



Joachim Krug (Autor)

Site species matching and planting techniques for arid-zone forestry in Namibia

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**Site-Species Matching and Planting Techniques for
Arid-Zone Forestry in Namibia**



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Cuvillier Verlag, Inhaberin Annette Jentsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany
Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

1 Introduction

1.1 Forest and land degradation in Namibia

Forests and trees have had and still do have an undeniable role in the development of the Namibian way of life. They provide the population with wood for fuel, building material and food, as well as fodder for livestock and manifold non-wood forest products. In addition to their economic and ecological value, forests also have an important social and cultural impact.

During the last few decades Namibian forests and woodlands have diminished rapidly, especially in the northern parts of the country. Logging, fires and overgrazing have generated a serious deforestation problem. Particularly in the northern regions, deforestation has caused a shortage of fuel wood and building material, as well as soil erosion. Where woodlands are diminished, the spread of invader bush species has dramatically decreased the grazing capacity of pasture lands and caused serious losses for livestock farmers.

According to ERKKILÄ and SIISKONEN (1992), the trend will increasingly endanger the remaining forest resources. "The high demand of poles for construction will be the main reason for deforestation in Owambo. Large forest areas will also be transformed into pasture and arable land. Natural regeneration is going to be endangered due to frequent fires and collection of fuel wood. Good road connections will attract more people to settle deep in the less populated forest areas, especially in Kavango and eastern parts of Owambo. Some agricultural projects will accelerate deforestation in East Caprivi and Kavango. Logging will ease the shifting cultivation. West Caprivi will have the last forests remaining in Namibia."



Figure 1: Namibia, situated in south-western Africa and bordering Angola, Zambia, Zimbabwe, Botswana and South Africa.

To alleviate the deforestation process, ERKKILÄ and SIISKONEN (1992) conclude that there is an urgent need for new approaches to “agro forestry, farm forestry or social-forestry”, but also admit serious constraints due to harsh growing conditions, low precipitation rates and poor soils in Namibia. ERKKILÄ and SIISKONEN recommend the prioritisation of forestry research towards natural and artificial regeneration as well as to plantations.

Figure 2 illustrates the main vegetation units of Namibia.

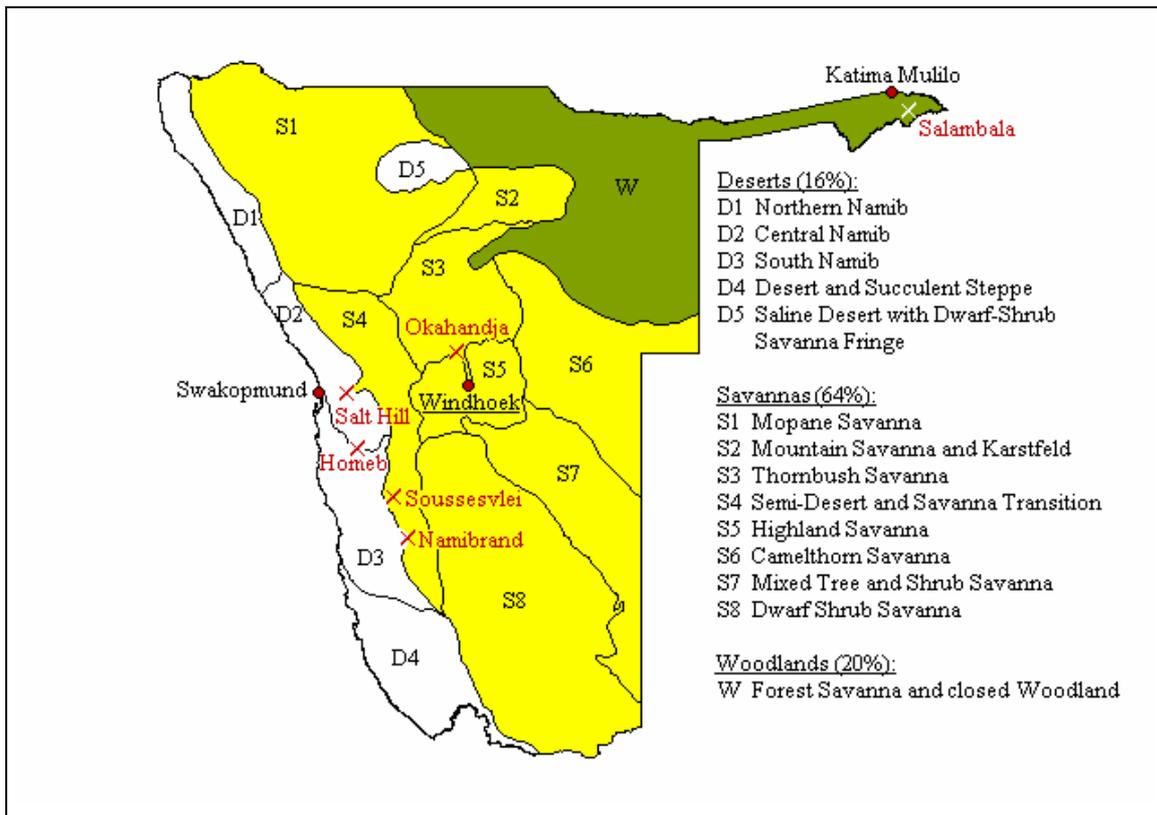


Figure 2: The major vegetation units of Namibia (modified from MENDELSON *et al.* 2002) – research sites are marked with a cross and labelled.

While the demand on industrial wood is met mainly by imports, the woodlands and savannas still support the majority of Namibians directly through the supply of energy and construction materials.

Fuel wood still provides the main source of energy for the majority of the population: In rural areas 93 % of all households use wood as their primary source of energy (ANONYMOUS 2000a). The ‘Forestry Sector’ of the ‘National Development Plan II of Namibia’ describes the annual consumption of fuel wood at ca. 670.000 tons for 1996 and estimates an annual increase of 3 % according to the annual population growth rate (ANONYMOUS 2001a). Furthermore, throughout most of northern Namibia, the construction of traditional homes and villages relies heavily on wood. Little information is available on the quantity of wood used in construction per year, but it has been estimated that 93 % of all wood consumed is used for building purposes

(ANONYMOUS 2000a). An increase in the consumption of construction materials (poles for house construction and fencing etc.) should not be estimated purely on the basis of population increase. ASHLEY (1994) concludes that in the north, 80 % of homes are built using indigenous timber and thatch: Traditional Owambo construction methods are estimated to consume more wood than any other form of traditional architecture in southern or central Africa. The total construction and fencing of a typical homestead requires 21.600 poles, ca. 100 cubic metres of lumber respectively.

This has put great pressure on the most popular, termite-resistant hardwoods such as ‘Mopane’ (*Colophospermum mopane*), ‘Leadwood’ (*Combretum imberbe*), ‘Purple-Pod Terminalia’ and ‘Silver Terminalia’ (*Terminalia prunioides* and *Terminalia sericea*). As timber becomes more scarce, people start to build fences with smaller trunks and branches, and less resistant woods which need faster repair and replacement (3-4 years instead of 6-50). As a result, more trees need to be felled more frequently. ASHLEY reports hauling-distances for timber and fuel wood of 30 to 40 km: “Traders are felling trees in the less populated areas of the north, ..., to transport and sell to the centre. Households that have their own vehicles or donkey carts increasingly use them for collecting wood rather than going by foot.” In 1994, ‘Namibia’s Programme to Combat Desertification’ (NAPCOD) assessed the monetary costs of land degradation and desertification on a household level for the northern region (Uukwaluudhi Area). Aggregated subsistence losses were calculated at around 2.000 to 2.500 Namibian Dollars (ca. US\$ 250 to 300) per household, per year. NAPCOD further states that most households were unable to afford subsistence expenditure at this level. In addition, it should be noted that destruction of habitat is one of the principal reasons for the disappearance of game animals from the Owambo region as a whole (QUAN *et al.* 1994).

The Ministry of Environment and Tourism's estimated figures for the existing biomass and the degradation of woodlands and savannas as given in Table 1. KOTSCHI (1986) indicates the rate of desertification in Namibia. The "desertification hazard rating" for Namibia is described as follows: 50,2 % of the area as "moderate" and 24,3 % as "severe".

Table 1: Biomass (tons/hectare of all species: The main tree trunk and branch wood is calculated) of total area within Namibia in 1996 (ANONYMOUS 2001a) and the annual degradation rate of forest cover between 1990 and 2000 according to ANONYMOUS (2001c).

	biomass (tons/ha)	total area (ha)	degradation (ha/a)
closed dry deciduous forests	84,4	2.799.391	24.355
open to very open dry deciduous forests	12,6	10.066.796	no data

The degradation of land, resulting mainly from destructive human impact combined with difficult climatic and environmental conditions, should be considered to be one of the most threatening problems for Namibia. DEWDNEY (1996) describes the scope of reforestation as limited, but nevertheless points out the imminent importance of forestry activities to combat desertification in Namibia.