

Status of bush encroachment in North West Province

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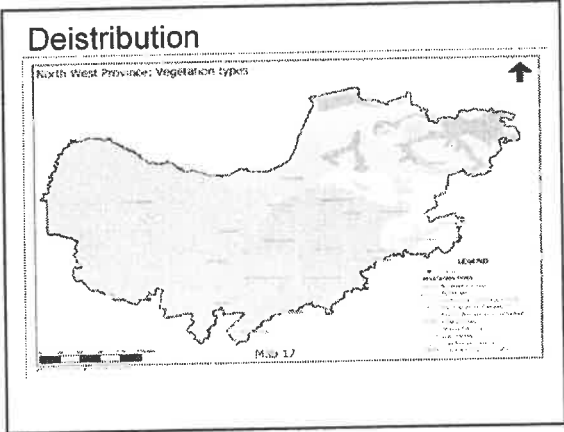
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Introduction

- Encroachment is the increase in density, cover and biomass of indigenous woody or shrubby plants in various grasslands or savannah, especially arid and semiarid areas
- Many use encroachment and invasion interchangeably, although invasion would be coming from another continent or a great distance
- The increase in bush encroachment started in the mid to late 1800s and continued through most of the 1900s.
- Arid and semiarid lands, or drylands, cover about 41% of the terrestrial surface of the Earth with approximately 2.5 billion people living in these habitats

Introduction

- Woody plants are spreading rapidly in parts of the world especially in North West Province. Heavy encroachments occur in major parts of the Dr Ruth Segomotsi Mompati, Ngaka Modiri Molema and Bojanala regions. Encroachment, however, is not restricted to these areas only and have also been noticed in isolated areas of Dr Kenneth Kaunda Region.
- According to Donaldson, (1969) about 13 million hectares of RSA was affected by bush encroachment by then it is likely that the process has worsened.
- Bush encroachment by indigenous woody plants is gaining a foothold in varying degrees in all parts of Southern Africa.



Distribution

Kalahari thorn veld and shrub bush veld 35%
 Savannah-Grassland 30%
 Mixed bush veld 25%
 Other turf thorn veld 10%

Causes

Overgrazing
 Increased atmospheric CO2 concentrations
 Precipitation rates
 Favorable edaphic conditions
 Fire suppression, fire intensity and frequency
 Temperature
 Soil depth and nutrient levels
 Amount and kind of herbivory

Factors promoting growth and establishment of bush encroachment species

Cause	Effect in the vicinity of foci points
Soil fertility	Nutrient enrichment (high soil nitrogen)
Moisture availability	Exclusive use by bush encroachment species, due to grazing/browsing exclusion of other species (cattle selectivity)
Fire	Exclusion due to lack/low herbaceous fuel loads
Topographical/ soil texture variation	Light/course grained soils retain less surface moisture and tend to favour woody plants. Heavy soils retain moisture at the surface and favour grasses

Factors that are dependent upon anthropogenic activities

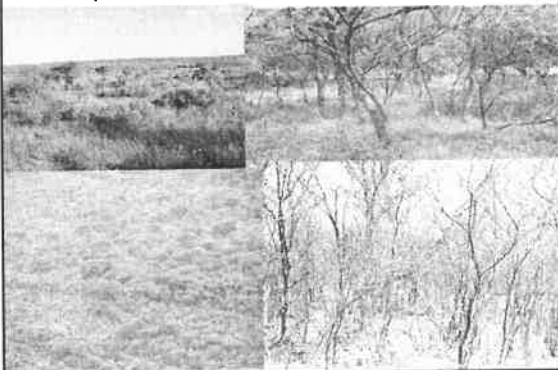
Distance from major foci points (e.g. boreholes, kraals, rivers, pans etc),

- (1) Grazing and trampling at water-points by cattle and pressure from both livestock and people around settlements
- (2) moisture competition can allow woody encroachers to establish themselves as seedlings and grow to maturity
- (3) Selectivity of cattle on the range can result in changes in structure and composition of vegetation
- (4) Fire frequency was very high in historical times as compared to today in all types of rangeland ecosystems

Bush encroachment species

Vachellia tortilis
Vachellia karoo
Senegalia erubescens
Senegalia Mellifera
Dichrostachys cinerea
Grewia flava
Tarchonanthus camphoratus
Euclea undulata
Gymnosporia baxifolia
Ziziphus mucronata

Composition



Invader species

Prosopis,
 Eucalyptus
 Acacia mearnsi
 Sesbania
 Phragmites australis (Common reed)
 Opuntia

Protasparagus spp and Serephium plomosum that crowd out indigenous grasses

Invader plants



Density

Species	Density	Species	Density
<i>Michelia arbuscula</i>	104.2%	<i>Cereus jamacaru</i>	58.2%
<i>Michelia robusta</i>	137.7%	<i>Combretum hercynense</i>	554.2%
<i>Michelia nilotica</i>	3287.5%	<i>Microrhynchus cinereus</i>	884.2%
<i>Michelia tortilis</i>	1747.2%	<i>Ehretia rigida</i>	81.7%
<i>Chrostachys unguis</i>	50%	<i>Euclea crispa</i>	62.5%
<i>Ehretia rigida</i>	4%	<i>Grassia flava</i>	104.2%
<i>Grassia flava</i>	43%	<i>Grassia flavescens</i>	55.2%
<i>Protosaraxus</i>	134.2%	<i>Cymodocea bartolola</i>	7%
<i>Rhus lancea</i>	12.5%	<i>Clea africana</i>	800.2%
<i>Yamania americana</i>	50%	<i>Passera canalis</i>	266.2%
Total	6007.5%	<i>Protosaraxus</i>	41.7%
		<i>Rhus lancea</i>	304.2%
		<i>Tarchoanthus</i>	4%
		<i>Combretum</i>	4%
		<i>Michelia robusta</i>	886.2%
		<i>Michelia nilotica</i>	68.7%
		<i>Michelia tortilis</i>	950.2%
		<i>Yamania americana</i>	4%
		<i>Acacia mucronata</i>	204.2%
		Total	5561.2%

Density



Impact

The density, cover and biomass of certain woody species increased as the density, cover and biomass of many species of grasses and other herbaceous species decreased in the vast area of grassland where encroachment has been occurring

Reduction of:

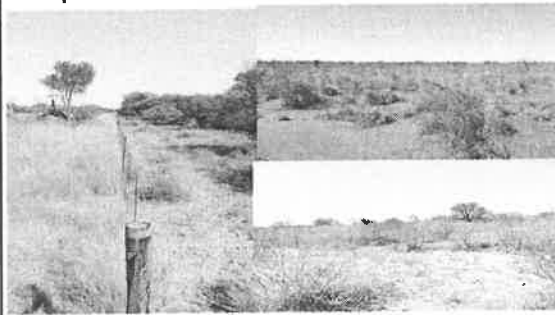
- biodiversity
- ecosystem services
- grazing capacity
- available soil moisture
- local livelihoods

Bush control programme

Before the bush control programme is embarked upon, two alternatives to reduce tree density or its impact should be considered. The alternatives are to adapt livestock to the existing vegetation or modify the vegetation to suit certain livestock. These can be done by introducing browsers or reducing the proportion of trees to grass respectively. Bush control measures should comply with the following requirements before it can be considered successful.

- The action should be ecologically responsible.
- The action should be economically justifiable.

Impact of herbicide use



Can the process of encroachment be slowed or reversed?

- This will be an arduous task. These dryland communities in western North West Province and in other places have changed over the past 100 years. In some areas of the world the process started much sooner and the time span has been longer.
- The communities cannot be changed back from savanna or woodland to grasslands overnight.
- Making the changes or reversing the current encroached ecosystems and ecosystem processes will be difficult and expensive.
- It will also require a change in mindset of those who are harvesting the grass biomass through grazing in these marginal ecosystems.
- Some grazing can be sustained in these dryland ecosystems, but these communities cannot sustain a high level of constant grass biomass removal and the grasslands cannot be sustained without fire.
- Sustainability of these ecosystems should be the overall goal.

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