

Southern African Grasslands: Aspects of their Biodiversity, Dynamics and Management

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Thank you Mr. Chairman, ladies and gentlemen. My talk is on the Southern African Grasslands: Aspects of their biodiversity, dynamics and management. I think one thing I must point out at the very start is that when you look at the traditional timber producing countries where plantations are used to produce timber, that activity takes place through modification of the natural resource. A natural resource, in that case mainly the Boreal Forest, in the northern hemisphere is either selectively utilised or there is some clear cutting and replanting with species very much native to that part of the world. The difference in southern Africa is we destroy a natural resource before we establish another resource, which should then be artificially maintained.

And the questions are "What are we destroying?" and "Is the destruction worth that with which we replace it?" Surely we cannot eat grass and we need to make use of agronomical practices to cultivate food and other products, but at the rate at which we are losing our local grasslands, the question is "Is it worth it?"

I am not involved in any conservation organization, I am a Plant Taxonomist, my job is to make sense of the biodiversity of the South African Flora and I have to go out into the veldt and find many of these species so I can see on the ground what is happening with some of our biodiversity.

When we are talking about grasslands it is important to make the distinction between

primary grasslands, these are grasslands that are natural, compared to secondary grasslands, which is the result of forest destruction, and it is interesting that in many parts of traditional timber producing countries, the grasslands tend to replace destroyed forests and the grasslands there are referred to as secondary grasslands, and the aim is ultimately to try and get some of those grasslands back to the climax stage, which is then forests.

But, there are a few parts of the world where we have primary grasslands of a temperate nature, they are not tropical. You do get tropical grasslands, just think of the grasslands of the Serengeti with the Blouwildebeest and so on. Those grasslands are very different from the grasslands that we have in the temperate parts of the world. There are only four areas where you can easily map the size of the temperate grasslands in the world, namely the Prairies, which is already largely destroyed, especially the long grass prairies which is 95% destroyed. The Pampas of South America, which is largely transformed especially by overgrazing and by alien invasive plants, the Steppes of Western Europe and Central Asia which because of human habitation for thousands of years have become very much also impoverished and suppressed. And, then the Highveld Grasslands of Southern Africa. The only grasslands that have evolved with man, because man originated in Africa. So there are certain features peculiar to the temperate grasslands of Africa.

One of them is that they can stand a good deal of human impact, which is not the case in the rest of the world, which has only seen modern man impacting on them for the last hundred thousand years or less, and you find that its not only the animals but also the plants in other parts of the world that we call ecologically naïve. They cannot withstand human impact as well as plants and animals

can do in Africa. As an example, man has only been in Madagascar for a thousand years, yet the destruction has been immense. Man has been in Africa for hundreds of thousands and millions of years, if you should count the hominids, and it very much is still intact.

I would like to say something about the grasslands biome, its biodiversity, its dynamics, because if you also understand a little bit about how the system functions, I think it would also help to increase appreciation for this vegetation type.

I am not a manager or a ecologist but I know a little bit about the topic to be concerned about certain aspects and to have noted certain trends. I would like to highlight a few of those.

A brief comment about the environmental impact assessment, which is often used as justification for timber plantations or for any other form of land change (that has been justified by an environmental impact assessment), and to conclude with a few words on conservation.

The biome concept is one which maps areas with large similar vegetation, not looking at the species that grows there but more at the general effect produced by the plants in combination.

If it's mainly trees, we call it a forest. That's why it's so easy to call a plantation a 'forest', but if you look closer you will see that a true forest is a very diverse system whereas your plantations tend to be mono-cultures. But, if not only referring to the plants, the plants are merely the habitat creating component plants create habitat. They are not only things that can be consumed, they are not only food, but they create habitat, a place to live for the rest of the components of the ecosystem notably the animal part.

Now, the grassland biome is here shown in yellow and you are all probably familiar with the biome map of southern Africa. This is the mapable portion of the grassland biomes, there are also outlying enclaves of the grassland biome, perhaps with a more

tropical nature especially in Maputoland and as you move further north, there are also in some water-logged areas in savanna, the so-called dambos, where you get grassland areas. But these are mainly the temperate grasslands that has been mapped here as the grassland biomes. Now you will realize that this is mainly the area where heavy afforestation (plantations) is taking place. *So the impact of afforestation is mainly affecting the grassland biome.*

Grassland Biodiversity

The diversity how many plant species do we have in the grassland biome?

It is estimated that we have about four thousand (4000) plant species in the grassland biome alone. It is a significant figure; it is more than the total flora of many countries.

Switzerland 3 000 species, Sweden 1 700 species, Norway 1 600 species, the Netherlands 1 200, Finland, probably one of the biggest timber producers in the world, mainly from natural and semi-natural forests 1 000 native species.

So we are dealing in biodiversity terms in a very significant resource in terms of genetic material.

If we zoom in a little bit, and we ask the question "How many species are you likely to encounter in a plot of 1000m². If you walk a thousand steps in a piece of veld how many species are you likely to encounter?, and you will notice that the richest on that scale is probably the Rhenosterveld down in the Cape, part of the Fynbos biome. And the grasslands is the second richest broad vegetation type in South Africa, where some of your other biomes, which are shown here, forests very much lower for example than the average 82 species of the grassland biome. So it is quite a rich vegetation type.

I want to make a few statement now, a few dictums, a few sort of what I would call "generalisations or general truths" about the grasslands. I am going to use as an example, the North-Eastern Mountain Sour-veld, which is the vegetation type on the escarpment, here from Nelspruit to the

Wolkberg, and which has been particularly heavily impacted upon by afforestation.

It is a misnomer to call grassland a grassland because the bulk of the plant species in a grassland consists of what we call non-grassy herbs or forbs, wild flowers. And, if you take the 823 species reported in the North-eastern Mountain Sourveld, only 11% of the flora is grass. It is true that the grass dominates in terms of numbers, that's a strategy adopted by plants that are wind pollinated. Wind pollinated plants tend to be gregarious, it is part of their life setup, because they must grow in large numbers in order to maximize the chances of pollination because they are dependant on the wind, which is non-directional. This applies to all the grasslands. The bulk of the species in any grassland of South Africa would be non-grassy herbs. The figure may vary, it's particularly high in the Northeastern Mountain Sourveld 89%, but I would say in perhaps most other grasslands, more than 60% would be non-grassy herbs.

Another important point to remember, - is that when you look at the rare plants, what we call endemic plants, because often they are confined to a particular vegetation type or a particular region. Lets look at the endemic flora of the Northeastern Mountain Sourveld, those plants are only found in that area, and there are about 130 species. If you analyse them, 2% of them are forest species, of native forests, and 98% are grassland species. And that is the pattern throughout the grassland biome. That the bulk of the rare species are in the grassland and not in the forest. One implication of this observation, is that the old idea brought here by the eurocentric views of our first ecologists that came out in the early 1900s, continuing with prominent people like Acocks and even Frank White. They reckoned that these grasslands are just like their European grasslands that they are familiar with, secondary grasslands caused by the natives who chopped out and burnt the forests, and that these grasslands actually should be brought back to 'forest' and it is still used in some of the forestry propaganda to this day that they are restoring the land to what it should be.

It is time that we for once and for all forget

about that view that these grasslands are secondary because, if you look at the special plants they contain and animals, they must have been in existence for millions of years because only then would there have been enough time for all these very specialized forms to have evolved.

Grassland Animals

Now, if we look at the animal component, birds, mammals, reptiles and amphibians, you will notice that the grasslands compare quite well with the other biomes. I am not going into detail here now, just to point out that many animals are highly specialized, they are highly adapted to an open grassland habitat. A tree dominated habitat is completely unsuitable to them, just like the flora for example, is highly adapted to open sunny conditions and can not tolerate shade. Many animals are threatened today, by transformation of grasslands. We see this particularly in the midlands of KwaZulu-Natal where the amphibians are under considerable stress the frogs... and there is even suspicion that *some may be extinct due to excessive destruction of grasslands.*

Grassland is not just grassland, we must all remember that within the grassland biomes, there is some difference in the floristic richness in our richer grasslands, where on average in 100m² we have between 30 and 50 species. So your more arid grasslands towards the west, the central grasslands, the drier grasslands, tend to be slightly more impoverished. So your escarpmental grasslands are among the richest and so are the grasslands of the bankenveld bordering the savanna biome and amongst the richest are these grasslands on dolomite which are also somewhat wet.

These figures are based on student work and I would not say they are too reliable because they are sampled at short periods of time and often not over all seasons, and when students encounter a plant which is difficult to identify they tend to ignore it and not worry about it, focusing on the grasses which tend to be the easier component to identify...

Let me make a few other statements, which I

think applies to the grasslands.

Sandy soil high floristic diversity.

Clay soil low floristic diversity,

Rocky-outcrops usually the highest diversity in any piece of grassland.

I mention this particularly for the managers who have to make decisions as to how to use a particular piece of land.

So Rocky Outcrops, rocky areas, tend to have, in any grassland, the highest diversity.

Floristic diversity in wetlands is low. In any piece of grassland, you tend to have your lowest diversity in the wetland. Yet, where you do have special plants in the wetlands, and there are many, they are highly specialised in the sense that they are not easily found elsewhere. Your more open grassland plants, can tolerate quite a spectrum from fairly dry to fairly wet, from very rocky, to less rocky to clay, to sandy. But wetlands plants tend to be very specific and that's why wetlands are also so important from a biodiversity point of view, despite the fact that a fairly large portion of wetland plants are cosmopolitan, they are world wide. You can see *fluitjiesriet Phragmites* spp. almost anywhere in the world, or the genus *Typha*.

The lowest diversity in any particular part of the grassland biome, would be cultivated areas and particularly fields that have been ploughed at one stage or another. To this day we have not seen any recovery of a piece of grassland to its original diversity, after it has been ploughed. Even after almost a hundred years.

Grassland Dynamics

I would like to say a few things about grasslands dynamics, because I think this is not understood by many people.

The grasslands represent an extremely stable ecosystem. It means the non-grassy herbs, the bulk of the species, can live to a great age, and the turnover of non-grassy herbs are very low indeed. Some people still think when the veld turn green in spring that that must be a new bunch of seeds coming up. There is very little re-generation from seed in a good piece of grassland. Those plants would sit for years and years in the same spot. I know plants that

has been in the same spot like some of these wild flowers (e.g. *Gerbera* spp.) for forty years, and they still look the same, as I remember them as a child, and there has been no spread from that particular spot.

Nearly all the native species in grassland are perennial, that means they have underground structures that keep them alive. The bulk of the biodiversity of the grasslands is underground, not above ground. What you see is just the 'tip of the iceberg'. They have rhizomes, rootstocks, tubers, bulbs, corms, etc., forget about all the technical distinctions between these structures, but they are underground storage structures.

Annuals are very few. Compare that with the Succulent Karoo in Namaqualand for example.

There are a lot of annuals in Namaqualand. Native annuals, the daisies, all those wild flowers that you see in floral display, they are the pioneers. They are annuals. They come up from seed. You don't have that sort of thing in the grasslands it is a very interesting observation. And if you do get annual non-grassy herbs, they tend to be mainly naturalised alien weed, like cosmos for example, kakiebos or blackjack, or stinkblaar/olieboom (*Datura* spp.), and I think we must be grateful for those weeds, so you will notice that those weeds are not on the weed list, they are not classified as undesirable, because what they do, is they fulfill a role that few native plants are available for. So if you have a ploughed field and you want it restored, you need pioneers. But there are few native pioneers. In Namaqualand you have then, for example the daisies. In fact they have to plough up parts of Namaqualand to get the tourists there to see the floral display.

So you must be grateful for some of these weeds because they fulfill an important ecological role, they have seen a niche, a opportunity, and they are filling that void.

What does it tell us? It tells us that grasslands have never experienced over millions of years a form of destruction that one can compare with the plough. There was no need to put in place pioneers because they would

have had no functional job to do.

If we look at the perennials in a grassland, the bulk of the species, and we look at their response to fire, it is very important to note that they are not killed by fire, but they are all basically resprouters. It means if you burn them they come up again from the underground structures.

That is very unlike the Cape for example, where you have a large proportion of the flora being re-seeders. It means a fire will kill the whole plant, and it will have to come up from seed again and you must give it about 15, 20 years to produce seeds before you can have the next fire cycle, for if the fire cycles are in too quick succession, you wipe out the species.

You essentially don't have re-seeders in a grassland. There may be very few, but among the perennials, I am not aware of any one that is really killed (by fire) and I would love to hear if some you can give me some example's of perennials that's killed by a fire and have to come up from seed again as the re-seeders in the Cape.

Pre-Rain Flowers

To me personally the most interesting components of the grassland, is what we call the pre-rain flowers. There flowering is stimulated by fire and they are non-dependant on the rainfall, even this year with the drought there in Gauteng they would come out, all they require is the fire, and they do this by having water stored underground which they have pot-up during summer to give them a competitive advantage by being first to flower in spring, before the grasses emerge to flower. Hence they can advertise for pollinators without having to compete for visibility among tall grasses These pre-rain flowers are also characterised by extremely rapid seeding.

This rapid-fruited has never been studied in detail, but they are fascinating plants, because within a week or two, almost overnight, they have fruit. And we think it is an adaptive strategy, that they cannot compete with the grasses, to advertise for pollinators, because they will have to grow

very tall to stand out above the grasses, so what they do, they use this opportunity, once the grass has been burnt and the area is open, they have their own water, they flower profusely and they make their seeds quickly. Because they want their seeds out, if the first spring rains come, just for that one in five hundred year replacement they need, so that when the seedling gets established it is early in spring and it's got the whole growing season so, by the time winter come, the underground structure is strong enough to see that little plant through the harsh conditions associated with the arid winter period, which is often characterised by frost and cold in the grassland biome.

Pyrogenic geoxylic suffrutices is a very peculiar growth form that is associated with our grasslands, and it is very much a type of growth form in Africa. It is not found in significant numbers anywhere else in the world except perhaps to a limited degree in South America. It is a growth form where you get plants, woody plants that can be compared to underground trees, and all that you see are these green twigs which can be compared with a canopy of the tree. And this is probably one plant sitting here, or maybe even this whole area may be one plant, and it's the canopy that just sticks out, the tips of the branches above ground. They burn down every year, but the rest of the tree stays underground.

Why they have adopted this strategy... it is a very interesting challenge to come up with reasons.

Is it fire? We don't think so.. Is some of it frost? Shallow water table? Grazing? There are lots of interesting things we can say about the reasons why plants have adopted this strategy and why it mainly evolved in Africa,

Now these clones, because we call them clones, they are essentially immortal, nothing can kill them. Grazers can not kill them, fire can not kill them, they are drought resistant. They grow extremely slowly, and if you look at the diameter of some of these clones, they must be the oldest inhabitants of our grasslands. I would say easily more than a thousand years for many of these clones since

the first seed arrived for that particular species. But I would not be surprised if some of them is one day shown to be perhaps more than 10 000 years old, amongst the oldest plants in the world, much older than any tree that you are going to see. They are very peculiar plants and we have quite a number of these species in our grasslands.

So much for the dynamics...

Grassland Management

I have to say something about grassland management. The standard book on the topic, is this one edited by Professor Tainton. It is very worrying when you look at the definition, for example "Veld condition assessment" which is one of the methods used to establish the condition of the veld. Veld Condition is defined - "it is used to describe vegetation in relation to its long-term potential for livestock production". So it is an exploitative view of the veld that it is only there for livestock production and the main component of significance for livestock production is grass. So the bulk of the species in the grassland is kind of ignored and many of the methods described only depends on quantification of the grass stratum. They do not survey the other plants and the bulk of the plant species are not looked at. Because their aim is to produce more livestock and there is the belief that these other plants play no role in the diet of the animal.

So the question is:- For what does one manage? It is important to have management objectives. If you manage for biodiversity, surely this definition is unsuitable? But the point I want to stress here, is that it is sad that to this day, veld-management studies in Southern Africa has been aimed mainly in the management of grass and not really the management of **grassland** in its full diversity.

That's why we know almost nothing of the bulk of the species, the non-grassy herbs. I would say essentially nothing. What I have been telling you here about their behaviour you won't even find in a text book, you won't even find reference to pre-rain flowers. Its not there.

We as taxonomists have known them for

years, but the ecologists, the people who do the studies; many of them get money to conduct agricultural research, so they have to take an agricultural approach. The timber people get their money from the timber companies, and its difficult to be a conservationist in the timber business, because you are often not empowered to do what you would actually like to say and do, because remember, you are in the business of managing for trees.

Now what can one really manage as a manager? You cannot manage the climate - you cannot manage the temperature and you can not manage the rainfall. But there are three things that you can manage, and these are very important from a management point of view:

Stocking Rate

The one is stocking rate you have to establish grazing capacity it is determined by your management objectives which depends on whether you want meat production from the veld, if you want to stock the area with game, and you want to see how many animals can be carried, and the stocking rate is very important in a small management area, particularly if you make use of fire as a management tool.

Because if you cannot burn large tracts of land, you find that if you have a lot of animals on the property, they all tend to focus on whatever area is burnt and that is often not the whole area.. So, when people calculate stocking rates, they take the whole piece of land, lets say a 100 ha., but they only burn lets say 20 hectares every year and then this carrying capacity of 100 ha. is all focused on 20 hectares because that's where the game goes to. It's a devastating effect, particularly if you have too many animals.

Fire

These grasslands evolved with fire. Any piece of grassland should have a burning program. *Remove the fire, you destroy the grassland*, it is as simple as that. You can not replace the fire with mowing; you can not replace the fire with grazing. So if you cannot use fire, because of safety considerations,

then you must not manage for grassland. Then you must change your management objectives.

Here are some of the aspects that are taken into consideration -like time -is very important. David (Lindley) pointed out some of the burning that take place when they do fire breaks in the beginning of winter that can have a devastating effect on the normal function of the grassland.

Your best fires are late, late winter, or very early spring.

Fire is the life blood of our grassland, It has been here for millions of years, and man has been using it for at least 1.5+ million years here in Africa, in addition to the lightning fires.

Invader Plant Control

The third thing you can do from a management point of view is, invader plant control. Both bush encroachment by native species and invader alien species.

Native species like *Acacia karroo*, and *Stoebe vulgaris* (bankrupt bush). You can do this through fire, chemical or mechanical means or biological control and again your management objectives must help you how you are going to handle especially indigenous invader plants, which is often a problem when you exclude fire from a grassland region.

Grassland Restoration

We see the inability of grassland to regain its original floristic diversity and we consider destruction by ploughing or by timber plantations, especially if they have been there for a long time, as irreversible.

Don't waste your time to try and get grassland back.

You can ask Why? Why does grassland not come back? It is a complex issue, we think that one of the reasons is historical - Our grasslands are the culmination of millions of years of different vegetation types being superimposed, and you can never turn the clock back and repeat that. It is not primary succession like the dunes there in Richards Bay, where you have pure sand dunes along the coast and then they get progressively

vegetated.

This is a different system where there used to be forests at times, where there used to be Karoo vegetation, and savanna vegetation all superimposed, and each time when a particular plant community or vegetation type change, it not completely replace the previous vegetation type -but some individuals stayed behind, some of the hardy ones and the whole thing gets 're-shuffled' and you can never repeat that in our lifetime, or in any future lifetime.

Soil

Soil changes are not often reversed, and one of the often overlooked soil changes is the increase in hydrophobicity of the soil. The soil becomes hydrophobic, especially under eucalyptus plantations. The soil becomes water repellent. It is a complicated factor - there is a waxy layer deposited on the sand grains, which is almost impossible to remove and it means that water run-off increases tremendously,

It is a feature of eucalyptus, the second worse would be wattle, then pine, and I know that grassland is least known for this hydrophobic condition.

It is being studied by the industry, they are very much aware of it. They are not putting it on display everywhere, but they are very much aware of this problem. And it is worsened by fire. So I hate to think what is happening to the soils, what has happened to the soils after these latest fires here on the escarpment. Will those soils ever recover? What is the run-off going to be after the first heavy rain? Erosion, flash floods, all sorts of problems.

Wetlands fortunately are relatively easy to restore so that is one of the best options. If you want to restore an old timber area, go for a wetland. And David (Lindley) has shown that the success is quite dramatic with wetlands.

Forests are relatively easy to restore (native forests). There I support Dirk Versfeld. I think if you chop down some of these old plantations, instead of trying to get such an area back to grassland with weeds

and all sorts of nonsense, rather try and just leave them. Take the fire out and they will gradually go back to forests. Because if you take fire from a grassland in our high-rainfall regions it will over time revert to a forest.

So forest is one of the easiest vegetation types to restore with quite a lot of diversity associated with it, but forget about the grassland. But this must make us more cautious, because can we afford to lose more grasslands, because its not just a matter of restoring them. **Once we have lost them, we have lost them!**

Environmental Impact Assessment

A final word on environmental impact assessments I do not know how much trust one should place in those assessments. People try their best, But you know, once ploughed you can say look, that area is not a very high priority from a biodiversity point of view. It may still be a high priority from a grazing point of view, You can still graze black wildebeest there, they wont mind the species impoverishment they just want an open habitat. But, you are not going to get the original diversity in terms of plant species. So we always say well, if that's a previously ploughed area that's the least concern, if you want to put other forms of agriculture in there.

It is important to survey grasslands during all seasons and not like often happens, that you are given two weeks time in the middle of winter to do an EIA in a piece of grassland. It's absurd. Because what you find is that many of the rare species are not the most conspicuous plants.

This is an example of a rare grassland plant, *Brachystelma incanum*. It is only known from one locality, just one little spot near Wolmeranstad. There is little of the plant above ground. A person doing an EIA is unlikely to see it. Its in flower, its got a little black flower. You will step over this plant, and it is only there for about two or three weeks. You are lucky to see the little black flower. It sort of blends in with the grasses. You can not walk every meter.

Because one of the golden rules is that:-
:"organisms do not occur where they cannot,
but often they do not occur where they

might".

And that you can see so well with rare species. There is no reason why that species should not grow there or there or there,, but would only grow here in this one little spot, nowhere else. There is no reason why but it will never grow there, at least, not in one's life time, because all niches are occupied, the grassland is stable. All niches are full. And unless something die or is taken out, there place can not be taken. Okay, if you remove some of the plants next to the road the annuals could still come in.

But then you may ask why do these plants still produce seeds, is the seeds still needed? They are all re-sprouters and can grow very old, but what we think is that these seeds have assumed another role in nature, they are fulfilling another function, they feed the ecosystem. Many rodents probably depend on seeds produced by these plants. So the plant has almost become 'generous' in donating some of its resources to sustain other elements in the biome.

So this 'modelling' that people do, to find out where are rare plants likely to occur must always be followed by work on the ground. Because the only thing you can say with certainty is where the organism will not grow , where the habitat is not suitable. But if the habitat is suitable, if the computer tells you that you have to go specifically an inspect In the majority of cases, I can guarantee you that it would not be there, if they follow this rule.

Grassland Conservation

If we look at the conservation of our biomes you will see that of all the biomes, grassland is the most transformed. There is actually relatively little also conserved. So grassland is not only the most threatened biome in the world, but, also the most threatened biome in South Africa. We are lucky, in that we still have more grassland than most other parts of the world because grassland and man evolved together here and we have not destroyed the grassland as dramatically as in those parts of the world where plants and animals tend to be ecologically naïve towards man, like as in Madagascar or the prairies.

In the prairies. they have devastated the natural fauna, I mean North America had a

natural fauna far bigger than southern Africa, far more species, different kinds of elephant, all sorts of predators, big horses, all sorts of things. 70% - 80% have been wiped out by man only in the last 12 000 years. Africa is the only continent where the mega-fauna is still intact. So we have a resilience that we much appreciate, and thanks to that we have more of our grasslands left than most of the other, I would say all of the other temperate grassland areas. So much more.. It is a very precious commodity which we should take care off.

I get very concerned as a Taxonomist, when I travel in rural areas and I see these rows upon row of little pine trees and eucalyptus springing up in the grasslands.

And I must stress that I am **not AntiForestry** but I am **Pro-Grassland**. And I think we need more people that's pro-grassland. I am proud to be pro forestry, it is a very essential, a very important activity, but at the least I think the timber industry could do is to also adapt their attitude and become pro grassland. If I can be pro forestry, it should not be too difficult for them to become pro grassland.

(Laughs & Comment from audience): “But you can not make money from a grassland”

Well, you can make money.. People say, what do you make out of grass? **But, in a sense, we all eat grass**, because all flesh is grass, we just harvest the grass with harvesting machines in the form of cattle, sheep and other animals, we utilise the milk, we all live from grass, its food . We must still find a way to process pine and eucalyptus to make food out of them. At least you can cook your food on them, and that I appreciate!

(Lots of Laughs)

And I think there is more than enough wood in South Africa, Its just that the wood goes to waste, it is in the wrong place. I see piles of wood, cut offs, being burnt, in forestry areas. Why is that wood not transported to rural areas where people need the wood? Why must they now plant timber, small timber plantations there? Its just a matter of moving these things where they are needed, instead of burning them.

We have an arbor day, started by the timber industry as part of their propaganda campaign. These days it has assumed sort off more, acceptable objectives. Why can we not have a national grassland day to counter that? Where is the timber industry? I would like you to become pro-grassland also and that is one way to show it. Call it 'national grassland day' and Arbor Day and appreciate and emphasise the importance of both components.

Because there are also millions of people making their living from grasslands, and lots of farmers that live from grasslands in the form of cattle farming and sheep farming.

And I hope that just as we now have the guidelines for wetland management, I am encouraged to hear that there is now plans to produce guidelines for grassland management.

I think for the timber industry to admit the problem is the start of the cure.

And I must say that over the years I have witnessed a change in the attitude from some timber companies. I have a lot of dealings with people like Ricky Pott and others who seem to be really concerned about what they are doing, but we would like to see more of that. We would like to see the industry admitting that it has a problem and talk to others to see how they can find solutions so that we can all be pro-forestry, and pro grassland.

Thank you very much.

