

Grassroots

Newsletter of the Grassland Society of Southern Africa

May issue, Vol 14 No. 2

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Grasslands Ecosystem Guidelines

 **Spotlight on Biodiversity**

**Tackling Climate Change
Through Livestock**



Advancing Rangeland Ecology and Pasture Management in Southern Africa

African

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May issue, Vol 14 No. 2 ISSN: 10166122

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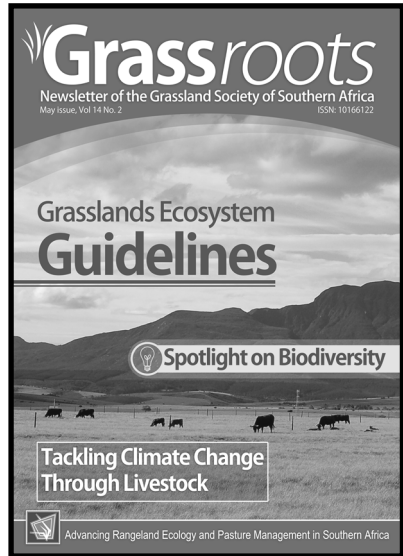
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Cover Photo: Pieter Swanepoel

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Editor's Note



The Grassland Society of Southern Africa (GSSA) is a dynamic and inclusive forum for scientists and practitioners in rangeland ecology and pasture management, and provides a forum for debate and exchange of ideas through Grassroots. This Newsletter keeps its members and other interested parties informed of news, events, publications, reports and opportunities in their fields of interest. As always, we welcome your ideas by sending us letters, feature articles, news snippets and reports.

This issue is filled with news reports relating to the interests of grassland scientists. Amongst others, you will find more information on the Grasslands Ecosystem Guidelines, which have been released recently. This programme provides guidelines for interpreting landscapes for addressing the biodiversity-related aspects of land-use planning, management and regulation in South Africa's grasslands. Greenhouse gas emissions and global warming have always been sensitive topics for ecologists and agricultural scientists. The Food and Agriculture Organisation (FAO) made a claim that domestic animals contribute 18% to anthropogenic greenhouse gas emissions, and this allegation caused substantial harm to the reputation of livestock production systems, and in particular to the grassland-based production systems. The feature article by Dr. Albrecht Glatzle provides his contrasting positions on the recommendation by the FAO to reduce the number of ruminants at a global scale in order to mitigate climate change. A very interesting read! The 49th annual GSSA congress is around the corner. It will be hosted at the Phillip Sanders resort near Bloemfontein from 20 to 25 July 2014. Herein you will find the preliminary programme and more information on registration, keynote speakers and tours.

We sincerely hope you will find this issue to be stimulating to read and shed new light on often fairly old ideas in addition to some novel and innovative ideas.

Pieter Swanepoel

22nd International Grassland Congress A Great Adventure

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More than 800 delegates attended the 22nd International Grasslands Congress (IGC), which was held in Sydney at the Sydney Convention and Exhibition Centre, situated on the waterfront of Darling Harbour. With almost 200 paper presentations and more than 600 posters, this congress was an ideal opportunity to learn and network with people of similar fields of interest. The excellent organization of the congress allowed delegates to move between six concurrent sessions. The sessions that I found most informative were “Understanding stress physiology of grasses and forages” in addition to “Advances in seed science, technology and production”. Presenters such as Florence Volaire (INRA) and Matthew Madsen (USDA) delivered exciting and innovative talks of their research activities. It was however, heart-warming to witness how South African speakers set the high standard of presentations for early career researchers.

The organizing committee of the IGC also held an early career researchers (ECR) forum to discuss challenges faced by ECR's and some guidelines on how to deal with these challenges. They used an internet based survey engine to identify these challenges and determine what the

majority of ECR opinion was with respect to these challenges. It was clear from this forum that even though South African researchers face many challenges, they have the ability to overcome many of them easily. Most of the ECRs who have a mentor, a person who can teach and often guide them through the pitfalls of certain research systems, do not have as many challenges as ECRs who work without assistance. The establishment of the mentorship programme discussed at the GSSA AGM has never been proven more important and should prove effective when it is established.

As a young professional researcher, the IGC provided me with a platform to uplift my scientific exposure and aspirations. Not only did this opportunity give me more insight into the scientific discipline I enjoy, but also provided me with some exciting social adventures. Networking with respected scientists and researchers from all over the world and exploring the city with new friends turned out to be a great journey in my life. The conference was however just the beginning of this adventure, followed on by visits to reputable grassland specialists in beautiful towns of Queensland, i.e Brisbane, Gatton and Toowoomba.



A road trip from Melbourne to Canberra and back to Sydney showed us the best of Victoria, New South Wales and the Capital Territory. This great adventure and opportunity was possible with the supportive funding provided by the GSSA Trust.

I truly believe that this opportunity supported by the GSSA Trust, has shown the world that South Africa is serious about Grassland Science and that the GSSA deems it important to invest in the young professionals of the discipline of Grassland Science.

“The establishment of the mentorship programme discussed at the GSSA AGM has never been more important...”



Grasslands Ecosystem Guidelines

A First for Planners and Managers in the Grasslands

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The Grasslands Programme is very pleased to announce the release and availability of the Grassland Ecosystem Guidelines: landscape interpretation for planners and managers. The Grasslands Ecosystem Guidelines provides a consistent benchmark and framework for addressing the biodiversity-related aspects of land-use planning, management and regulation in South Africa's grasslands and grassland-related ecosystems, namely wetlands, rivers and indigenous forest. Until now, there has been no single document that brings the current state of knowledge about grasslands together, with the specific aim of providing non-scientists with easy-to-use, practical guidelines on how to take better account of biodiversity in land-use planning and decision-making.

The development of these Guidelines was an effort to synthesize knowledge on grassland ecosystems for planners and managers, so that they can easily and effectively incorporate biodiversity into their land-use planning and decision-making. In practice, this means that people who do not necessarily have a background in biodiversity conservation are being called upon to manage land, plan for development, and make decisions with biodiversity in mind. The Grasslands Ecosystem

Guidelines equip planners and managers with reliable information that is relevant to the decisions that they need to take to ensure that biodiversity is sufficiently considered in plans and activities. Experience shows that ecosystem guidelines can be useful aids to encourage wise decisions by responsible planners and managers. The Grasslands Ecosystem Guidelines present the biodiversity of the Grasslands Biome and grasslands-related vegetation as eight broad 'ecosystems', defined by shared management requirements. Each 'ecosystem' is interpreted against the same six questions, which address factors such as ecological 'drivers', common threats and restoration potential. A chapter explains how environmental consultants can use the guidelines with resources hosted by SANBI's BGIS website (<http://bgis.sanbi.org.za>). The guidelines are dedicated to the memory of Rob Scott-Shaw, who sadly passed away in December 2012, in honour of his incredible knowledge, contribution, and commitment to grasslands ecology. His vast knowledge of grassland flora was an inspiration to many and an invaluable resource to the grasslands community. The guidelines are accessible on the Resource page of the Grasslands Programme website or <http://www.grasslands.org.za/document-archive/category/21-grassland-ecosystem-guidelines>



Fracking: Heading for a showdown

Agri Online Newspaper

November last year was a big month for those on either side of the fracking fence. The 30-day period for public comment on the draft regulations on fracking drew to a close on November 14th 2013, with people for and against shale gas extraction just as passionate about the issue as ever. Billionaire conservationist and Rlichemont chairman, Johann Rupert, the Treasure Karoo Action Group, led by Jonathan Deal, and many other concerned South Africans have led the charge against fracking, but the odds seem increasingly against them. Several key government ministers have come out clearly in favour of shale gas extraction, a potential money-spinner for the government and an alternative to coal-fired power.

A contentious Econometrics study says if exploration is successful and fracking goes ahead, it could add 0.5% of GDP to the economy every year for 25 years. The Econometrics report and its figures have been challenged by Deal. Deputy President, Kgalema Motlanthe, Trade and Industry Minister Rob Davies and Mineral Resources Minister, Susan Shabangu, have all recently weighed in on the benefits of fracking. Davies told a Cabinet briefing in August that the government could authorise shale gas exploration before the May elections, while Shabangu has said it's

The government's responsibility to explore energy sources that would improve the country's energy mix, grow the economy and create jobs. The proposed regulations, which were approved by Cabinet on October 9 2013 and opened for input and comments, are aimed at augmenting the Mineral and Petroleum Resources Development regulations. The department says they set standards and practices that will ensure safe exploration and exploitation of petroleum.

But Deal believes the regulations as they stand are a 'cut and paste job' from the American Petroleum Institute (API), an industry-funded body not focused on environmental concerns. The Treasure Karoo Action Group is to release an over 400-page report on Thursday in response to the regulations. The regulations include looking at the terms for the Environmental Impact Assessment. They stipulate that water resources should not be polluted and look at the need to assess conditions below ground. They also raise the importance of putting together a geological map of the area with details that could lead to a better understanding of potential structural problems. The sensitive Square Kilometre Array (SKA) area in the Karoo will be out of bounds and this is also included in the regulations.

The Treasure Karoo Action Group, environmentalists, NGOs and several scientists say the draft regulations are inadequate and would not protect the constitutional right of South Africans to an environment that is not harmful to their health and well-being. The group believes fracking technology is water-thirsty, unsustainable and poses a documented environmental risk.

Deal believes the government has not fully investigated the ramifications of fracking. "It's a very ill-prepared approach at the moment, on such a huge initiative," he told Moneyweb. He's also disappointed about what he says is the 'virtually non-existent' public participation with people living in the Karoo, including farmworkers. Rlichemont Chairman, Johann Rupert has earlier said that lack of proper consultation with landowners over exploration had violated property rights enshrined in the Constitution. He's promised to take legal action if exploration licences are granted.

Fracking has led to a massive expansion of natural gas in the US, but has been banned in other countries like France. The process involves digging wells of up to four kilometres deep, pumping in millions of litres of water mixed with chemicals under intense pressure. This is intended to crack the shale rock and release the gas. Shell has applied for an exploration licence covering more than 95 000 square metres – a huge section of the Karoo. Shell in South Africa has been at pains to say that the company would practice responsible fracking and would not compete for water with the people of the arid Karoo.

The company says its environmental, social and health impact assessment would include conducting specialist studies, water tests and seismic testing. If Shell is granted a licence to explore the area to determine if commercial natural gas resources exist in the area, exploration would involve drilling up to 24 wells in over three years. The licences could be renewed three times for two years each.

Shabangu had said that the government has 'acted in the best possible way, in the interest of the South African economy and its citizens and would continue to do so as it traversed the journey of hydraulic fracturing for the production of shale gas.' Exploration activities could end after three years if exploration is not a success. If all goes well, Shell says production could be up to nine years away, but that doesn't hold water for many people in the Karoo, who fear the tranquillity of their land will be shattered. With the government showing signs that it is committed to exploration, lobbyists are considering all of their options. "If fracking goes ahead, we will push hard for public oversight and strict regulation. We'll insist on it," says Deal.*



*www.moneyweb.co.za

Aardvark Research Project

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Aardvarks are fascinating animals. They look absolutely bizarre, just like a fusion of a variety of other mammals: aardvarks have large ears like rabbits. Their tail and elongated face remind one of a kangaroo, the soft, blunt nose ends like that of a pig. Aardvarks also have long claws on hands that almost look like those of a human. When an aardvark sits in front of its burrow, it almost looks like an oversized rabbit - but will run in a doglike manner when spooked.

Aardvarks are lovely creatures which are generally peaceful, and are a unique sight when they slowly stride through the golden Kalahari grassland. Aardvarks are also classified as a so-called ecosystem-engineer, as they actively change their habitat: they create burrows in the soil to sleep in, and dig sites where they forage. To the dislike of many farmers, they often dig on pastures and roads or underneath fences, causing potential damage. However, they are not only causing havoc - in fact, many other animals have been found to be dependant on the presence of aardvarks in their habitats. Aardvark burrows provide shelter from predators such as warthogs, African wild-cats, bat-eared foxes, porcupines, gerbils, shrews, mongooses, ground squirrels, and badgers.

Various birds like bee-eaters, swallows, chats and kingfishers build their nests in aardvark burrow entrances - and even reptiles and amphibians, such as snakes, agamas, and toads, have been found to use aardvark burrows.

Moreover, when aardvarks are foraging, they open feeding opportunities for various opportunistic feeders, which would not be able to reach the deeper levels of the soil where ants and termites are abundant.

These animals include bat-eared foxes, ant-eating chats, yellowbilled hornbills, and aardwolves. The aardvark occurs in many different habitats, and it is dependent on the availability of its exclusive food source: ants and termites. These social insects show different abundances and activity patterns in summer and winter. This, together with a drop in night temperatures, forces the aardvark to forage during the day in winter - providing the fascinating opportunity to view these otherwise elusive animals when they bask in the morning sun, or forage in the afternoon.

If approached very carefully, aardvarks can be followed and observed from short distances, allowing one to become aware of their elegance. However, due to prevailing changes in the climate of southern Africa, some areas where aardvarks occur are predicted to become even drier and hotter than they already are. One of these regions is Tswalu Kalahari Reserve, where I conduct my doctoral research. This Reserve is situated at the edge of aardvark distribution, thus allowing me to investigate how aardvarks adjust their behaviour, their activity patterns, and their physiology to different climatic conditions - and how they could potentially cope with climatic changes.

Tswalu also provides me with the opportunity to determine which impact the changes in ant and termite availability has on aardvarks throughout different seasons. For the next two years, I will be monitoring aardvark movement and behaviour, prey consumption, prey availability, and influences on the aardvarks' ecophysiology by use of implanted data-loggers, as well as visual observations of the animals. The findings of my research can potentially be used to imply conservation strategies for the aardvark - an animal which is not only extraordinarily beautiful, but also exceptionally important for so many other animals in southern Africa.



Revision of the Red List of South African Mammals is ready to go

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Red Lists, developed by the International Union for the Conservation of Nature in 1963, are the global standard to assess the threat of extinction for each species. The Red List is a key policy tool to measure conservation progress towards national and international goals and can lay the foundation to build conservation priorities (such as South Africa's Threatened or Protected Species List). Red Lists are thus a prerequisite for regulating environmental legislation and conservation decision-making. The previous Red List assessment for mammals was compiled by the Endangered Wildlife Trust (EWT) in 2004 and thus urgently needs to be revised.

The EWT, in partnership with the South African National Biodiversity Institute and MammalMAP (a collaboration between the Animal Demography Unit, University of Cape Town and the Mammal Research Institute, University of Pretoria) began the revision process in March 2014. The ultimate goal of the 2014 revision is to produce a dynamic Red List database where assessments can be revised in real time as new data are generated. This will enable conservationists to continually measure conservation progress;

identify research gaps; and interact with citizen scientists who can help to monitor species distribution. Another aim of the Red List revision is to produce an atlas of mammal distribution within South Africa, and eventually throughout Africa, to enable more effective incorporation of key mammal areas into systematic conservation planning. The revision will make use of remote-access tools to encourage greater participation in the process, and is intended to forge new connections between individuals and institutions.

Recently, both the bird and butterfly Red Lists of South Africa have been revised or completed, soon to be followed by the reptiles. The mammal Red List revision will add another piece to the state-of-biodiversity puzzle and enable us to measure conservation trends across taxa. Mammals hold immense ecological, economic and cultural value, and Africa is the only continent with its full spectrum of large mammals still in existence. We should be immensely proud of this, as it helps define South African identity, and should thus strive to promote Red Listing projects as a public service and standard conservation practice.



Saving our Biodiversity our Responsibility

Megan Loftie-Eaton*

We at the Animal Demography Unit are a conservation organisation with the goal of promoting an appreciation of nature and biodiversity in South Africa as well as the rest of Africa. Our purpose is to provide a platform for all South Africans, and people from other African countries, to contribute to conservation projects (Citizen Science Projects) by taking photographs of animals and plants in the wild and submitting them to our Virtual Museum (<http://vmus.adu.org.za/>).

These records help us to understand the distributions of species, how they are impacted by humans, and what actions are needed to protect them. We have produced some of the most important publications for the conservation of birds, frogs, butterflies and other animals in the country. Our portfolio of projects is growing (see the project logo banner below), and we would like to extend the reach of these projects to as many people as possible. One of the ways we would like to promote our projects is through the conservation and tourism industry. Our natural heritage is one of our most important assets for tourism. We would like to ask if you would be willing to forward this email to your network of contacts to ask if they would be interested in learning more about us and contributing to our projects. Or you could print out the poster and put it up in your office or on a noticeboard.

If you would like to become involved that would be fantastic! Here is an easy to follow slideshow that shows you step-by-step how to register with the ADU and start uploading photos to our Virtual Museum: <http://www.slideshare.net/meganloftieeaton/how-to-submit>

You can also visit the ADU website, <http://www.adu.org.za/>, or Facebook Page at <https://www.facebook.com/animal.demography.unit> and have a look at the Virtual Museum website at <http://vmus.adu.org.za/>



* www.conservancies.org

Have You Seen This Hedgehog?

Jessica Artingstall
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IFAH Project

Have you seen a southern African hedgehog on your property (work or residential)? Please tell us if you have. We are a team of scientists from Wits University, researching the distribution of the SA hedgehog in southern Africa. We are known as the IFAH project which stands for "I found a hedgehog". If you have seen a SA hedgehog please tell us where and when you saw it! All records are valuable to our collection. We will even take records up to 100 years old!

We have attached a poster for our research so that you can identify a SA hedgehog (*Atelerix frontalis*). You can also visit our website - ifoundahedgehog.wix.com/hedgehogs and join our Facebook page www.facebook.com/ifoundahedgehog

Please pass this message on to as many people as you can! With your help we can understand so much more about these incredible little creatures!



HAVE YOU SEEN THIS HEDGEHOG?

Distribution

Report when and where you saw a southern African hedgehog to Jessica at the IFAH PROJECT.
ifoundahedgehog.wix.com/hedgehogs

Even records 100 years old and anywhere in southern Africa!

Southern African hedgehogs have hard spines, a dark underbelly and a white band on their forehead. They are 15 - 20cm long and weigh 280-350g. They are nocturnal and roll into a tight spiny ball when threatened. SA hedgehogs feed on insects mainly. Please join our Facebook page www.facebook.com/ifoundahedgehog

I.F.A.H.
I FOUND A HEDGEHOG

UNIVERSITY OF THE WITWATERSRAND
JOHANNESBURG

GSSA Mandela Day Gifts of Love Handing Over to Dira-O-Direlwe Drop-in Center at Modmolle

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The 48th GSSA congress was held between the 15th and 19th July 2013 at Weesgerus Holiday Resort and Conference Centre, in Modimolle, Limpopo Province. The overarching objective of Mandela Day is to inspire individuals to take action to help change the world for the better and in doing so the GSSA Congress 48 delegates donated money (gift of love) to the amount of R860.00.

The aim of the gift of love was to support a charity organization which has agricultural activities such as vegetable gardens etc. or children care charity organization, within the Modimolle Municipal area. Based on these criteria there are no charity organisations with agricultural activities within their programs because they are supported by Department of Correctional Service (The Correctional Modimolle Youth Centre of Excellence,) with vegetables and a limited piece of land. Dira-o-direlwe Drop-in Center was our chosen facility. July was Mr Mandela's 95th Birthday.

Dira-o-direlwe Drop-in Center is a day-time facility providing a range of services, including care support (food, hygiene, clothing, educational etc) to the needy, vulnerable and orphan children from Phagameng Township. It started to operate in 2004 and currently houses 50 children and youth aged between 5 and 18 years. It's mission is to provide welfare, religious, educational, physical care and support to abandoned children so that they become happy, healthy and well-disciplined members of the community. Their wish, amongst others, was to have toys for the children for after school and weekend play times.

Members of the Grassland Society of Southern Africa 48th Organising Committee took gifts in the form of toys and stationery (colouring books & crayons) to children of Dira-o-direlwe Drop-in Center at Modimolle on the 13 August 2013.

GSSA C48 Organising Committee would like to thank the congress delegates who participated in this initiative to put the smile onto the children's faces by giving them a chance to play, laugh and have fun.



Questioning key conclusions of FAO publications 'Livestock's Long Shadow' (2006; 2013)*

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Abstract

The allegation by the United Nations Food and Agriculture Organisation (FAO) that domestic animals contribute 18% (Livestock's Long Shadow) or 14.5% (Tackling Climate Change Through Livestock), respectively, to anthropogenic greenhouse gas (GHG) emissions caused considerable damage to the reputation of animal husbandry in general, and in particular to the grassland-based production systems. This rebuttal highlights the following:

- The publications mentioned ignore the uncertainties associated with the climate sensitivity of GHGs.
- Baseline scenarios over time and space for livestock-borne methane and nitrous oxide emissions are elided.
- There are deficits in the methodological treatment of emissions derived from land use change (deforestation).
- It is not acknowledged that there is virtually no livestock signal discernible in global methane distribution and historical methane emission rates.

- The loss of energy through methane emissions by enteric fermentation in ruminants is considered as damaging to production. However, livestock-borne methane might be the price to be 'paid' for the effective transformation of high-fibre diets from crop residues and vast areas of grass- and rangelands marginal to agriculture into valuable food for humans (meat and milk).

Consequently, the mentioned publications highly overstate livestock contribution to climate change in its extent and impact.

Keywords: Green house gases; Livestock; FAO; Rangelands; Grasslands; Environment.

The influential report 'Livestock's Long Shadow' was published by FAO in 2006 (Steinfeld et al. 2006). This report's main message (which claims that domestic animals contribute 18% to anthropogenic greenhouse gas (GHG) emissions caused a major storm in the global media. The report has been cited nearly 1,200 times, according to Google Scholar. The concern about live-stock's alleged

* Open access articles: Glatzle, A. (2014). Questioning key conclusions of FAO publications 'Livestock's Long Shadow' (2006) appearing again in 'Tackling Climate Change Through Livestock' (2013). *Pastoralism: Research, Policy and Practice*, 4(1), 1.

contribution to climate change culminated with a hearing in the European Parliament 2009 on the topic 'Less Meat = Less Heat'. The United States Council on Foreign Relations marks the report as 'must read'. The USA Cattleman's Beef Board issued a rebuttal (2009). In summary, the above-mentioned report caused considerable damage to the reputation of animal husbandry in general, and in particular to the grassland-based production systems. In a series of talks (almost two dozens), which I gave in the past seven years in Paraguay, Argentina and other countries at national and international congresses and seminars, I strongly criticized several basic assumptions and methodological approaches in the above-mentioned report. Meanwhile, however, I got the impression that the FAO had quietly abandoned its critique of domestic livestock promoting climate change, as it had become fairly quiet around this topic. Unfortunately, I was mistaken: I was quite surprised when I recently discovered another report on the home-page of FAO 'Tackling Climate Change Through Livestock' (Gerber et al. 2013) (http://www.fao.org/ag/againfo/resources/en/publicationstackling_climate_change/index.htm)

In this publication, the contribution of global domestic livestock to the anthropogenic GHG emissions has been somewhat reduced to 'only' 14.5% as compared to the above-mentioned previous report; however, it still contains the same methodological deficits, ignores the uncertainties associated with the climate sensitivity of so-called GHGs and ignores the inconsistencies between some of its conclusions and several empiric observations in the

After seven years of intensive scientific examination of this topic, I feel obliged to challenge FAO with the following seven questions. I think the worldwide community of taxpayers, of which I form part too (in Paraguay and Germany) and which finances the FAO in order to comply with its mandate (to contribute sensibly to global food security), has the right to see the FAO rejecting well-founded doubts with its mandate compliance or, alternatively, heading to an institutional course correction. It certainly cannot be the function of the FAO to dis-credit grazing systems in general and the beef sector in South America (the continent with the highest growth potential for food production) in particular, with unrealistically high emission values due to methodological inconsistencies and negligence and due to overstating the relevance of these emissions.

Being a cattle rancher in Paraguay, and a native of Germany, I also feel personally challenged, not to say threatened, by the FAO's journalistic activities.

Here are my questions:

1. Does FAO agree to the following statement? The assumption of noticeable climate sensitivity to anthropogenic GHG emissions (as defined as the mean increase of global temperature with a doubling of CO₂ equivalent (CO₂-equ.) in the atmosphere) is the basis for the hypothesis that live-stock husbandry could eventually influence the climate (cause global warming).

2. Does FAO agree that considerable doubts with noticeable climate sensitivity to anthropogenic GHG emissions are justified, in the light of the following facts?

- Mean global temperatures were flat in the past 15 years, and did even slightly decrease in the past 10 years, in spite of steadily increasing CO₂ levels in the atmosphere which even caused a remarkable greening of some deserts in the past 30 years by fertilizing plants and making them more drought tolerant (CSIRO 2013). This is an empirical observation contradicting all the scenarios of projected temperatures published in the fourth IPCC assessment report and earlier reports. These scenarios are summarized in Figure TS 26 of the Technical Summary of AR4 (IPCC 2007).
- There is an overwhelming number of peer-reviewed papers, and among them various recently published ones, such as Alley (2000), Mangini et al. (2005), Mangini et al. (2007), Kobashi et al. (2011), Markonis and Koutsoyiannis (2012) and Esper et al. (2012) that acknowledge the existence of various warm periods during the Holocene (after the end of the latest ice age), which were warmer than or at least as warm as the present age (in spite of the pre-industrial atmospheric CO₂ levels at those times).

- In the AR4-IPCC report, 16 variables are identified as forcing agents of global warming/climate change and are used in the models. The level of understanding for 11 of them was specified by the IPCC as ‘very low or low’ (Table 2.11 in IPCC 2007). However, models made with uncertain variables require empirical validation.

As far as the modelled temperature projections for a variety of emission scenarios published by the IPCC in the past four assessment reports are concerned, recent temperatures are located well outside the confidence intervals of all IPCC models, which therefore did not pass its validation exam as shown in Fig. 1.4. of the leaked second order draft of IPCC-AR5 (IPCC 2012, The Washington Times 2012). This Figure 1.4. is not shown in the Summary for Policy Makers (SPM) of AR5, released on Sept. 27, 2013. The ‘observed reduction in surface warming trend over the period 1998-2012’ is mentioned on page 10 of the SPM, hidden in the text body and provided with a number of excuses. I am not aware of any final version of the scientific-technical main report of AR5.

3. If the FAO report authors affirm questions 1 and 2, why did they not allude to the mentioned uncertainties, constraints and inconsistencies in the recent FAO report ‘Tackling Climate Change’ (Gerber et al. 2013)?
4. Comparing the global domestic livestock distribution (Steinfeld et al. 2006,

map 20) and the geographical distribution of atmospheric methane concentrations determined with the satellite ENVISAT (University of Bremen: www.iup.uni-bremen.de/sciamachy/NIR_NADIR_WFM_DOAS_xch4_v1_2003_2005.png), there is no consistent relationship to be found between both items. The historical evolution of the mean methane concentration in the atmosphere (including the decline of the growth rate from about 1980 on) is determined by fossil fuel extraction and use, as well as the associated technological quality standards (Quirk 2010; Aydin et al. 2011). As there is no livestock signal discernible, neither in the global methane distribution nor in the historical evolution of the atmospheric methane concentration, would FAO agree to the following statement? ‘Domestic live-stock is obviously irrelevant (or at least a minor player) for the global methane budget, as also suggested by IAEA (2008)’.

5. The only continent the FAO reports are blaming for CO₂ emissions from deforestation for pasture establishment is Latin America and the Caribbean. South America is charged with the very high ‘emission intensity’ of 100 kg CO₂-equ. per kg of carcass weight (CW) produced, of which 40 kg CO₂-equ. per kg CW is attributed to deforestation. This is justified in the FAO reports with the ascertainment that in other continents there have been no significant deforestations for pastureland expansion recently. However, in other continents, particularly Europe, extensive deforestations took place already centuries ago to establish permanent grasslands. Mathematically, the term ‘emission intensity’ (used extensively in Tackling Climate Change

2013) describes the emission of a certain quantity of CO₂ equivalent necessary for producing 1 kg of a product (in this case carcass) under certain conditions (I prefer the term ‘specific emission’). It is questionable to charge this mathematical term with emissions which are not related to the generation of this particular product. For example, while deforesting a specific area of land, the beef production is carried out on other pasturelands, already established earlier. In other words, the emission due to deforestation at one specific site has no immediate relationship to the ongoing production on already established grasslands. It is therefore methodologically legitimate to allot the one-time CO₂ emission from deforestation to any accidentally chosen quantity of a product (e.g. yearly beef production in South America). The single emission from deforestation is generated (and tolerated) in order to produce beef on the new pastureland to be established for a very long period of time in the future (hundreds of years just like on European grasslands). But when the single ‘carbon debt’ from deforestation is spread over the accumulated production from the deforested area over centuries, the specific mission per kilogramme of product tends towards zero. And in case a certain grazing area is eventually abandoned, the carbon captured by encroaching secondary forests will offset the CO₂ released at the initial deforestation. Therefore, other continents such as Europe are treated correctly in the FAO report, by disregarding emissions from ‘land use change (LUC)’. On the other hand, beef products from South America are charged with far too high values of ‘emission intensities’

(kg CO₂-equ. per kg CW), because of deforestation still being practiced which has, however, nothing to do with the current beef production within the continent (in the year of deforestation) but with future production on the cleared land. With the term 'emission intensity', the FAO might want to quantify the emissions actually brought about by the total beef industry sector in a specific year within particular regions, continents or production systems. However, this approach is misleading when this number is referred to a certain quantity of product (e.g. kg of CW) without advising explicitly that the above-mentioned term contains casual emissions (from recent deforestations) which arose in the respective continent but did not contribute to the product generated in that particular year but will contribute instead to the products generated in the future.

According to the FAO methodological approach, 500 years ago, when there was still ongoing deforestation in Europe, Europe once reached similar emission intensities as South America today, and in 10 or 20 years' time, when deforestation has come to a halt due to legal, environmental policy or physical limitations, emission intensities in South America will be similar to the ones in Europe today. But the FAO report did not tell readers this. Without an explicit footnote explaining this context, the FAO approach is scientifically dubious. In the tables and figures of the report, values are compared which are not comparable, because they need to be interpreted distinctly and some have (restricted) validity just for the moment. In that way, FAO loads (purposely?) unrealistically high emission values onto the

South American beef industry and onto cattle grazing systems in general. Tropical deforestation reduces competitiveness in the agricultural sector of industrialized countries (<http://assets.usw.org/our-union/pulp-paper-forestry/farms-here-forests-there-report-5-26-10.pdf>). To castigate deforestation, particularly in the Amazon, is generally considered noble and highly ethical (presumed mitigation of climate change and loss of biodiversity) and increases therefore the chances for the FAO to raise funds from the rich donor countries. It is not sufficient to offer values without the burden of emissions from deforestation, hidden in the text body, and to casually mention in a very general manner that the correct treatment of deforestation in the calculations is a very complex matter. Moreover, the fact that FAO is using the period from 1990 to 2006 to quantify deforestation, while thereafter deforestation dropped considerably in Brazil (Box 5, p. 95 in Gerber et al. 2013), can be interpreted as a deliberate discrimination of the beef production in South America by charging it with emission burdens which were already much lower at the time of the publication of the 2013 FAO report.

An additional observation is that we could show that in the semiarid Chaco of Paraguay, deforestation for pasture establishment diversifies the habitats and therefore promotes species richness, provided the legal land use restrictions of preserving almost 50% of each farm's surface in pristine condition (in the form of a nature reserve, bush corridors and islands) are respected, as do >90% of the land owners. The additionally created habitats and

resources are extensively used by wildlife too. These refer to the bush border effects over many kilometres, savannah-like landscapes, nutritious pastures and rainwater collection reservoirs (gráfico 1 in Glatzle 2009; Glatzle 2011). South American beef industry and onto cattle grazing systems in general. Tropical deforestation reduces competitiveness in the agricultural sector of industrialized countries (<http://assets.usw.org/our-union/pulp-paper-forestry/farms-here-forests-there-report-5-26-10.pdf>).

6. The concealment of any baseline scenario over space and time most likely is the biggest fault of the latest publication by FAO on livestock and climate (Gerber et al. 2013). This new report interprets the direct and indirect emissions of methane and nitrous oxide by live-stock at a 100% level as an additional anthropogenic emission of GHGs from animal sources. This is not the case, e.g. areas formerly populated by large herds of wildlife or areas comprising wetlands, drained later on, could emit less methane after a land use change towards pastoral land for livestock grazing than did the pristine ecosystem. In other words, livestock-borne GHG emissions need to be corrected by the emissions which would occur anyway in a (natural or pre-climate change) base-line scenario. This is particularly important for nitrous oxide. Grazing animals indeed somewhat accelerate nitrogen cycling; however, they do not increase the amount of nitrogen in circulation. Both the nitrogen quantity in circulation and the mean nitrogen turnover rate determine the nitrification and denitrification rates (besides, of course, the prevailing site characteristics such as

waterlogging or temperature), which are crucial for the quantity of nitrous oxide produced as a leaking by-product. Therefore, nitrous oxide emitted from manure is by no means additionally released by live-stock. Herbage and other plant biomass also produce considerable amounts of nitrous oxide (N is mineralized, nitrified and de-nitrified) even without passage through livestock's intestines. It could well be that N_2O emission rates from native forests (with often high N contents in the leaves) are even greater than from managed grasslands. In this case, the 23 kg of CO_2 -equ. per kg CW (from N_2O) charged to the beef industry in South America should be reduced to zero or even adopt a negative value, when the grassland is situated at a formerly forested area. In any case, this number has to be corrected by the amount of N_2O , which would be released by the biomass anyway, even if it had not passed through the animal stomach. Only a nitrogen fertilization (which is rarely done on extensive grazing land because of economic constraints) considerably increases the amount of nitrogen in circulation and thereby the chance of N_2O emissions. This applies, however, to a far higher degree to (forage) cropping than to true pastoral systems. Just like CO_2 , methane and nitrous oxide are also part of natural cycles. Rather than considering the actual emissions, one ought to take into account the observed or theoretical difference of the atmospheric steady state equilibrium concentrations (between sources and sinks) before and after the creation of a new or additional source of emission. If at all, only this difference of concentration of a GHG could exert any influence on the

climate. The missing database or the high complexity of the matter (also due to the overlapping of various emission sources and sinks) does not excuse FAO from clearly displaying this complexity rather than omitting important baseline scenarios. It would rather be correct to desist from estimating specific emission values (or emission intensities, as the FAO report terms them) than to suppress weighty baseline scenarios, because they are complex and difficult to quantify. Moreover, certain pastoral ecosystems may represent a sink and not a source for methane (Gocher 2009, quoting Mark Adams, University of Sydney). This is another empirical observation which considerably reduces the utility of FAO's simplified bottom-up calculations.

What is FAO's response to this critique? Did FAO simply forget the baseline scenarios just like (almost?) all the authors of publications on 'life cycle assessments' (recent review: De Vries and De Boer 2010)? Even in its 'Guidelines for National Greenhouse Gas Inventories' (which most authors refer to), the IPCC (IPCC, Intergovernmental Panel on Climate Change 2006) proposes N₂O emission factors to calculate emissions of nitrous oxide from the total nitrogen deposited (as fertilizer, cured manure or fresh dung and urine) or mineralized from crop residues or soil organic matter in managed soils. I am not aware of any corrections for baseline emissions from pristine ecosystems (replaced by the respective agro-ecosystems) carried out by the IPCC. Base-line emissions are treated as if they had been inexistent. A tremendous overestimation of anthropogenic emissions is the obvious consequence.

7. The FAO 2013 report reckons that methane emissions by ruminants damage production as they constitute a waste of nutritional energy. Of course, methane emissions deliver energy to the environment, but do not spoil it, as methane is a (so far) unavoidable by-product of anaerobic degradation (by rumen cellulolytic bacteria) of the most widely spread substance in the biosphere, cellulose. Without methanogenesis, hydrogen (H₂) would accumulate in the rumen and inhibit ongoing fermentation and digestion by negative feedback (Eckard et al. 2010). Thanks to the methane emissions, ruminants can make use of the high-fibre diet growing abundantly on the enormous terrestrial areas marginal to crop agriculture and convert it into precious food for humans (meat and milk), as well as skins, fibres and other useful products. As long as there are no effective and inexpensive technologies available to manipulate the rumen metabolism in order to cut back the methane emissions without hampering the digestibility of fibre-rich diets, methane emissions seem to be the price for the very important contribution of ruminants to food security and livelihood resources for humanity. Has the omitted elucidation of this very important role of grazing ruminants been an oversight or was it done on purpose?

Conclusion

'Tackling Climate Change...' (Gerber et al. 2013) unjustifiably burdens grazing systems with ruminants, and in particular the beef industry of South America, with far too high emission values of GHG per kg CW. Due to gross negligence (omission of important baseline scenarios and of

uncertainties in the appraisal of climate sensitivity to anthropogenic GHG emissions) and due to inconsistencies in the calculation and evaluation of specific emission values, this study will hardly be of a long lasting scientific merit. However, the good reputation of grazing systems in general and the South American beef industry in particular has already been damaged (by the FAO!!!). Therefore, the FAO should distance itself from this publication and withdraw it from its website. My latest presentation on the website of the Asociación Rural del Paraguay given recently at the 4^o Congreso Ganadero in Asunción contains further explanations and illustrations on the topics touched upon herein ([http://www.arp.org.py/Index_Phpotion=com_Content & view = article&id = 84http : // www . arp . org . py / images / files / Ganaderia % 20y % 20 clima % 20 DR _ % % RECHT 20 GLATZLE . pdf](http://www.arp.org.py/Index_Phpotion=com_Content&view=article&id=84http://www.arp.org.py/images/files/Ganaderia%20y%20clima%20DR_%20RECHT20GLATZLE.pdf)).

Competing interests

The author declares he has no competing interests, apart from those mentioned in the text.

Author's information

Albrecht Glatzle is an agricultural biologist with a PhD in Soil Microbiology from the University of Hohenheim, Stuttgart, Germany. During 25 years of applied research, he worked in Botswana (range ecology in an FAO project, 2 years), Morocco (forage improvement in a GTZ project, 4 years) and in Paraguay (as expert for pasture management and improvement at the Central Chaco Research Station during 8 years with subsequent additional 11 years as Technical Director of the non-profit association INTTAS

(www.chaconet.com.py/inttas/ From 1977 to 1981 and from 1985 to 1989, he was a scientific staff member at the Institutes of Plant Nutrition and Animal Production in the Tropics and Subtropics, respectively, University of Hohenheim. He has authored more than 100 publications and/or reports and two books (Pasture Management in the Tropics and Subtropics (in German language) and Compendium on pasture management in the Chaco (in Spanish language)). He is the recipient of awards received from two provincial governments of the Paraguayan Chaco for valuable assistance given to the development of sustainable land use systems, and was in 2005 awarded with the Fellowship of the Tropical Grassland Society of Australia. Received: 7 December 2013 Accepted: 15 December 2013 Published: 20 Jan 2014

References

- Alley, RB. 2000. The Younger Dryas cold interval as viewed from central Greenland. *Quaternary Science Reviews* 19:213–226. <http://www.ncdc.noaa.gov/paleo/pubs/alley2000/>.
- Aydin, M, KR Verhulst, ES Saltzman, MO Battle, SA Montzka, DR Blake, Q Tang, and MJ Prather. 2011. Recent decreases in fossil-fuel emissions of ethane and methane derived from firn air. *Nature* 476:198–201.
- Cattlemen's Beef Board and National Cattlemen's Beef Association. 2009. Critical Analysis of Livestock's Long Shadow. *Explorebeef.org*. http://www.explorebeef.org/CMDocs/ExploreBeefFactSheet_LivestocksLongShadow.pdf. CSIRO, Commonwealth Scientific and Industrial Research Organization. 2013.
- Esper, J, DC Frank, M Timonen, E Zorita, RJS Wilson, J Luterbacher, S Holzkämpfer, N Fischer, S Wagner, D Nievergelt, A Verstege, and U Büntgen. 2012. Orbital forcing of tree-ring data. <http://>

- www.blogs.uni-mainz.de/fb09climatology/files/2012/03/Esper_2012_NatureCC4.pdf.
- European Parliament. 2009. Less meat = Less heat. <http://www.europarl.europa.eu/sides/getDoc.do?language=en&type=IM-PRESS-Reference=20091201IPR65710>.
- Gerber, PJ, O Pio, J Dijkman, A Faluccci, and G Tempio. 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Rome: Food and Agriculture Organization of the United Nations (FAO).
- Glatzle, A. 2009. Ganadería chaqueña en pasturas implantadas: características, potencialidades y servicios ambientales. Asunción Paraguay: Memorias del Congreso Mundial Brangus. Octubre de 2009. http://www.chaconet.com.py/inttas/projects/pdf/a_glatzle_ganaderia_chaquena.pdf.
- Glatzle, A. 2011. Extensive cattle ranching in the Paraguayan Chaco and its environmental impacts. In *Diverse rangelands for a sustainable society*, ed. I. Feldman, 216. Rosario: Proceedings of IX International Rangeland Congress. Gocher, K. 2009. Soil can store Methane. Northern Territory, Australia: ABC Rural. http://www.abc.net.au/site-archiv/r_rural/nt/content/200908/s2649444.htm.
- IAEA, International Atomic Energy Agency. 2008. Belching ruminants, a minor player in atmospheric methane. <http://www-naweb.iaea.org/nafa/aph/stories/2008-atmospheric-methane.html>.
- IPCC, Intergovernmental Panel on Climate Change. 2006. IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>.
- Kobashi, T, K Kawamura, JP Seuringhaus, J-M Barnola, T Nakaegawa, BM Vinther,
- Kobashi, T, K Kawamura, JP Seuringhaus, J-M Barnola, T Nakaegawa, BM Vinther,
- Mangini, A, P Verdes, C Spötl, D Scholz, N Völz, and B Kromer. 2007. Persistent influence of the North Atlantic hydrography on central European winter temperature during the last 9000 years. *Geophysical Research Letters* 34. Markonis, Y, and D Koutsoyiannis. 2012. Climatic variability over time scales spanning nine orders of magnitude: Connecting Milan kovich cycles with Hurst–Kolmogorov dynamics. *Surveys in Geophysics* 34(2):1881–207. <http://itia.ntua.gr/getfile/1297/2/documents/2012SurvGeophysMilankovitch-HurstKolmogorov>
- IPCC, Intergovernmental Panel on Climate Change. 2007. Contribution of Working Group I to the Fourth Assessment Report (AR4). The Physical Science Basis. http://www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html. IPCC, Intergovernmental Panel on Climate Change. 2012. Fifth Assessment Report AR5, Leaked second order draft. Introduction. www.stopgreensuicide.com
- Quirk, T. 2010. Twentieth century sources of methane in the atmosphere. *Energy and Environment* 21:251–265. Steinfeld, H, P Gerber, T Wassenaar, V Castel, M Rosales, and C de Haan. 2006. Livestock's Long Shadow. The Livestock, Environment and Development Initiative (LEAD). Rome: FAO. <http://www.fao.org/docrep/010/a0701e/a0701e00.HTM>.
- The Washington Times. 2012. Editorial: Chilling climate-change news. New leak shows predictions of planetary warming have been overstated. December 18, 2012 <http://www.washingtontimes.com/news/2012/dec/18/chilling-climate-change-news/>.
- De Vries, M, and JM De Boer. 2010. Comparing environmental impacts for livestock products: A review of life cycle assessments. *Livestock Science* 128: 1–11. www.sciencedirect.com/science/article/pii/S1871141309003692. 10.1186/2041-7136-4-1
- Deserts ‘greening’ from rising CO₂. <http://www.csiro.au/Portals/Media/Deserts-greening-from-rising-CO2.aspx>. Eckard, RJ, C Grainger, and CAM de Klein. 2010. Options for the abatement of methane and nitrous oxide from ruminant production: a review. *Livestock Science* 130:47–56.



The future of warm-season, tropical, and sub-tropical forage legumes in sustainable pastures

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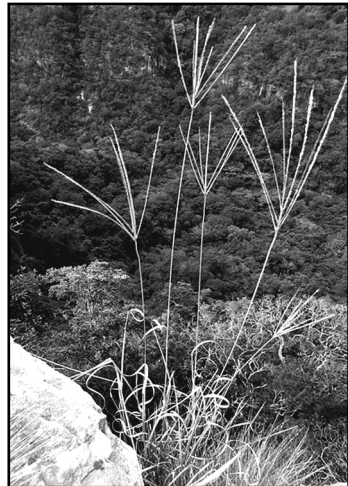
African Journal of Range and Forage Science

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Despite all the talk about including more legumes in rangeland rehabilitation and pasture seed mixes, very few warm-climate species have been widely used in the tropics and sub-tropics. Grasses, especially of African origin, are widely used throughout the world but not herbaceous legumes. A look at the few successful cases of forage legume research and dissemination in such places as Australia and Brazil may provide some keys to success.

These include biological factors such as 1) ease of seed harvest, 2) vigorous seedlings, 3) persistence under heavy competition with grasses, and 4) low palatability relative to other species under grazing. Mostly, however, successful incorporation of forage legumes into existing rangeland and pastures depends on non-biological conditions such as 1) good fit into farming systems, 2) sustained technical support by extension, 3) stable commercial seed industry, and 4) obvious profit return on investment.

As pastures and rangeland face greater competition from cereal crops for prime farmland, pressure to consume fewer inputs such as fertilizers, and growing interest in self-sustaining systems, we can learn from numerous past failures and a few isolated successes as we seek to increase the use of forage legumes in warm-climate pastures and rangeland.



Digit grass in Krantzklouf Nature Reserve, South Africa *

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Savanna browse production: I Determinants and measurement

Caryn A. Penderis and Kevin P. Kirkman

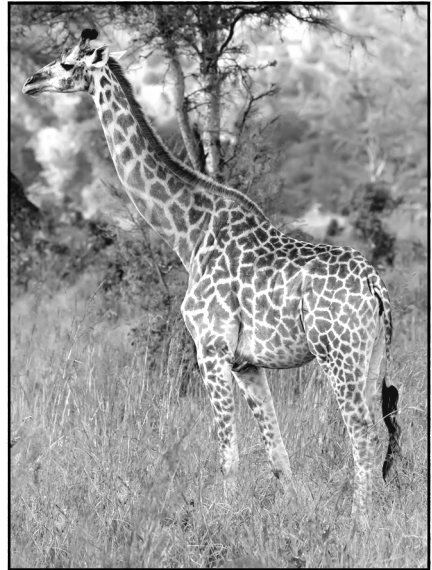
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African Journal of Range and Forage Science

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With the rapid expansion of wildlife ranching and conservation in South African savannas and the resultant increase in multi-species grazing and browsing systems, information on browse production potential is essential in determining carrying capacity. Our study was aimed largely at investigating factors affecting browse production in African savannas. The accurate prediction of browse production is of value to any management system, whether conservation, game ranching or even game farming, as it allows for some degree of monitoring to take place and for estimates of game carrying capacities to be determined. Browse production was primarily affected by the volume of the tree canopy, the type of tree species (deciduous or evergreen, broadleaved or fine leaved) and temperature. Browse production was also seen to differ between seasons, with the growing season onset occurring during the sampling period prior to the rainy season when daily temperatures peaked. Our study has reduced the knowledge gap regarding the measurement and prediction of browse production in South Africa, specifically in KwaZulu-Natal.

The investigation of the different biotic and abiotic factors affecting savanna browse production has increased our understanding of savanna browse dynamics and the resultant implications for herbivore carrying capacity.



Giraffe - Wikimedia Commons



Savanna browse production: II Prediction

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African Journal of Range and Forage Science

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Browsing herbivores are generally highly selective feeders, selecting for new shoots and young plant material. Determinations of browser carrying capacity are then greatly inflated when based on available browse biomass estimates. Browsing capacity is said to be most influenced by the following six factors: (i) the density of the woody plants, (ii) the amount of leaf material within reach of an animal, (iii) the species composition of the woody vegetation, (iv) the palatability of woody species, (v) the digestibility of the woody species, and (vi) the growth potential of the woody species. While all of these factors affecting browsing capacity have been investigated to various degrees, one aspect is still lacking, namely the ability to predict browse production and using these estimates to predict browser carrying capacities.

Our study was initiated with the aim of modelling browse production rates of key savanna tree species in the northern Zululand region of KwaZulu-Natal, with the assumption that browse production equates to utilised browse biomass.

Predictive models for the production of browse, at different game feeding levels, on deciduous, semi-deciduous and ever-green trees were developed. Predictors of the production of browse were measurable plant dimensions, namely: available canopy volume, stem diameter and foliage density and climatic variables, namely: maximum and minimum daily temperatures and cumulative daily rainfall.

Game conservation and ranching areas require a browse management tool that has a general application, is easy and quick to apply and can be used by non-scientists. The models presented in this paper provide a means of not only predicting growing season browse production, but also assisting in the monitoring of the browse component by comparisons of production estimates over time.



Grootfontein College of Agriculture Student Award Minette van Lingen

The GSSA trophy, together with a certificate, is awarded to a deserving third year Grootfontein student. This award is made to a final year student who achieved the highest marks for rangeland, pasture and environmental management modules, with an average of at least 70% for all modules. In 2013 this prestigious award was presented to Sophia van der Merwe during the diploma ceremony at Grootfontein. Sophia was also the third year dux student and excelled in all other fields within the diploma programme. She is currently working at Oos Vrystaat Kaap Operations Limited (OVK) in the Hopetown region as a clerk. She also enrolled for further studies in foundation phase education.



Sophia van der Merwe

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Postdoctoral fellow position available at the South African Environmental Observation Network

The Department of Science and Technology, and the National Research Foundation have introduced the Professional Development Programme (PDP) aimed at training South African Doctoral students and Postdoctoral Research Fellows. Under the DST Professional Development Programme (PDP), the NRF SAEON national Office, administered through the Grassland, Forest and Wetlands Node, invites applications from suitably qualified individuals for a postdoctoral Fellow.

The South African Environmental Observation Network (SAEON) is a research platform funded by the Department of Science and Technology and managed by the National Research Foundation. SAEON is mandated to establish and manage long-term environmental observatories; maintain reliable long-term environmental data sets; promote access to data for research and/or informed decision making; and contribute to capacity building. The mandate is executed through six geographically distributed nodes that are coordinated by the SAEON National Office in Pretoria. The available research project is: Projecting climate change impacts on plant species and communities in the Maloti-Drakensberg mountains through examination of plant-environment relations. The Maloti-Drakensberg is a centre of plant endemism whose plant diversity may be threatened by global change.

The general aim of the project is to address the question of the possible nature of species loss and re-organisation of communities in the face of climate change and CO₂ loading at a landscape to local scale. This project is intended to use statistical modelling techniques to examine current relations between environment and the distribution of species and communities in a spatially explicit manner. Some specific foci will be the potential availability of climate refuges at high altitude, possible conflicting effects of climate change versus CO₂ loading on C3 versus C4 plants, and topographic constraints on altitudinal adjustment of species distributions.

The study will examine regional to local landscape scales using existing data sets for the former and targeted field exercises for the latter. Most of the field work will be conducted in the Cathedral Peak area of the Maloti-Drakensberg. The candidate will collaborate with SAEON partners from the University of KwaZulu-Natal and from Ezemvelo KwaZulu-Natal Wildlife, as well as with other SAEON nodes undertaking similar work. The minimum requirement for a postdoctoral applicant is a PhD (received within five years of this application) with a focus in Botany or in Plant Ecology. Candidates should demonstrate knowledge of the flora of grasslands, experience with

Research Opportunities

fieldwork, good knowledge and experience of statistical modelling, preferably modelling of species distributions, analysis of community data, and a basic competency in Geographic Information Systems. Candidates would need to be prepared for physically demanding fieldwork under challenging conditions.

A driver's license is mandatory and experience with four-wheel driving is desirable. Candidates should be available to start by the 1st October 2014 but could start earlier. Successful applicants for the Postdoctoral Fellows positions will each receive a market-related stipend paid on a monthly basis. These positions are offered as one year contract appointments with the possibility of a renewal up to two years depending on funding availability, research progress and research output. Applicants should submit a detailed CV, the names and contact details of three references, a copy of their SA ID document, and a covering letter summarising the reason for applying and motivating why they are well suited to take up position, to Dr Tim O'Connor (tim@saeon.ac.za; 033 347 5201). A completed NRF application form must accompany your application. Forms can be downloaded from the SAEON webpage www.saeon.ac.za.

The closing date is 31 July 2014. SAEON reserves the right to withdraw the advertisement should a suitable candidate be found earlier. SAEON is committed to employment equity and redress. Preference will be given to South African candidates. SAEON reserves the right not to make an appointment to the position as advertised. Only successful applicants will be contacted.



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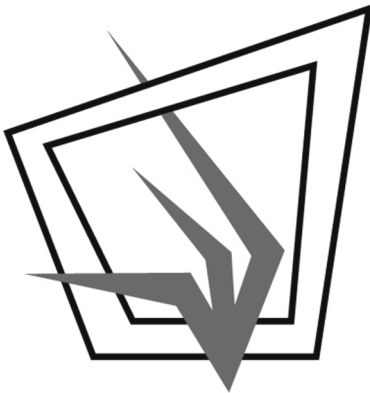
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49TH ANNUAL CONGRESS OF THE GRASSLAND SOCIETY OF SOUTHERN AFRICA

Incorporating the Fifth Research Skills Workshop and a Short Course on Fire Management in South Africa – Policy and Practice with a Practical Field Demonstration

14h00 Sunday 20th July 2014 until 17h00 Friday 25th July 2014
Phillip Sanders Resort and Conference Centre
Verkeerdevlei Road, Bloemfontein, Free State Province, South Africa

SECOND ANNOUNCEMENT & PRELIMINARY PROGRAMME

Prof Jonathan Jansen, Vice-Chancellor, University of the Free State will be delivering the Keynote Address at the Opening of the Congress on the evening of Monday 21 July 2014, following the Presidential Address by Dr Igshaan Samuels, Agricultural Research Council – Animal Production Institute. The Congress will incorporate the highly acclaimed Research Skills Workshop to be held from 20 to 21 July 2014 as well as the extremely popular short course on Fire Management in South Africa – Policy and Practice on Friday 25 July 2014.

TUES 22 JULY

Keynote Address: A new vegetation map for the Free State: A tool for better biodiversity management. Prof Johann du Preez, University of the Free State, Strategic Institutional review of the wildlife ranching industry, Dr Gert Dry, Wildlife Ranching South Africa and Developing and delivering a range science and management curriculum to meet stakeholder needs, Dr John Taylor, Australian Rangeland Society & Primary Industries Education Foundation, Australia
General Sessions: Rangeland Monitoring and Management and Wildlife
Interactive Feedback Session: Research Proposal Posters Workshops: Curriculum Development in Grassland Science and Policy Debate Forum: Enablers and Barriers to Implementing Communal Rangeland Policy
Annual General Meeting of the Grassland Society of Southern Africa
DINNER with Stargazing at Boyden Observatory

WED 23 JULY

Keynote Address: Alien invasives in rangelands, Dr Colleen Seymour, South African National Biodiversity Institute (SANBI) and At Your Fingertips! Worldwide Rangelands Information from the Rangelands Partnership, Dr Barbara Hutchinson, University of Arizona, USA
General Sessions: Bush Encroachment and Invasives and Animal Nutrition
Cultivated Pastures Tour to Umpukane, Clocolan
Mid-Congress Tours: Cactus Pear (Opuntia) Trials at Waterkloof, Amanzi Private Game Reserve, Free State
State National Botanical Garden and Kwagqaleni: ecology of the endangered Bloemfontein Dry Grassland, Central Free State
DINNER: Cheese & Wine Function: Launch of the Special Issue of the AIRFS: Bush Encroachment - changes, causes, consequences and cures

THURS 24 JULY

Keynote Address: Mainstreaming biodiversity in the grasslands biome – smoke and mirrors or gains at scale?, Ms Anthea Stephens and Mr Mahlohi Tau, South African National Biodiversity Institute (SANBI) and Soil organic matter accumulation, composition and function under intensive pastures and crops in KwaZulu-Natal, Dr Neil Miles, South African Sugarcane Research Institute (SASRI)
General Sessions: Rangeland Monitoring and Management, Ecological Processes, Climate Change, Remote Sensing, Pasture Systems, Management and Animal Nutrition and Production Potential of Planted Pastures
Special Session: Soil Carbon for Sustainable Pasture Production
Industry Liaison Workshop: Pastures, Seed and Fertilisers
GALA DINNER

IMPORTANT DEADLINES

ABSTRACTS (Research Proposal Posters) C49 & RSW2014 PAYMENTS C49 & RSW2014 REGISTRATION CLOSES	12 MAY 2014 11 JUL 2014 11 JUL 2014	FIRE COURSE REG & PAYMENT CLOSES LATE PAYMENTS	18 JUL 2014 22 AUG 2014
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REGISTRATION COSTS (including VAT)		FULL-TIME STUDENTS	OTHER DELEGATES
Research Skills Workshop (includes accommodation and all meals from Sunday lunch until Monday afternoon tea, plus workshop materials)		R 2 200.00	R 2 860.00
Research Skills Workshop Day Delegate (Sunday lunch and afternoon tea, Monday lunch and two teas, plus workshop materials, NO accommodation)		R 1 500.00	R 2 160.00
Congress 49 Registration: Members (includes accommodation and all meals from Monday supper until Friday breakfast, congress attendance, mid-Congress tour and primary membership of the Society for 2015; members with ANY outstanding fees will be required to register at the non-member rate)		R 5 600.00	R 6 490.00
Congress 49 Registration: Non-Members (includes accommodation and all meals from Monday supper until Friday breakfast, congress attendance, mid-Congress tour and primary membership of the Society for 2015, if desired)		N/A	R 7 095.00
Short Course: Fire Management in South Africa – Legislation, Policy and Practice (includes pre-course refreshments, morning tea and lunch, plus course materials)		R 400.00	R 500.00
Single Accommodation Surcharge (this surcharge guarantees that you will not share a room but may share a bathroom with no more than one other delegate)		N/A	R 1 750.00
Day Delegate (includes teas, lunch and supper on day of attendance; daily rate)		N/A	R 1250.00
Accompanying Persons (includes accommodation and all meals as for delegates)		N/A	R 3025.00
Airport Shuttle (from Bram Fischer to Phillip Sanders return) (VAT exempt)		N/A	R 350.00

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