashab. The vegetation cover of the green belt consisted of different species such as *Eucalyptus camaldulensis*, *Acacia tortilis*, *Acacia ehrenbergiana*, *Acacia seprocarpa*, *Acacia radiana* and *Parkinsonia aculeate* (Musa, 2004). The Green Belt was established for the purposes of protecting the citizens of Khartoum from blowing dust storms, using sewage water for irrigation of the trees, conservation of the soil, provide fuel wood and building materials for the population, amenity area use for recreation of activities and providing fodders for livestock (Musand and Kamel, 1964).

The area after the removal of the Green Belt

Ali *et al.* (2009) reported that the area becomes unfavorable and the beautiful scenery has disappeared. The windblown dust continues every year, the air pollution in some areas intensified coupled with wide spread of mosquitoes, flies and other insects and the poor people lost the fuel wood and building materials.

Problem

The trees of Green Belt were irrigated by processed sewage water that is 13590 cubic meters per day from Algoz sewage water station. The disappearance of the green belt causes some problems such as draining of sewage water which has increased with rapid population growth in Khartoum, spread of factories, The citizens were affected by wind blowing dust from June to August every year and the people suffer from dust due to deposits of the fine particles of dust on the houses and building causing diseases when it sinks into the lungs during the breathe, Spread of nasty odors in the area and disappearance of fuel wood and building materials.

The study has come up with the following objectives:

1. To encourage the decision makers to take urgent decisions to re- establish three shelter belts around the three major cities.
2. To minimize the adverse effects caused by the removal of Green Belt towards the population.
3. To solve the serious problem of sewage water of the three major cities.
4. To provide the needs of the population from fuel wood and building materials and fodders for livestock.

Materials and Methods

The data were collected through different methods such as conducting interviews with the official staff of forestry and soil conservation in addition to population who have settled for long time around the Green Belt. The questions concentrated on the benefits of the green belt before cutting down its trees and the negative impact of the removal of the green belt from the area. The data are also supported by the report of

senior government officials, booklets and published papers.

Results and Discussion

Environmental benefits of Khartoum Green Belt prior to its removal

All official staff mentioned that the environmental benefits of Khartoum Green Belt before its removal consist of protection of the population from wind blowing dust, providing shades, decreasing the rise of temperature through the evapo-transpiration of trees, conserving the soil removal from erosion by wind and rainy water. These benefits are the same as stated by (Musand and Kamel, 1964) and (Bitog *et al.*, 2009). Windbreaks systems play significant role in improving the quality of the natural environment, reclaimed land, where detrimental dusts are of enormous concern. The main purpose of windbreaks can be exclusively to control soil erosion, dust generation and diffusion.

Social benefits of K. G. B. before its removal

The reviewers also said that K. G. B. before clearance provided fuel wood, building materials for the population settled round the belt, providing fodders for livestock and used as amenity place for recreation and scientific tours for the students. This is also the same as reported by (Musand and Kamel, 1964) and (Bitog *et al.*, 2009). The Green Belt has led to increase of ecological, social and economical benefits.

Negative impact of the removal of Khartoum Green Belt

All the respondents agreed that the disappearance of Khartoum green belt creates environmental problems. These problems are: emission of nasty odors from

sewage water that harm the people when the wind blows during the winter and autumn. However the area becomes breeding ground for insects such as flies, mosquitoes and worms. On the other hand these insects cause disease to the peoples. This is the same as stated by (Ali *et al.*, 2009).

The study concluded that the wind breaks help in modifying climate under the trees. Air humidity is relatively high under tree cover. Wind speed is reduced in forests. In varying degrees; the forest affects light and solar radiation, air temperature, wind, atmospheric humidity, precipitation, evaporation and transpiration. Forests modify physical and chemical properties of soil through addition of organic matter, decomposition of leaves and other plant parts, root penetration and activity of other animals inhabiting the forest. The forest protects the soil against erosion. Forests help in reducing floods in the hills as well as in the plains by reducing the volume of surface run-off. Forests have also sanitary influences upon environment due to the production of oxygen through photosynthesis. Forest plays a major role in reducing various types of pollution such as water, air and noise pollution. Influences of forest upon biotic conditions include its effect on animal life and mankind. Forests significantly influence the life of many terrestrial animals. Forest acts as source of food and shelter for many animals. The life of man is affected by the presence or absence of forests. All the above mentioned influences also affect human

Recommendations

The study results have revealed the following recommendations:

1. Re-establishment of three shelter belts for the three cities, Khartoum, Omdurman and Khartoum North at the direction of wind blowing dust. This will

protect the soil from wind and water erosions, reducing the annual flooding in autumn.

2. Improvement of the natural ecology which in turn will reduce the temperature and increase humidity, which is called micro-climate.
3. Reestablishment of new green belts helps in getting rid of the processed sewage water that can be used for irrigating the trees of green belts.
4. The problem of nasty odors experienced by residents of South Khartoum should be urgently addressed by the concerned authorities.

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