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THINK NAMIBIA
Sustainable Forest Management

FACT SHEET ON:

Silviculture of Natural and Planted Forests

The purpose of this fact sheet is to provide details on the status of silviculture in Namibia and its potential to support the production of natural forest resources.

WHAT IS SILVICULTURE?

Silviculture is the process of controlling the establishment, growth, composition, and health of forests. It is applied mainly to increase the production of wood or other forest products, but also to improve the social and ecological functions of the forest by cultivating trees or forest crops. Silviculture is applied by forest and plantation managers either for commercial or for public gain. It is implemented at stand level and not on a broad level like forestry. It can however be applied to both natural and planted forests. Typical silvicultural treatments include regeneration, stand tending, thinning, and soil level treatments.

Table 1: Potential benefits of silviculture

Social	Economic	Environmental
Improve local capacity in indigenous plant production. Create opportunities for empowering communities and giving them a sense of ownership over forest resources.	Provide income-generating opportunities through the sale of wood and other forest products. The economic benefits will not be seen immediately, but over time.	Has the potential to improve ecological functions, and reintroduce plants in disturbed areas.

SILVICULTURE HISTORY IN NAMIBIA

Silvicultural interventions started around 1894 during the German administration, with ten forestry stations set up across the country by 1910. The interventions were aimed mostly at growing plants for timber production.

In the late 1990s and early 2000s the Namibia Finland Forestry Programme, with the support of the Finnish government, developed programmes that encouraged tree planting and sustainable use of forest resources. This approach saw the setting up of nurseries at forestry stations and community projects. However, the challenge with this approach was that focus was placed on growing exotic fruit trees such as guavas, mangoes, and lemons.

INDIGENOUS KNOWLEDGE OF SILVICULTURE

Silviculture is a concept that is not generally known by most of the indigenous communities, probably because they have utilised forest resources for centuries within acceptable limits. Indigenous knowledge of silviculture is therefore almost non-existent. However, indigenous lore can enhance silvicultural approaches through a wealth of information on:

- **Forest resources use:** Rural community members can provide information on species that are used for various purposes, including medicine, food, and construction. This information can be important for silvicultural planning in determining potential species to focus on.
- **Distribution patterns of species:** Elderly community members can provide details on distribution, possible age, and growth characteristics of species in their local areas. This information is important in determining target species for silvicultural interventions adapted to local conditions and requirements. For example, moth larvae that are considered delicacies by some ethnic groups and a source of income by others, such as the mopane worm, do not feed exclusively on the leaves of mopane, but also on a range of other tree species, well known to local communities.

STATUS OF SILVICULTURE IN NAMIBIA

Namibia currently has no focused initiatives in silviculture and little is known regarding silvicultural management of local forests, with no trees being planted for timber production. This is despite the fact that timber harvesting is depleting the natural stock of timber species, especially in the north-eastern parts of the country.

Current initiatives

Some local nurseries have tried propagating local species, including the timber species, but these have proved to be challenging as the species are generally slow-growing, forcing many individuals and communities to resort to growing exotic fruit, and shade and ornamental plants. This can be addressed by engaging in research aimed at assessing species adaptation and tolerance to extended periods of drought.

Photo 1: Local nursery in Katima Mulilo

Opportunities for silviculture research in Namibia

According to the Forestry Research strategy, the main objective for silviculture in Namibia is to "conduct research to develop planting materials that are suited or adapted to Namibia's dry climate". Implementation is reliant on several key actions.

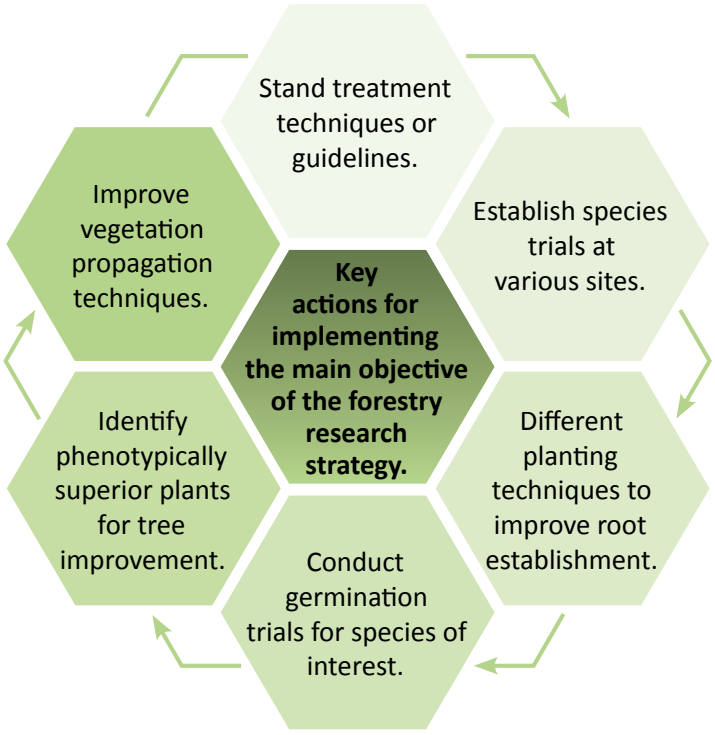

Figure 1: Key actions for implementing the forestry research strategy (MAWF, 2011)

The time period for this planned strategy has lapsed without the listed activities being fully implemented. The information can however serve as a blueprint for potential silvicultural projects targeting local species under local conditions.

POTENTIAL SILVICULTURE TREATMENTS FOR NAMIBIA

There are various silvicultural treatments, the majority of which might prove to be challenging under Namibian conditions and with existing capacities. It is therefore important to highlight treatments that can be implemented with ease on a local scale and within a semi-arid environment. It is crucial that these approaches be replicated by individuals and communities at large, including Community Forests in their efforts to ensure Sustainable Forest Management. In planning for silviculture, one of the key aspects to be considered is whether to focus on silviculture or simply focus on genetic improvement through tree breeding. It is of importance to ensure that when planning for silviculture, there is sufficient information available, in order to provide adequate understanding of such plans.

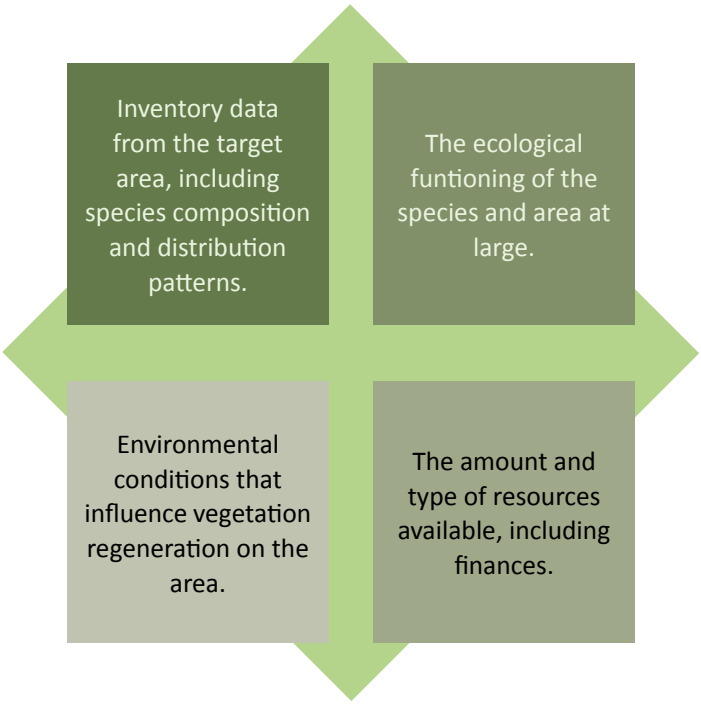

Figure 2: An overview of the information needed for silviculture planning under ideal conditions

Soil level treatment using fire

This involves soil improvement by burning or scarification. Controlled patch burning is recommended at the end of the wet season (May-July) to avoid hot fires that would cause extensive damage to vegetation. Species such as Kiaat *(Pterocarpus angolensis)* naturally require fire to germinate. It has however been found that it is not only the occurrence of fire but more the frequency of occurrence that influences regeneration of such species. More frequent fires may lead to seedling mortality and may also speed up the loss of soil nutrients.

Photo 2: Forest after a fire (Credit: V. De Cauwer)

With adequate training, local communities can implement this approach as it is similar to the conventional slash and burn agricultural method commonly used in the Kavango and Zambezi Regions. Care needs to be taken to avoid runaway fires from burning non-targeted areas.

Enrichment planting

This treatment involves growing seedlings in nurseries and transplanting them in target areas. This can be used in instances where natural regeneration is inadequate or to promote valuable species that regenerate slowly. This would be an option for local timber species such as Kiaat *(Pterocarpus angolensis)*, Zambezi teak *(Baikiaea plurijuga)*, Rosewood *(Guibourtia coleosperma)*, Wild syringa *(Burkea africana)*, and many other local species of social-economic and ecological importance.

Species used in **enrichment planting** should justify the investment. Characteristics to be considered:

- Good timber or nutritious fruits of high value
- Grow rapidly
- Regular flowering and fruiting
- Wide ecological ranges
- Tolerate moisture stress
- Resistant to pests
- Preferably indigenous, otherwise no tendency to invade surrounding areas, such as riverbeds.

Direct seeding

This is the practice of sowing or broadcasting selected seeds directly in the target area of revegetation. This approach would be applicable in remote areas with poor natural regeneration. The approach requires interventions such as patch burning at the end of the wet season, to ensure optimal conditions for the growing plant stock.

Care needs to be taken to ensure that predation of the broadcast seeds and seedlings is minimised by providing some type of protection around the area. Thorny branches are a common and cost effective option in rural communities.

Stand tending

Stand tending includes a variety of forest treatments, including thinning, fertilising, and pruning, which are carried out to maintain a healthy forest and to increase the quality and quantity of timber produced. Thinning aims to promote the survival and growth of valuable trees by harvesting the trees that directly compete with them. As the Namibian forests are very open, thinning would not be a very intensive operation.

Stand tending can also be done through pruning. This is the removal of side branches from a tree to allow proper growth of the main stem. The trees to be pruned must be valuable timber species, be relatively small (diameter at breast height less than approximately 20 cm), have straight stems and healthy crowns. It is further advised to prune live branches in the dry season and not to use an axe for pruning as this might cause damage to the tree. Stand tending can be systematically employed in natural and planted forests.

POTENTIAL CHALLENGES IN IMPLEMENTING SILVICULTURE IN NAMIBIA

KIND OF CHALLENGES	Social and Institutional	Environmental
	• There is limited in-country capacity to fully implement silviculture. • Furthermore, facilities to carry out consolidated silvicultural research are limited.	• The frequent occurrence of wildfires poses a threat to silviculture as seedling growth might be inhibited in natural forests. • The occurrence of low nutrient levels and low water retention capacity of soils, especially in the forest regions of the north-east, are another challenge
REMEDIAL ACTION	• This can be improved through the provision of hands-on training in silviculture for staff members and local communities. • The remote research stations of the Directorate of Forestry can be staffed to allow for silviculture implementation.	• Develop adequate fire management plans to reduce impacts on forests and seedlings. • Encourage the establishment of plantations or woodlots on both small and large scale, to allow for controlled management and interventions.

CONCLUSION

Silviculture has the potential to improve indigenous plant production and Sustainable Forest Management, especially within local communities. Although it is a fairly new concept for many in Namibia, people can be educated about its potential benefits for local communities and the nation at large. It is of importance that the Directorate of Forestry, in partnership with research institutions and other interested stakeholders, starts taking the lead in advocating for silviculture. These partnerships should further invest time and resources in silvicultural research that is specific to Namibia. A detailed understanding of the possibilities and influencing factors will allow for informed decisions in the implementation of silviculture.

GLOSSARY

Direct seeding:

The sowing of seeds directly into the field.

Enrichment planting:

The planting of selected valuable species to supplement regeneration in degraded areas.

Stand tending:

An intervention meant to improve the appearance and composition of forests.

Tree breeding:

The improvement of plant genetic compositions to produce the best qualities of plants as desired by humans.

Water retention capacity:

The ability of soil to hold water against gravity.

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