

# Control of encroacher bush species in Namibia

Encroacher bush species should never be eradicated, but thinned judiciously. Methods to be used for bush control should ensure environmental sustainability. Therefore, all bush harvesting activities should comply with environmental laws and regulations governing bush thinning and value addition, as outlined in the Forestry and Environmental Authorisations Process for Bush Harvesting Activities (2017) guidelines. The following bush control methods can be used:

## Manual



Manual bush control typically refers to small scale operations which are labour intensive and time consuming. Labourers are deployed using hand tools such as axes, bush picks, handsaws and pangas. In Namibia, the bush pick and the axe are widely used in manual felling. Manual bush control has few negative environmental impacts, however, if not suitably supervised and/or trained there is a risk that non-target bushes and trees may be removed accidentally.

- Manual bush control can be highly selective and ecologically sustainable but is also one of the slowest bush control methods, and without coupled value addition of the harvested biomass, it can also be a relatively costly exercise.
- Labourers need to be sufficiently trained in order to ensure that thinning falls in line with forestry regulations and health and safety guidelines.
- In order to reduce the incidence of re-growth, the stumps should either be chemically treated or should be felled below the soil.
- Species such as, Black Thorn, Red Thorn and Mopane will likely coppice if felled, hence aftercare is required.

## Main Principles for Bush Control

### → Leave a mix of trees and bushes ←

The veld should have a variety of tree species (including encroacher species) of different sizes. They should be spaced in a way that there are some open patches and some dense patches. This provides a variety of habitats for animals.

### → Thin bush in a phased approach ←

Avoid to "shock" the land by an abrupt change from dense bush to open veld.

### → Protected plants should not be harvested ←

Exceptions can be made under supervision of Forestry officials in cases of high densities.

### → If arboricides are being used, foliar (leaf spray) and stem-applied arboricides are recommended ←

Pellets should not be used, as they tend to get washed along the surface by rain and end up in non-target areas.

### → Dry river beds tend to carry more and larger trees ←

Forestry regulations state that trees should not be thinned within 100 metres of a river course. Thinning is required in densely encroached river margins, but one should leave a higher density of trees than on the adjacent habitat. It is especially important to leave large trees along a river course. The exception to this is *Prosopis*, which invades river beds and should be eradicated completely.

### → Training of the work force is necessary before harvesting starts ←

Workers need to know which trees to target and which to avoid. Work teams need to be managed so that any excessive harvesting or killing of the wrong species is noticed and corrected.

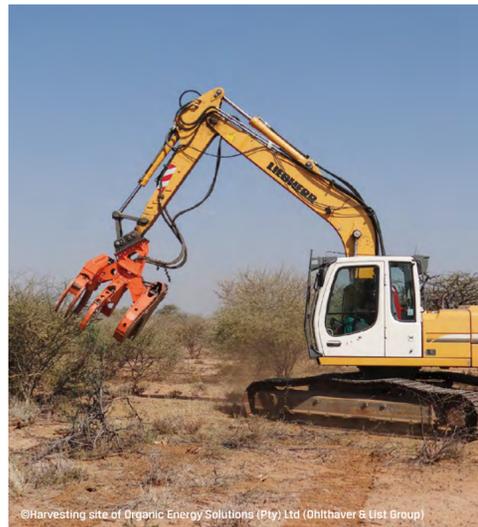
## Semi-mechanised



Semi-mechanised bush control is another labour control method, whereby hand held or pushed power tools are used to fell the bush. This method can be used for the production of animal feed, charcoal and other products, as it is selective and more efficient than manual bush control. Power tools, such as chainsaws, brush cutters and trolley saws, are useful when operated by trained teams of operators. Access can be difficult and often requires teams of two or more people per power tool, to reduce the risk of injury and improve efficiency.

- Horizontal and vertical trolley saw cutters are produced locally and are commonly used for bush control in Namibia.
- Semi-mechanised methods are selective, however, the method needs highly trained operators, both in terms of safety and to ensure that non-target bushes and trees are not removed accidentally.
- Semi-mechanised bush control is typically an expensive bush control solution and should be coupled with further value addition of the harvested wood.

## Fully mechanised



Encroacher bush can be controlled mechanically by self-propelled heavy machines mounted on tyres or tracks and equipped with blades, saws, shears, pullers, rollers and other tools.

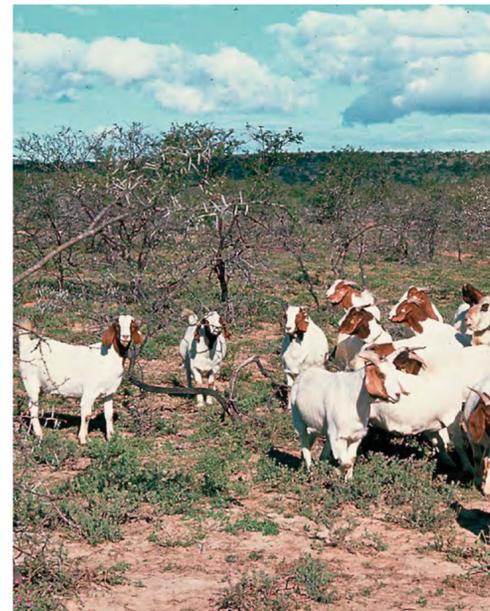
Fully mechanised harvesting methods primarily aim to harvest or thin the bush on larger scales. Mechanised bush control can be achieved with a number of different types of equipment, such as skid steers, front end loaders, forestry harvesters, self propelled horizontal rotary cutters, excavators with saw or hydraulic shear attachments, bulldozers, and bush rollers.

Some of the options for fully mechanised bush control are outlined in the 'Harvesting Technologies for Encroacher Bush in Namibia' booklet (GIZ 2015).

The use of highly mechanised bush control is usually dependent on a number of variables, such as the area, the costs, the throughput, the distance to market (applicable to harvesting operations) and the compliance to environmental considerations.

Fully mechanised bush control requires a highly skilled and trained team of operators and supervisors to ensure that it is as environmentally sustainable as possible. If not properly implemented, fully mechanised bush control is at risk of non-selective felling, excessive soil disturbance, accidental fires, hydrocarbon spillage, and safety concerns, amongst others.

## Biological



Biological bush control refers to when natural factors, such as fungi browsing pressure and fire is used to control bush.

The use of browsing animals such as game species, goats and sheep to clear bush is best used as an aftercare method, once the primary bush control activity has taken place.

Biological control can also be applied through use of biological organisms e.g. specific fungi such as *Phoma glomerata*. However, efforts to use fungi to combat bush encroachment have been largely unsuccessful thus far. Microorganisms can also be used to accelerate the decomposition process of the felled biomass, tree stumps and root systems.

Fungi and other plant pathogens, while largely underresearched and unproven, could play an important role in biological bush control in the future.

## Chemical



Chemical bush control methods refer to the application of chemicals, either applied to stems, foliage and/or soil to kill woody plants. These chemicals are known as arboricides, which contain active ingredients that kill woody plants. Aerial broadcasting of arboricides has been one of the commonly used bush control methods by farmers in the past, but it is considered risky and unselective, and as such, has been banned by the Forest Regulations of 2015 (based on the Forest Act 2001), whereby only selective application of arboricide is allowed. The cost of chemical control is largely dependent on the area to be treated, including density, sizes and species of the bush, the soil type of the area and the arboricides being used.

Chemical treatments can be applied in the following ways:

- Soil application
- Foliar application
- Application to cut stems and stumps

The Forest Regulations further state that only prescribed herbicides for bush control may be used.