

# An Outline of Some Key Recommendations to Improve and Manage Forest Trees in Northern Nigerian Soil Ecosystem – A Short Message

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**Abstract:** In recent years, the concern about degradation and deforestation of forest trees has changed from negative consequences and decline of many important natural species, to thinking about ways to improve and manage the remaining plants in northern Nigeria. The benefits of this management has been noted to ensure the sustainable use of woods for fuel, honey for medicine and other human needs, fruits for eating, fodder and grasses for livestock and many other important plant resources for medicinal purposes in local communities. Deforestation and desertification caused serious damage to most of the forest areas in northern Nigeria. Many advices and practices continue to provide favourable environment for better management of the African forests. Sustainable forest management was considered as an alternative to maintains and improves the soil biodiversity, soil productivity, regeneration capacity, vitality and potential of the economic values of northern Nigerian forest trees. As part of this sustainable forest management practices, this paper, provides an outline of some key recommendations on how to improve, maintain and manage forest trees and their soil biodiversity in the region.

**Keywords:** Advice, Forest Trees, Manage, Improve, Northern Nigeria

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## 1. Introduction

Forest, land and vegetation are important components of ecosystem [7]. These resources are damaging and disappearing at a faster rate without much concern on the aspect improvement and management practices [1]. The major environmental problems affecting these components of ecosystem in Africa have been noted to include deforestation, soil degradation, desertification, declining biodiversity and marine resources, and deteriorating water and air quality [3, 23,]. Socially, poverty, lack of awareness and corruption are factors increasing the existence of deforestation and desertification in northern Nigeria [26]. One of the national report noted that Nigeria is threatened with a loss of 35,1000,000 ha per year, the outward visible sign of the desertification process is gradual shift in vegetation from grass, bush and occasional trees to pine grass and bush, and in the final stage, extensive areas of desert like sand [17]. It has been estimated that 50-75% of the northern front-line states of Sokoto, Kano, Katsina, Kebbi, Jigawa, Borno and

Zamfara are susceptible to wind erosion-desertification [28]. This process is detrimental to the region's future sustainable food security, soil protection, economic development and plant biodiversity [26]. According to the Nigerian Forestry Action Plan [17], the problem becomes worried as a result of the following reasons:

- (1) Widespread and increasing land and vegetation degradation caused by misuse and abuse of natural resources;
- (2) Growing debilitating effect of land degradation on communities who are experiencing increasing difficulty in obtaining sufficient food, water and fuel;
- (3) Escalating real supply/demand deficits for forest products, of which fuel food is most critical;
- (4) Ineffective management of forest reserve which have been overexploited and abused to the extent that many are not capable of sustained yield production;
- (5) Neglect of biodiversity with a low level of protection of existing reserves, and the need the need for protection of additional areas, which are being rapidly

degraded and deforested;

- (6) Low capability of research development programmes resulting from skills gaps, resource deficits, neglect of key workers and community involvement potentials in forest resources creation and management as well as a variety of institutional weaknesses.

Sufficient to emphasise that the above outlined reasons must reassure the urgent need for enlightening, awareness, reminder and educating the rural people in particular on issues related to the important of environmental management and preservation on key components of ecosystem: forest development, plant biodiversity and soil protection. Therefore, this paper is a short communication focus on outline some important advices to improve, manage and preserve forest and vegetation areas, agricultural soils and grazing land from the impact and consequences of desertification in northern Nigeria.

### **1.2. Forest Image in the Region**

The image of forest in northern Nigeria can be related to the context of Africa's forest condition which was estimated to cover around 635 million ha classified into nine categories namely [13]: (1) tropical rain forests, (2) tropical moist forests, (3) tropical dry forests, (4) tropical shrubs, (5) tropical mountain forest, (6) sub-tropical humid forests, (7) sub-tropical dry forests, (8) sub-tropical mountain forests and (9) plantations. These categories covered about 16% of the world's forests, estimated to occupy about 636 million hectares [10]. The percentages distribution of these forests in Africa are accounted as follows: Central Africa (37%), Southern Africa (28%), West Africa (11%), North Africa (11%) and East Africa (13%) [15]. These are found in two geographical locations namely – the tropical moist deciduous and tropical dry forests. Northern Nigeria falls in the category of tropical dry forest, generally categorised as follows [15]:

- (1) Warm humid dry forests with a dry season that lasts 1 to 4 months, and with 1,000 – 2,000 mm average annual rainfall.
- (2) Warm sub-humid dry deciduous forests with a dry season that lasts 4 – 7 months, and with 800 – 1,500 mm rainfall.
- (3) Warm very dry wooded savannas with a dry season that lasts 7 – 9 months, and with 400 – 800 mm rainfall.

This type of forest in northern Nigeria assists rural people and cattle nomadic Fulani with diverse important resources including fodders for livestock, fuel consumption, forest fruit and leave products, maintaining soil erosion and preserving water and water quality. The image of forest in this part of Nigeria can be described as evergreen vegetation, short medium shrubs (scattered clustered), dwarf vegetation (scattered isolated), grass vegetation, dense (thick) vegetation, thorny-grass vegetation (scattered sparse) and short-length vegetation [25]. The physical image of these forest areas varies from one zone to another – very scattered in the north-west and dense in north east around Bauchi and Plateau states. The trees

and shrubs provide wide range of economic products used by the rural people for diverse benefits including woods for fuel, honey for medicine and other human needs, fruits for eating, fodder and grasses for livestock etc [25]. They are considered important resource base for the provision of medicinal plants in local communities [21, 2]. Indeed, over 2,000 forest plant species were reported to be used in traditional medicine by rural people in West Africa [2008]. Thus, sustainable management of the forest and forest tree resources must be ensured in the region.

### **1.3. Deforestation and Forest Trees Scenario**

Forest trees are important component of ecosystem, globally [18]. They provide shelter to million fauna and flora and accommodate variety of divers living organisms plus protecting environment from impact of soil erosion [3]. These trees are drastically declining in northern Nigeria due to the fact that deforestation becomes an imperative business among rural people in the states of Adamawa, Bauchi, Borno, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Niger, Sokoto, Yobe and Zamfara [25]. The annual global deforestation in the tropical areas of Africa including northern Nigeria was reported to reach 14 million ha during 1990-2000 and decreased to 13 million ha during 2000-2005 [5]. About 37 million hectares of forest and wood land are said to be disappearing each year and nearly 4 million hectares are now being deforested [6]. Therefore, deforestation and desertification are two environmental factors, which might have caused serious damage to most of the forest areas in northern Nigeria [26]. The International Conference on Land degradation and Desertification [14] in Thailand considered the problem as: "... the impoverishment of terrestrial ecosystems that can be measured by reduced productivity of desirable plants, undesirable alterations in the biomass and the diversity of the micro and macro flora and fauna, accelerated soil deterioration, and increased hazards for human occupancy". This accentuates that desertification is land degradation in arid, semi arid and sub-humid areas resulting from various factors, including climatic variations and human activities [20]. The typical examples of this explanation in northern Nigeria may be related to factors such as poverty, poor vegetation cover, poor environmental management policies, lack of awareness and climate change impact [26]. These could have lead to failure in rainfed and irrigation systems by reduction in land cover and biomass production in rangeland with an accompanying reduction in quality of feed for livestock; reduction of available woody plants for fuel and increased distances to harvest them; significant reduction in water quality; enhancement of sand and crop damage by sand-blasting and wind erosion; and increased gully and sheet erosion by torrential rain [4]. And, of course, believed to have directly affects around 1.9 billion hectares, globally [3, 24].

### **1.4. Forest Trees and Their Common Names**

Forest trees and plants are species of high economic values

to human development of which over 7000 were considered useful [18]. The most common species of forest trees in northern Nigeria are outlined in Table 1. Physically, most of

these plant species are sparse, disappeared as a result of deforestation by local people [25]. Typical examples of some of these trees are shown in Figure 1 and 2.

**Table 1.** List of some common forest trees in northern Nigeria.

| Local Name (Hausa)  | Botanical Name (Scientific)       | Local Name (Hausa)      | Botanical Name (Scientific)        |
|---------------------|-----------------------------------|-------------------------|------------------------------------|
| 'Aduwa'             | <i>Balanites aegyptiaca</i>       | 'Hawayen zaki'          | <i>Ozoroa insignis</i>             |
| 'Asawaki'           | <i>Boscia angustifolia</i>        | 'Huda Tukunya'          | <i>Vismia guineensis</i>           |
| 'Bagaruwa'          | <i>Acacia nilotica</i>            | 'Inwar Bauna'           | <i>Morella senegalensis</i>        |
| 'Bakar Kaya'        | <i>Acacia gerrardii</i>           | 'Jar Loda'              | <i>Haematostaphis barteri</i>      |
| 'Bakin Makarfo'     | <i>Burkea africana</i>            | 'Jan Taramniyya'        | <i>Combretum collinum</i>          |
| 'Bakin Mutun'       | <i>Holarrhena floribunda</i>      | 'Jan Yaro'              | <i>Hymenocardia acida</i>          |
| 'Baure'             | <i>Ficus sycomorus</i>            | 'Jarga'                 | <i>Bauhinia paradoxa</i>           |
| 'Bauren Kiyashi'    | <i>Ficus trichopoda</i>           | 'Kadanya'               | <i>Vitellaria paradoxa</i>         |
| 'Baushe'            | <i>Terminalia avicennnioides</i>  | 'Kadanya Rafi'          | <i>Breonadia salicina</i>          |
| 'Baushen Giwa'      | <i>Terminalia mollis</i>          | 'Kafar Mutuwa'          | <i>Mallotus oppositifolus</i>      |
| 'Baushen Kurmi'     | <i>Malacantha alnifolia</i>       | 'Kaiwa (Kanya)'         | <i>Diospyra mespiliformis</i>      |
| 'Bishiyoyi'         | <i>Ficus populifolia</i>          | 'Kalgo'                 | <i>Piliostigma reticulatum</i>     |
| 'Chediya'           | <i>Ficus thonningii</i>           | 'Kama-mu-raba'          | <i>Acacia gourmaensis</i>          |
| 'Chichiwa'          | <i>Macrura angolensis</i>         | 'Kerafi'                | <i>Acacia seyal</i>                |
| 'Chiriri'           | <i>Combretum nigricans</i>        | 'Kimba'                 | <i>Xylopia aethiopica</i>          |
| 'Dagera'            | <i>Combretum nigricans</i>        | 'Kirya'                 | <i>Prosopis africana</i>           |
| 'Dakwara'           | <i>Acacia senegal</i>             | 'Kokiya'                | <i>Strychnos spinosa</i>           |
| 'Danya'             | <i>Sclerocarya birren</i>         | 'Kokuwa'                | <i>Afraegle paniculata</i>         |
| 'Daragaji'          | <i>Grewia venusta</i>             | 'Kuka'                  | <i>Adansonia digitata</i>          |
| 'Dashi'             | <i>Commiphora africana</i>        | 'Kurna'                 | <i>Ziziphus spina-christi</i>      |
| 'Dinya'             | <i>Vitex doniana</i>              | 'Kurnar Nasara'         | <i>Melia azedrach</i>              |
| 'Dinyar Biri'       | <i>Vitex simplicifolia</i>        | 'Karya'                 | <i>Bombax costatum</i>             |
| 'Dinyar Rafi'       | <i>Vitex chrysocarpa</i>          | 'Madachi'               | <i>Khaya senegalensis</i>          |
| 'Doka'              | <i>Isobertlinia doka</i>          | 'Madachin Dutse'        | <i>Ekebergia senegalensis</i>      |
| 'Dokar Rafi'        | <i>Berlinia grandiflora</i>       | 'Madobiya'              | <i>Pterocarpus erinaceus</i>       |
| 'Dorawa'            | <i>Parkia biglobosa</i>           | 'Magariya'              | <i>Ziziphus mauritiana</i>         |
| 'Dorawar Kurmi'     | <i>Aubrevillea kerstingii</i>     | 'Magaryar Kura'         | <i>Ziziphus abyssinica</i>         |
| 'Dorawar Mahalbi'   | <i>Albizia coriaria</i>           | 'Maje'                  | <i>Daniellia oliveri</i>           |
| 'Dulu'              | <i>Ficus vallis-chondac</i>       | 'Makarfo'               | <i>Pericopsis laxiflora</i>        |
| 'Dundu'             | <i>Durostachys cinerea</i>        | 'Male'                  | <i>Khaya grandifoliola</i>         |
| 'Dikki'             | <i>Celtis integrifolia</i>        | 'Malga'                 | <i>Cassia arereh</i>               |
| 'Durumi'            | <i>Ficus polita</i>               | 'Malmo'                 | <i>Syzygium guineense</i>          |
| 'Dushe'             | <i>Acacia seyal</i>               | 'Marike'                | <i>Anogeissus leiocarpa</i>        |
| 'Farar Doka'        | <i>Isobertlinia tomentosa</i>     | 'Marken Duste'          | <i>Grewia bicolor</i>              |
| 'Farar Geza'        | <i>Combretum collinum</i>         | 'Rawuya'                | <i>Kigelia Africana</i>            |
| 'Farar Kaya'        | <i>Acacia sieberiana</i>          | 'Rimi'                  | <i>Ceiba pentandra</i>             |
| 'Farar Taramniya'   | <i>Combretum collinum</i>         | 'Gumbi'                 | <i>Cassia singueana</i>            |
| 'Farin Bushe'       | <i>Antiaris toxicaria</i>         | 'Sansami'               | <i>Stereospermum kunthianum</i>    |
| 'Farin Loko'        | <i>Lonchocarpus laxiflora</i>     | 'Shunin Biri'           | <i>Lonchocarpus laxiflorus</i>     |
| 'Faru'              | <i>Lannea barteri</i>             | 'Taura'                 | <i>Deterium microcarpum</i>        |
| 'Farun Doya'        | <i>Lannea schimperii</i>          | 'Taura Kurmi'           | <i>Deterium senegalense</i>        |
| 'Fasa Kwari'        | <i>Zanthoxylum zanthoxyloides</i> | 'Tawatsa'               | <i>Entada Africana</i>             |
| 'Fatar Giwa'        | <i>Ficus lutea</i>                | 'Tsada'                 | <i>Ximenia Americana</i>           |
| 'Malga (Gama fada)' | <i>Cassia sieberiana</i>          | 'Tsadar Masar'          | <i>Spondias mombin</i>             |
| 'Gamji'             | <i>Ficus platyphylla</i>          | 'Tsamiya'               | <i>Tamaridus indica</i>            |
| 'Gawasa'            | <i>Neocarya macrostachya</i>      | 'Tsamiyar Kurmi (Biri)' | <i>Dialium guineense</i>           |
| 'Gawo'              | <i>Acacia albida</i>              | 'Tukuruwa'              | <i>Raphia sudanica</i>             |
| 'Giginya'           | <i>Borassus aethiopum</i>         | 'Uwar magunna'          | <i>Securidaca longepedunculata</i> |
| 'Gyayya'            | <i>Mitragyna inermis</i>          | 'Uwar Yara'             | <i>Ficus sur</i>                   |
| 'Goruba'            | <i>Hypaene thebiaca</i>           | 'Wutsiyar Biri'         | <i>Faurea speciosa</i>             |
| 'Gwabsa'            | <i>Cussonia arborea</i>           | 'Zaitun'                | <i>Olea capensis</i>               |
| 'Gwaddar Daji'      | <i>Annona senegalensis</i>        | 'Zogala'                | <i>Moringa oleifera</i>            |
| 'Gwanno'            | <i>Acacia macrothyrsa</i>         | 'Zure'                  | <i>Boscia salicifolia</i>          |
| 'Gyadar Kurmi'      | <i>Pterocarpus santalinoides</i>  | 'Zuwo'                  | <i>Celtis zenkeri</i>              |
| 'Gwaska'            | <i>Andira inermis</i>             |                         |                                    |
| 'Hana Gobara'       | <i>Commiphora kerstingii</i>      |                         |                                    |
| 'Hanaruwa'          | <i>Cola verticillata</i>          |                         |                                    |
| 'Hano'              | <i>Boswellia dalzielii</i>        |                         |                                    |



**Figure 1.** Examples of some forest trees in Fadama/Dryland areas: (a) *Ziziphus spp* (Magarya), (b) *Adansonia digitata* (Kuka), (c) *Acacia nilotica* (Bagaruwa) [Photos by Suleiman Usman].



**Figure 2.** Examples of some forest trees in Dryland area: (a) *Hyphaene thebaica* (Goriba), (b) *Piliostigma reticulatum* (Kalgo), (c) *Azadirachta indica* (Darbejiya) [Photos by Suleiman Usman].

## 2. Some Key Recommendations: 'Sustainable Forest Management'

Africa's natural forest is vast and diverse in the aspect of its biophysical, geographical, economic and ecological context. The sustainable management of these vast areas is proving to be extremely challenging due to much less

information on socio-economic and policy aspects related to forest condition in the region [19, 11]. Research for sustainable forestry development [15] noted that there are some challenges in the aspect of sustainable forest management in sub-Saharan Africa. Subsequently, some cases of forest management in the tropics are being critically questioned considering how the environmental forest policies are working in the region [1]. According to Food and Agricultural Organization of United Nation [9] sustainable

forest management can be defined as the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and does not cause damage to other ecosystems. This entails that ensuring the sustainability and renewability of forest trees in northern Nigeria will help in achieving profitable ecosystem in the region. This will not only serve as a means of protecting soils from erosion and climate change impact but also improving the soil quality, sustaining indigenous and foreign forest trees, increasing timber availability and minimising environmental hazards [27]. It could also aiming at protecting and enhancing the economic, social and environmental values of all types of forest trees, for the benefit of present and future generations in the region [22]. However, achieving these set of benefits means adapting some practices, which are valuable to both soil and environment. These practices can be achieved by considering the following key advices outlined below.

- (1) To increase production of nursery seedlings of indigenous and foreign trees of high economic values to both environment, government and the region.
- (2) To increase production and establishment of forest areas on a sustainable manner.
- (3) To ensure proper management of available and remaining forest trees around dryland and fadama areas
- (4) To fight against deforestation and an unsustainable management of remaining forest trees in the region
- (5) To enhance the biodiversity of all floras in the region through a combine soil-forest-vegetation management policies based on experts advices.
- (6) To support any practice that is important to surface soil protection and conservation
- (7) To find ways of minimising dependence on forest trees for fuel consumption by millions of people in the region by ensuring the availability of cooking gases and other means of stopping direct use of these trees.
- (8) To fight against soil erosion, soil desertification and land sliding that affect or cause harm to forest trees in the affected area.
- (9) To ensure sustainable management of all forest and soil vegetation resources.
- (10) To ensure sustainable agricultural systems (cropping, animal rearing, orchard etc) that could increase the values of forest trees around.
- (11) To support research and research activities on forest resources, soils and biodiversity.
- (12) To increase forest trees regeneration within and around the vegetation area.
- (13) To increase security of land, soil and forest area.
- (14) To support activities of forest extension officers in providing workshops, rural awareness and trainings on the important of forest trees to communities.
- (15) To set a low and proper implementation of its functions on anyone who cause harm or involved in

deforestation.

- (16) To utilise all areas that have been abundance or not in use for regeneration of forest trees and vegetation plants.
- (17) To establish habit of planting trees around and within town areas.
- (18) To involve all primary and secondary schools in the process of forest trees plantation programmes.
- (19) To support Non-Governmental Organizations (NGOs) working to ensure the sustainability and quality of all forest trees in the region.
- (20) To include the aspect of forest development in the national and state budgets to help support proposals of high values for the improvements of forest trees in the region.

### 3. Conclusion

This paper concludes that the northern Nigerian forest trees are declining and need to be protected by all means. These forest trees are important natural resources, which play a key role in ensuring fodders for livestock, fuel consumption, forest fruit and medicinal plant products, maintaining soil erosion and preserving water and water quality. However, for a quite long time ago the widespread and increasing land and vegetation degradation caused by misuse and abuse of natural resources, ineffective management of forest reserve, neglect of proper management of trees biodiversity, low capacity of research development, lack of improve scientific forest management skills and management resources deficits, are real issues undermining the ways to improve and manage forest trees in the region. Sustainable forest management means maintaining forest biodiversity, forest productivity, forest regeneration capacity, forest vitality and forest potential today and tomorrow for the benefits of present and future generation in northern Nigeria. It is believe that enshrining and achieving this goal means building a capacity that may consider outlined set of advices presented in this paper.

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