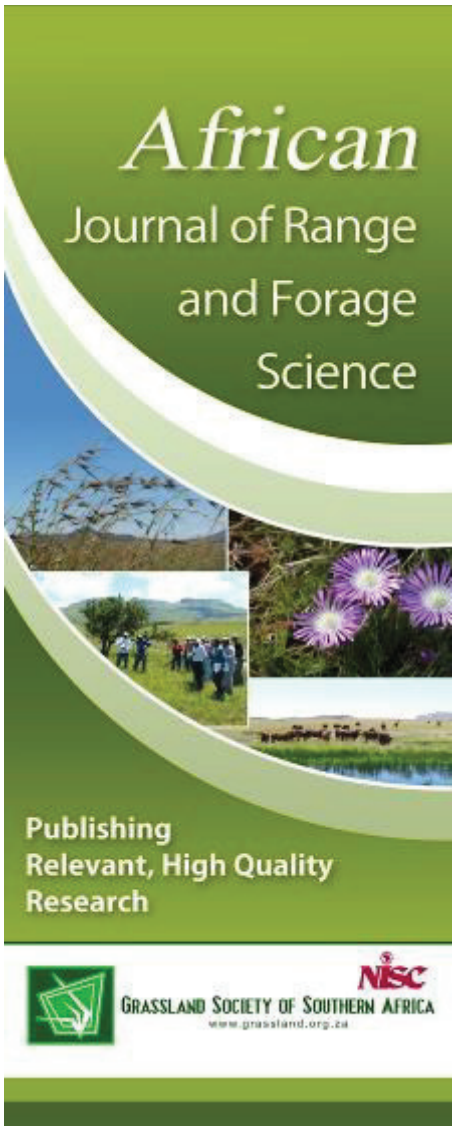

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Editor's Note

Welcome to a rather late third edition of Grassroots for 2015.

The recent GSSA 50th Congress, held in Pietermaritzburg was a great success with many range and pasture scientists giving informative and interesting presentations. It was great to see the range of Congress delegates and to have long time GSSA members interacting with first time Congress goers. Thank you to the Organising Committee for making this Congress such a memorable event. You can look forward to a special Congress edition in the final Grassroots edition for the year.

This issue of Grassroots contains four feature articles where a variety of interests are covered. These range from sustainable agriculture to the impact of fire and goats in the Thornveld region of the Limpopo region. Dr. Felix Reinders presents his ideas on global food security in his article on irrigation and food security.

Iowa State University in the USA has been doing some exciting research on prairie conservation strips, which might be of interest to South African grassland scientists. These researchers found that function and integrity of row-cropped farms improves when small patches and strips of native prairie in farmland are planted.

It is important to remember that all of us can contribute to the GSSA community through our Grassroots publication, and we can make an impact on the rest of the agricultural world through passing on our news and knowledge, so please continue sending us your news, important dates and any feature articles you would like published and we will add it into the next edition. We do appreciate it!

Happy reading!

Janet Taylor

Strong Data From Latest Roadkill Survey

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Surveys of wild animals killed by passing traffic (roadkill) have produced strong data and several recommendations. This is according to Bridgestone, which sponsored the Endangered Wildlife Trust's (EWT) recent investigations into the issue of roadkill in the Pilanesberg National Park. The surveys, conducted by the EWT between 21 October and 23 November 2014, consisted of on-site investigation of roadkill as well as questionnaires completed by 302 visitors to the park. Of the 120 roadkill observed by the roadkill research team, 62 were amphibians, 27 were reptiles, 20 were birds, ten were mammals and one was not identifiable.

Vehicle numbers were monitored by the use of traffic counting devices. However, the roadkill research team soon discovered that elephants had taken a liking to the devices and damaged them. Drawing on previous research which has shown that elephants dislike the smell of chilli pepper, the team then applied a daily coating of chilli pepper and oil onto the counters. The traffic counting devices were then protected from further damage. One of the most interesting aspects of the project was the role of speed in contributing to roadkill. "More than 95% of respondents to the questionnaire survey believe that speed is the sole cause of roadkill. Our aim was to investigate this issue in more detail," said the EWT's Wildlife and Roads Project Executant, Wendy Collinson. Compliance with park speed limits was found to be high, with 72% of the 6981 vehicles monitored driving at or below the speed limits. In order to investigate the role of speed in determining rates of roadkill, the research team placed fake animals on the road and observed the behaviour of 201 drivers. "Of these drivers, almost 70% were considered to not be looking at the road, but rather scanning the bush for wildlife", said Collinson. "This suggests that many roadkills in national parks happen because of the expectation that animals are to be found in the habitat alongside the road, rather than on the road itself", she added.

The team did not find a significant relationship between the number of fake animals hit and the speed at which the vehicles were travelling, with 71.5% of drivers driving over the animals when assessed to be driving less than 20 km/h, 62.1% when driving between 20-40 km/h, and 74.2% driving more than 60 km/h.

"From our survey, it seems that observation levels of the driver, rather than the speed of the vehicle, is the key factor in preventing roadkills," Collinson commented. "One of our recommendations from the latest roadkill survey is that a driver awareness campaign be launched

in parks to make drivers more aware of animals on the roads themselves," Collinson commented.

Collinson also said she was concerned about the low awareness levels of roadkills among park visitors. "Of the 284 respondents who had visited a park previously, only 2.8% had noticed roadkill, with 6.3% noticing a roadkill on their current visit," she explained.

Steven Dell, Pilanesberg National Park's Field Ecologist remarked, "despite the use of road signs both at the park gates and within the park as well as efforts to raise public awareness of roadkill, roadkill still occurs. This project was extremely beneficial to the park as it has assisted in identifying the cause for roadkill and will enable us to focus our future public awareness efforts."

Bridgestone PR Manager, Desirée van Niekerk, said the results of the latest roadkill survey had proved as fascinating as ever. "Bridgestone has been involved with the roadkill project for three years now, and we applaud Wendy and her team's contribution to both road safety and wildlife protection," she said. "We hope these latest findings will soon be used to improve the quality of the experience of park visitors and safeguard the animals in these protected areas," she concluded.

The next stage of the project will shortly commence in Addo Elephant National Park.

The EWT's Wildlife and Roads Project in Pilanesberg was supported by Bridgestone SA, Arrow Bulk Logistics, Pilanesberg National Park, Copenhagen Zoo, Mikros Traffic Monitoring and Africa:Live.

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Is 2015 The Year Soil Becomes Climate Change's Hottest Topic?

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Recently, 650 people from 80 countries gathered in Germany for a week-long discussion about an increasingly important topic in climate change: soil. Dubbed Global Soil Week by the Global Soil Forum - an international body dedicated to achieving responsible land use and soil management - the conference brought together scientists and environmental advocates from all over the world who hoped to translate scientific research about soil into tangible policies for its management. 2015 is shaping up to be a big year for soil - in addition to being Global Soil Week's third year running, the United Nations Food and Agriculture Organization has declared it the International Year of Soil. José Graziano da Silva, director of the FAO, has called soil a "nearly forgotten resource," and has implemented more than 120 soil-related projects around the world to mark the International Year of Soil. Farming First, a global agriculture coalition with more than 150 support organizations, has also called for soil health to be a top priority in the UN's new Sustainable Development Goals.

So why is soil so important?

"If you look at the global carbon created in nature under land-based systems, soil and trees are the two dominant reservoirs where carbon is," Rattan Lal, director of the Carbon Management and Sequestration Center at Ohio State University, told ThinkProgress.

Soils and the microbes that live within them store three times as much carbon as is in the atmosphere, and four and a half times as much as in all plants and animals. "If the soil carbon reserve is not managed properly," Lal said, "it can easily overwhelm the atmosphere."

Climate change can stimulate the release of carbon from soil in a few different ways. Normally, carbon is bonded to minerals in the soil, which helps keep carbon locked in the soil and out of the atmosphere. A recent report by scientists at Oregon State University, however, found that when chemicals emitted by plant roots interact with minerals in soil, it can cause carbon to break free. This exposes the carbon to decomposition by microbes in the soil, which pass it into the atmosphere as carbon dioxide. As the climate warms, the scientists found, more carbon dioxide in the atmosphere will stimulate the growth of plants, which will in turn stimulate the production of the root compounds that breakdown carbon and soil minerals.

"We thought for many many years if you just increase plant productivity, soil carbon will just go up," Kate Lajtha, professor of biogeochemistry at Oregon State University, told ThinkProgress. "What more and more models are seeing now is that the opposite is true."

The microbes that break down stored carbon are also likely to become more active in a warmer world, according to a 2014 study published in Nature. The study looked at microbes in 22 different kinds of soil from along a climatic gradient, testing samples of soil from the Arctic to the Amazon. They found that as temperature increased, the respiratory activity of the microbes in the soil also increased, releasing more carbon dioxide and that effect was most pronounced in northern soils, which tend to store more carbon than soils at other latitudes. Soil isn't just useful for storing carbon, it also grows 95 percent of the food we eat, according to the FAO. But even beyond climate change, agriculture is the number one cause of soil disruption. "What we're seeing is probably the biggest drivers aren't going to be those direct effects of climate," Lajtha said. "Really, the big driver of soil carbon change is what humans are doing to the soil, and a lot of that is agriculture."

The UN estimates that nearly a third of the world's soil is degraded in sub-Saharan Africa, that figure is closer to two-thirds. Degraded soils are less effective for growing crops, threatening food security in places where most of the population lives off of subsistence farming. According to the Montpellier Panel an international group working to support national and regional agricultural development and food security priorities in sub-Saharan Africa, soil degradation costs sub-Saharan Africa $68 billion per year. If soil degradation continues at its current rate, the UN estimates that all of the world's topsoil could be gone in 60 years.

Topsoil, Lajtha says, is where most soil carbon is stored it's where decomposed plant matter and plant roots are deposited so losing topsoil means losing a huge amount of carbon currently stored in the soil. But soil degradation isn't irreversible. "If we manage the soil properly, we can reverse the degradation and some of that carbon that we lost can be put back," Lal said. Conservation practices like no-till agriculture can help minimize soil degradation, according to Lal. Other practices like planting cover crops in the winter season or continously applying compost to soil can also help boost soil's ability to retain carbon. "In some ways, it's as simple as a disrupted soil loses carbon and intact soil with vegetation retains carbon," Lajtha said.

But conservation practices aren't widely adopted yet in Ohio, according to Lal, cover crop use and no-till agriculture is practiced on just one-third of the cropland. Worldwide, such conservation practices account for only 10 percent of cropland. For some farmers, switching to no-till agriculture means replacing seed drills, which can cost upwards of $100,000.

"Even though the community as a whole benefits, there might be a reduction in yield that is prohibitive to farmers that adopt it," Lal said, noting that the adoption rate of no-till agriculture has been almost zero in places like Africa and Southeast Asia. "We have a long way to go," he said. Scientists have also seen promise in the practice of agroforestry combining trees with cropland or livestock systems. Elizabeth Teague, senior associate for environmental performance at Root Capital, an investing fund that works with small agribusinesses in Africa and Latin America, have seen a slew of benefits associated with agroforestry, mostly with coffee and cocoa crops. "Trees can help enrich the soil, and if done properly you can help avoid erosion, which is a big problem in coffee producing environments," Teague told ThinkProgress. "Many studies have also shown that the agroforestry system can help mitigate climate change by helping with carbon sequestration. compared to other type of cropping systems, the trees are sequestering carbon and increasing above and below ground carbon stocks."

Like no-till and cover crops, however, certain barriers still exist between smallhold farmers in developing countries and agroforestry. Planting trees alongside crops requires a certain level of finesse plant too many trees and the crops won't thrive; plant too few, and the environment suffers. "Farmers have to figure out what this sweet spot is where they are maintaining a diverse, robust agroforestry system that also allows them to have a commercially viable farm," Teague said. "For small farmers without education, resources, and technical assistance, that can be very difficult."

To Lal, who contributed to the Montpelier Panel's 2014 report on soil restoration, agriculture might be the problem but it can also be the solution. "Most of the time the perception is that agriculture is a big time problem," he said. "Yes, agriculture done improperly can definitely be a problem, but agriculture done in a proper way is an important solution to environmental issues including climate change, water issues, and biodiversity."

Image: www.photol.com

What is agricultural land?

Charles Simkins
http://www.ngopulse.org/article/2015/05/20/what-agricultural-land
SA NGO Pulse

In this article, the author sets out the definitions of agricultural land and outlines the regulatory framework contained in the Preservation and Development of Agricultural Land Framework Bill.

The story goes back to the Subdivision of Agricultural Land Act 70 of 1970, as amended. In that Act, agricultural land was defined as a residual category. Excluded was:

- Land situated in the area of jurisdiction of a municipal council, city council, town council, village council, village management board, village management council, local board, health board or health committee;
- Land of which the State is the owner or which is held in trust by the State or any Minister for any person;
- Land which the Minister after consultation with the executive committee [of a province]; concerned and by notice in the Government Gazette excludes from the provisions of the Act; and
- A number of other categories of land, often specific to individual provinces.

What happened when wall to wall local authorities were introduced? That threatened to create a situation in which no land was agricultural land, so a proviso was added by proclamation which said that any land classified as agricultural immediately prior to the first election of the members of a transitional local council would remain classified as such. The issue of what would happen once the new local authority system was finalised was tested in the courts, with the Constitutional Court ruling that the proviso would continue to apply. Much, though not all, of the land in the former homelands was, and continues to be, state trust land. The draft Preservation and Development of Agricultural Land Framework Bill proposes to update the definition. Agricultural land is again defined as a residual category. This time the exclusions are:

- Land in a proclaimed township;
- Land included in an application for declaration as a township before the commencement of the [new] Act, provided that the application is approved;
- Land which, immediately before the commencement of the Act, was formally zoned for non-agricultural purposes by any sphere of government or any public entity; and
- Land which the Minister, after consultation with other relevant Ministers and provincial MECs concerned, excludes by notice in the Government Gazette.

Gone is the earlier reference to state land or land held by the state in trust. Applying for a subdivision or rezoning of agricultural land after the commencement of the new Act will be a lengthy process. First an application has to go to the province. Then the province has to consult the relevant municipality. If the land is occupied by a traditional community, traditional authorities have to be consulted by the municipality. The application then goes back to the province and from the province to the national department responsible for agriculture, forestry and fishing, where it has to be considered by a committee and then by the Minister, who makes the decision. At every stage, the application must be considered in the light of several criteria and recommendations made. This means that there can be no new township without the approval of the Minister of Agriculture.

In tandem with the publication of the Bill, a Draft policy document on the preservation and development of agricultural land has been released by the Department of Agriculture, Forestry and Fisheries. This contains quite a different definition of agricultural land: any land which is or may be used for the production of biomass that provides food, fodder, fibre, fuel, timber and other biotic material for human use, either directly or through animal husbandry including aquaculture and inland and coastal fisheries or any other agricultural purpose, with the exception of land excluded by the Minister.

The draft Bill innovates by defining eight classes of land, ranging from Class I, which has very high potential for intensive crop production to Class VIII, which has permanent limitations that preclude its use for commercial agricultural production and restrict its use to recreation, wildlife, water supply or aesthetic purposes. Classes I and II are suitable for intensive crop production, class III has a moderate and Class IV has a marginal potential for crop production. Classes V-VII are suitable for grazing and forestry while Class VIII normally includes very steep areas that are not suitable for agricultural purposes.

Classes are grouped into high potential cropping land (Classes I to III plus irrigated or potentially irrigated land plus other land capable of producing high quality and high yields of a specific crop) and medium potential land (all other agricultural land).

This classification has bite, because the Bill:

- States that agricultural land is the common heritage of all the people of South Africa and the Department (DAFF) is the custodian thereof for the benefit of all South Africans;
- requires that a farmer actively uses and develops the agricultural land concerned to its optimal agricultural potential, with due regard to the farming enterprise concerned;
- and protect the agricultural land concerned from non-sustainable agricultural activities and non-agricultural activities. Failure to do so may result in expropriation at a lower price than would be paid for similar land in the same geographical area which is used optimally for agricultural purposes.

The draft Bill also:

- Prohibits the conversion of high potential cropping land to eco-tourism game farming or other agricultural production activities, where such conversion will result in a decrease in, or cessation of, the production of food and food crops;
- Requires that lease agreements of longer than ten years on high potential cropping land be approved by the Minister;
- Requires written consent, by the Minister in the case of high potential cropping land or the provincial MEC in the case of medium potential land before any portion of agricultural land, whether surveyed or not, is sold or advertised for sale for non-agricultural purposes;
- Requires Ministerial consent to consolidation of high potential cropping land;
- Requires Ministerial consent to the acquisition of agricultural land by a foreigner; and
- Permits the Minister to intervene in matters succession to agricultural land, possibly requiring the realization of the land as part of winding up an estate.

The passage of the Draft Bill as it stands would introduce much heavier regulation than existing legislation. In turn this requires considerable information and capacity, at all three levels of government. The next brief in this series will consider both these issues.

The State Plans our Agricultural Future Part 2: Can the Informational Requirements for Heavy Regulation be Met?

Charles Simkins
www.ngopulse.org/blog/2015

Feet on the Earth or Head in the Clouds? The State Plans Our Agricultural Future

The first brief in this series set out definitions of agricultural land and outlined the regulatory framework contained in the Preservation and Development of Agricultural Land Framework Bill. The Bill proposes heavy regulation of agricultural land, which in turn imposes substantial information requirements. Can these requirements be met? The draft Bill provides for the establishment of an electronic geo-referenced land register which will:

- Store data and information for the development, protection, sustainable use and management of natural agricultural resources and agricultural land. This includes demarcation of high potential cropping areas and potential agricultural land. For each piece of agricultural land there must be a record of its ownership, including the nationality and gender of the landowner, and any other information as may be prescribed by the Minister from time to time, and the characteristics of agricultural land, including land cover and land capability class. Information on current agricultural or other land use, environment tal encumbrances, water licenses and other natural resource-related information is also required.

- Lodge and track applications

Every provincial Department must provide information on relevant spatial datasets, show the extent of agricultural land lost to mining, formal urban residential developments, informal urban residential developments, and industrial developments, and integrate datasets from different sources, including municipal and farm level.

What resources do we currently have to help meet these requirements?

- The State Land Audit, completed in 2014, was conducted to determine how much land was owned by the state, what was it used for, and who were the occupants or users. The audit was conducted for all spheres of

government, and the former home lands, public land held by the Ingo nyama Trust and land of state owned enterprises. It excluded land not regis tered at the Deeds Office. There were site visits to registered state land, while a desktop study was made of private land.

The audit provided statistical information pertaining to land ownership, specifying gender, and nationality or citizenship, and identity of owner. The audit found that of the 121 973 200 hectares of land in South Africa, 79 percent was privately-owned, 14 percent was state land and seven percent could not be accounted for. Of the private land, 48 percent was owned by individuals, 22 percent by companies, 27 percent by trusts and three percent by private organisations.

The 17 061 882 hectares of state land was divided into 1 155 508 land parcels. 40 percent of this land was held by national departments, including tribal trust land, 22 percent was held by parastatals, 19 percent by provinces and 12 percent by municipalities, with the remainder not classified.

The surveyor-general also reported to Parliament that 95 percent of unsurveyed land in the former homelands in 2011 had been surveyed by 2013. The Land Audit reported that 16 035 593 hectares of land were situated in the former homelands. Some of this would have been private and some held in trust by the state. The extent of electronic geo-referencing of land is unclear.

On the basis of national spatial data in its possession [1], the Department estimates that the distribution of land capability by class and land by use is:

Class I	0.0%	Land water	0.20%
Class II	1.5%	Irrevocably transformed from	
Class III	11.5%	Agricultural use	2.60%
Class IV	13.5%	Formally protected	
Class V	11.2%	Game reserves	4.60%
Class VI	14.9%	Forestry	1.30%
Class VII	37.3%	Cultivation	11.40%
Class VIII	10.3%	Range land	80.00%

Namibia committed to biodiversity conservation

https://www.newera.com.na/author/staff: New Era Staff Reporter

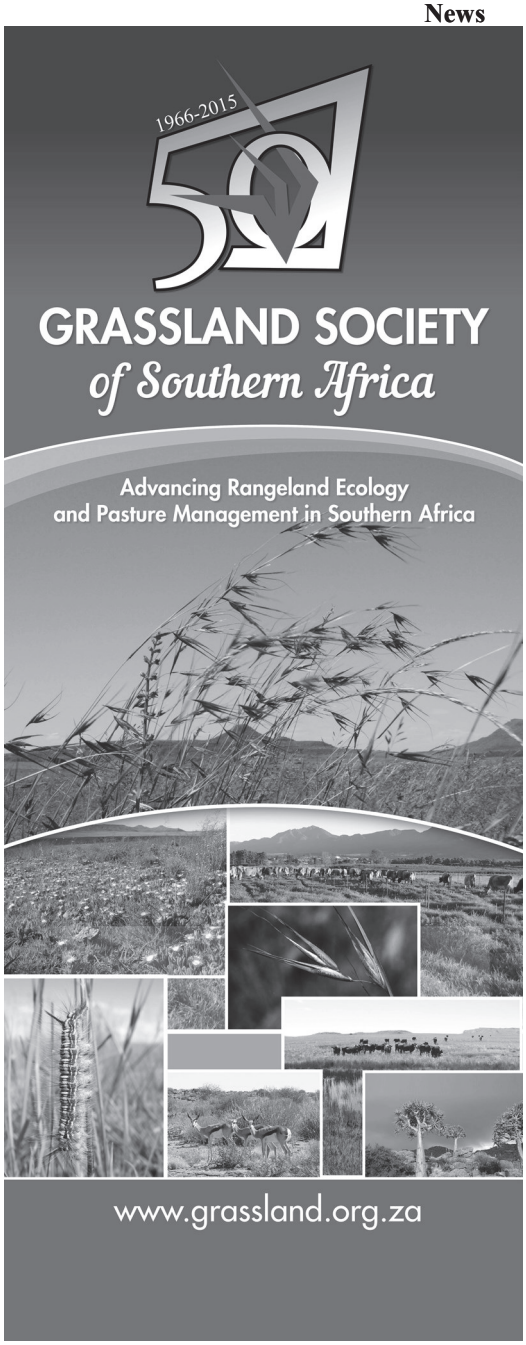
Over the past five years the government has invested an average of about 2 percent of its total expenditure in biodiversity conservation with the aim to safeguard and maintain the health of the national ecosystem at all costs.

About 70 percent of the Namibian population depends directly on natural resources for their livelihoods - income, food, grazing land, medicinal plants, animal products, fuel and shelter. Hence, the government remains committed to the conservation of healthy ecosystems and wishes that the 2 percent spent over the last five years will be increased with the assistance of the newly launched Resource Mobilisation for Biodiversity Conservation (ResMob), a first of its kind project. Launching the project on Wednesday the Minister of Environment and Tourism, Pohamba Shifeta, said quantifying the value of biodiversity and nature to the economy would be a powerful tool to assist government in this regard. He said it is not only the preserve of government to mobilise resources for biodiversity conservation, adding that the activities of the private sector through the consumption of water and electricity alone often negatively affect the environment.

Therefore, Shifeta called on all captains of industry also to help government by increasing their contributions to biodiversity management. Ecosystems are being increasingly threatened and degraded by unsustainable practices, such as mining, over-fishing, over-grazing, deforestation and the inefficient use of water, while climate change is expected to intensify the country's existing vulnerability to droughts and floods. These all have substantial impacts on the economic potential of rural areas and the livelihoods of people and are possible serious barriers to development.

Meanwhile, Kauna Schroder, Coordinator for Biodiversity and Sustainable Land Management in the ministry highlighted the importance of the project among key stakeholders to raise awareness of biodiversity conservation. The Ministry of Environment and Tourism in partnership with GIZ - commissioned by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety - is jointly implementing the ResMob project. It is expected the project will support and complement the activities of the environmental economic divisions in their attempts to put a value on Namibia's natural capital and ingrate these values into national accounting systems. This will aid Namibia in integrating biodiversity in planning for development, poverty alleviation, land use, sustainable use of natural resources and climate resilience.

It also aims to result in a cabinet-approved resource mobilisation strategy for biodiversity conservation. Namibia launched its first National Biodiversity Strategy and Action Plan (NBSAP1) in 2001, as part of its efforts to conserve biodiversity. Although this acted as an important tool for biodiversity financing, the NBSAP review found that implementation had been limited in some areas due to funding constraints. The overarching aim of ResMob is to improve Namibia's capacity to mobilise resources for biodiversity conservation, specifically to enable it to implement the objectives outlined in NBSAP2.



South Africa: Communities urged to protect SA's biodiversity

AllAfrica

Pretoria — Deputy Minister of Environmental Affairs, Barbara Thomson, has urged all South Africans to step up efforts to protect the country's biodiversity for the benefit of the present and future generations. "Our vast wealth of biodiversity, our variety of life from genes, species and ecosystems offer a suite of natural solutions in the face of unemployment, rising poverty levels and climate change," Deputy Minister Thomson said on Friday. She was speaking at the launch of the Environment Sector Local Government Strategy as part of the International Day for Biological Diversity (IDB) celebration's in uMgungundlovu District Municipality, KwaZulu-Natal. Some of the benefits offered by the biological diversity included protecting areas from soil erosion, providing food security, medicinal products as well as reducing the risk of local and global climate change ."The strategy will propel government initiatives aimed at advancing sustainable development projects in South Africa as these are implemented at the grassroots level," department spokesperson Albi Modise said. The Local Government Support Strategy provides a platform for a more coordinated and structured mechanism of dealing with sustainable environmental management in local government.

Modise said the department in partnership with various entities was running several biodiversity initiatives aimed at solving water security challenges and promoting sustainable development in the catchment areas of the Municipality. The initiatives included the "Save the Midmar Dam" Project and the WESSA "Working with Traditional Leaders in the uMgeni Catchment Programme". "This area has also attracted various international projects focussed on biodiversity and climate change adaptation through making use of Ecological Infrastructure for poverty eradication and improvement of livelihoods," he said.

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

ASSAF Report Addresses Safety in Research

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Safe, secure and ethical conduct in life science research in South Africa is assessed in a consensus study on biosafety and biosecurity launched by the Academy of Science of South Africa (ASSAf).

The ASSAf report entitled *The State of Biosafety and Biosecurity in South Africa* evaluates existing measures and capacity to detect, identify, control and prevent the natural, accidental or deliberate spread of infectious agents. It comments on the relationship between science and safety and addresses shortcomings, strengths and gaps in the laws and their implementation, as well as the practices relating to biosafety and biosecurity at laboratory level.

Key findings from the study include poor education and/or training on research ethics for life scientists, inadequate compliance with the statutory obligations to report Notifiable Medical Conditions, the lack of a database of both public and commercial laboratories in the country and a low level of awareness among life scientists about national and international conventions, laws and regulations related to their research. Research and development in the life sciences are important elements of South African growth and development and are essential to address the needs of the country. The ASSAf study contributes towards ensuring that biosafety and biosecurity are properly observed in life science research as it is in the interests of all South Africans and that of the life science community.

On education and awareness raising, several findings were made. A survey among practising life scientists found that education and/or training on research ethics, including issues such as scientific misconduct (falsification, fabrication and plagiarism), is not routine for life scientists. Such training is essential to ensure the integrity of science in South Africa. Biosafety training is not regularly conducted for staff working in laboratories, nor was a test of competence routinely required. There was also a low level of awareness among life scientists about national and international conventions, laws and regulations related to their research. In this regard, the report urges the Department of Health to consider regulations requiring laboratory staff to undergo biosafety training that includes an assessment of competence.

The report provides guidance on how recommendations can be implemented in a manner that can improve the state of biosafety and biosecurity in South Africa.

These are grouped under the following four themes, namely:

- Improving the capacity to detect and respond to infectious disease outbreaks.
- Education and awareness raising.
- Ethics review.
- Scientific openness and transparency.

This report is the product of the work of a 10-member consensus study panel chaired by Prof Jill Farrant.

The Academy of Science of South Africa (ASSAf) is mandated to provide evidence-based advice to government on matters of critical national importance. The study has followed the traditional Academy consensus study methodology, in which a panel of experts, guided by the panel chair, undertakes the study on a voluntary basis. The advantage of this multiperspective approach is that it is free of partisan interest. As a result, the findings and recommendations are the best considered outcomes in the circumstances.

Low Use of Improved Sorghum Hybrid Seeds Stifles Production of Crops

Milliam Murigi
Originally published in People Daily 7 April 2015
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Sorghum is one of the most important cereal crops in arid areas though largely underutilised. In Kenya, sorghum is grown in the drought-prone marginal agricultural areas of Eastern, Nyanza and Coast regions. The crop—one of the orphan crops can be an alternative staple food in hunger-stricken areas and ensure food security in the drought-prone regions of the country. But despite its suitability in the semi-arid areas, the area under sorghum production is still low with minimal yields, especially in Eastern Kenya.

According to the International Crops Research Institute for the Semi-Arid Tropics (Icrisat), the reason for low productivity of highly nutritious traditional crops such as sorghum is partly low use of improved hybrid seeds arising out of poor distribution systems. Also, farmers hardly use inputs because of low incomes. "Eastern region is a rich agricultural area and productivity could be improved by use of locally available germplasm. In Kenya, 230,000 hectares are under sorghum but only 25 per cent of the total is under improved variety— not because there are no such seeds but because of lack of accessibility," said Dr Erick Manyasa, a crop breeder at Icrisat.

He said the organisation has come up with 38 varieties of hybrid sorghum which have been proven to be adaptable and more productive by 15 to 40 per cent compared to open– pollinated varieties. "We focus on what impacts growers most, such as water management, stress management and overall plant health for each region, and the results of that research are reflected in these new hybrids for 2015," said. Manyasa. He said the crop is well-adapted to the environment in Eastern, Nyanza and Coast regions and varieties have been developed for the major ecological zones, with fast maturing varieties for low rainfall areas, and slower ones for the wetter parts. "These hybrids will offer sorghum growers strong yield potential, improved agronomic performance, a wide range of defensive trait packages and adaptability to both irrigated and dry land acres," added the scientist. "There is high demand for sorghum mainly in the brewing industry to replace barley, yet the amount produced by farmers is too low to satisfy the market demand. I would urge more farmers to embrace this farming not only for commercial but also for food security." He said Icrisat is giving the seed traders in Kenya hybrid parent seeds for free to multiply so that they can have enough for their customers.

East Africa: Sap-Sucking Insects May Combat Kenyan Cactus Plague

Maina Waruru
SciDev.Net

An insect that sucks the sap out of cactus plants has been trialled in East Africa to contain the spread of an invasive cactus species that threatens local grazing areas. The cochineal bug, known as dudu in Swahili, for biological control has been released on farmland in Kenya's Laikipia region, which is used by Maasai for livestock herding. The trial showed that the dudu bug feeds exclusively on the *Opuntia stricta* cactus, better known as prickly pear, which has invaded grasslands and drives out local plants used to feed cattle.

The Maasai community in Laikipia partnered with the Centre for Agriculture Biosciences International (CABI) to conduct the trial and halt the spread of the cactus. According to CABI, an non-profit science organisation from the United Kingdom, the trial, which concluded last month, has shown that the dudu bug will not be harmful to native and non-harmful imported plants in the region.

"The cochineal has not been found on other cactus species such as *Austrocylindropuntia subulata* and Cereus *jamacaru* that are growing in association with *Opuntia stricta,"* says Arne Witt, the coordinator of the invasive species programme at CABI-Africa. "In a nutshell, there is no risk."

The prickly pear cactus was introduced in Kenya during colonial times as an ornamental plant capable of living in arid regions. Since then, the plant has colonised thousands of acres of fragile rangelands in northern Kenya, putting at risk the livelihood of animal herders.

According to CABI the cactus is also suspected to have caused the death of baby elephants after they consumed its fruit, meaning it poses a threat to local wildlife and related income from tourism. The dudu bug, which is related to the cicada, was imported from South Africa, where it has been used in Kruger National Park to tackle prickly pear infestations. The insect sucks the sap from the plant, which ultimately kills it.

In Kenya prickly pear infestations have previously been addressed with herbicides and manual removal methods, which are expensive and often create additional environmental damage. Lusike Wasilwa, a researcher at the Kenya Agricultural and Livestock Research Institute (KALRO) says the dudu bug could be a safer alternative.

*http://www.scidev.net/global/livestock/news/insects-kenyan-cactus-livestock-cabi.html

However, she adds that the bug will not be released more widely unless it is absolutely certain that it will not kill local plants. "This research must be followed by exhaustive trials to ascertain that any foreign species brought into the country will not negatively impact on local biodiversity," she says. "Necessary approvals must also be sought." A previous proposal to tackle prickly pear infestations included using the cactus as animal fodder during dry season. But Witt says that work done since has shown that prickly pear would not make a viable alternative to conventional animal feed. Instead, feeding the plant to livestock would greatly increase its spread through defecation and propagation of plant fragments, CABI found.

"It would mean that when conditions are favourable the weed will continue to spread and only when there is a drought will it be utilised," Witt explains. "So when times are good it will continue to displace local plants and make more valuable pasture inaccessible."

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Irrigation and Food Security

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The Food and Agricultural Organisation (FAO) define food security as follows: "When all people at all times have access to sufficient, safe and nutritious food to meet dietary needs for a healthy and active life". The challenge is to achieve a sustainable food system, which allows increased food production while reducing poverty and hunger and over-exploitation of natural resources.

In this regard water gives life and is crucial to development all over the world. It waters the fields; nurtures the crops and stock; provides recreation; it support mines, industry; electricity generation and it provide life for plants and animals that make up ecosystems. The biggest share of water (70% in the world and 62% in South Africa) is used for agricultural production. Agriculture is also the key for rural development and poverty reduction and water use for food production is a value adding process. This water is applied artificially by means of irrigation and although the total cultivated area (1534 million hectare in the world) that is equipped with irrigation (300 million hectare), the irrigated area which is only 20% of the area, provide more than 40% of the food to assist with food security. Internationally, food security has slowly, but markedly, improved during the past years. Approximately 842m people today are estimated to be experiencing chronic hunger. The 2013 Global Food Security Index (Figure 1) provides a worldwide perspective on which countries are the most and least vulnerable to food insecurity.

Irrigation

Irrigation is an important factor in agricultural productivity. In Africa there is a potential of 43 million hectares that can be irrigated but only 13 million hectares are irrigated. Figure 2 shows the trends in the share of total cultivated area that was equipped with irrigation facilities in the SADC countries between 1990 and 2009. It was found that throughout the SADC region, only 8% of the cultivated area was equipped with irrigation facilities. SADC member states need to take serious measures to increase investment in irrigation projects, in order to tap the potential of irrigation to increase agricultural productivity and food security, and reduce poverty.

According to the Food and Agriculture Organization, the total food production in South Africa has increased over the last 40 years, mainly through improvements in productivity (see Figure 3), but the production per capita in South Africa and Southern African Development Countries (SADC) is declining (see Figure 4)

*AgriKultuur/Culture no 26, July 2015, www.agrikultuur.co.za

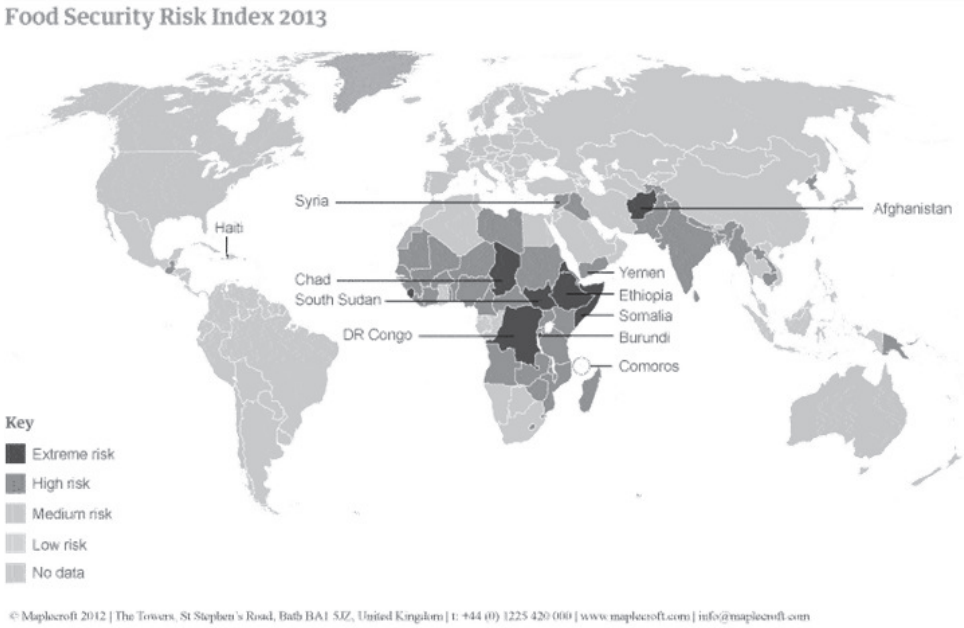

Figure 1: Food security index 2013 (The Economist Intelligence Unit Limited)

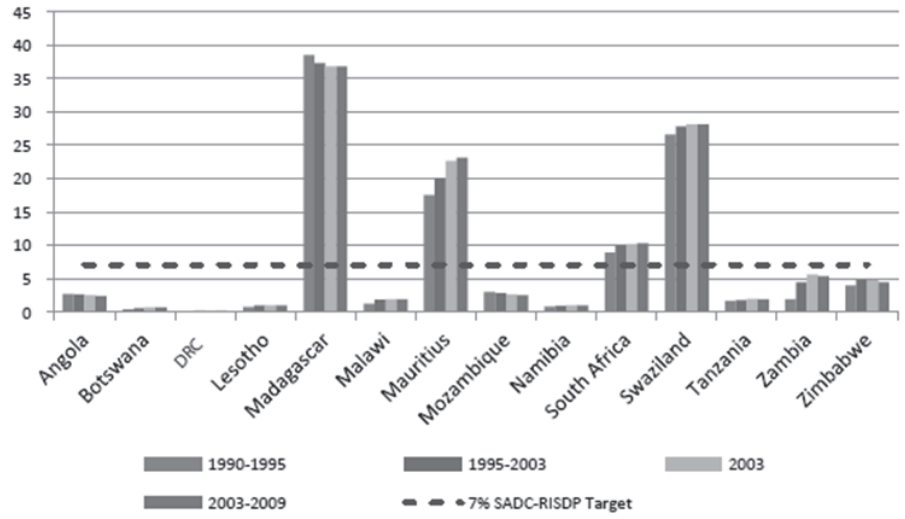

Figure 2 Percentage of cropland area equipped for irrigation in SADC countries (1990-2009).

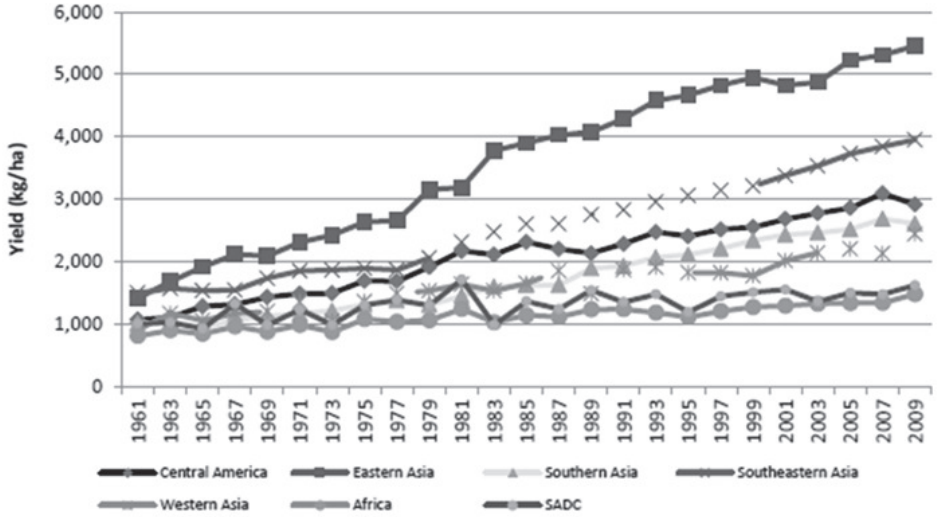

Figure 3 Trends in cereal yield in the SADC region relative to other regions

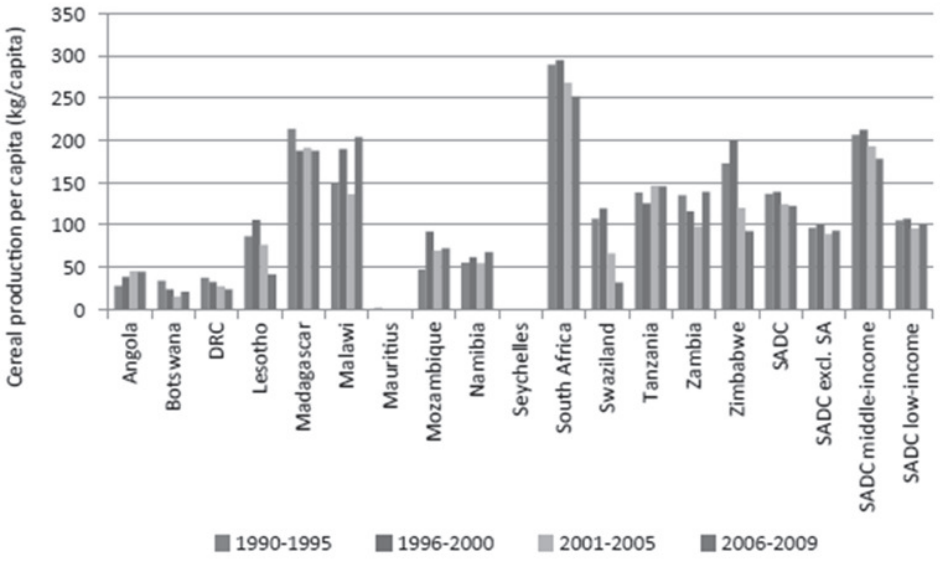

Figure 4 Per capita cereal production in the SADC region.

There have been large drops in production that coincided with major droughts followed by periods of recovery. But these recovery periods have not been sufficient for food production to keep up with population growth. This could become an area of concern as it may have an impact on food security, not only in South Africa, but in the region also.

In the integrated food security strategy for South Africa it is stated that: "Food security is part of the section 27 Constitutional rights in South Africa. On these rights, the Constitution states that every citizen has the right to have access to sufficient food and water, and that the state must by legislation and other measures, within its available resources, avail to progressive realisation of the right to sufficient food" In this regard the application of the correct irrigation equipment and systems is imperative for optimal food production and productivity.

Summary

Irrigation play an important role in food security because water is crucial to food production and development and can:

- ensure that enough food is available to all;
- ensure access to sufficient food;
- make optimal choices for nutritious and safe food;

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The Short-term Effect of Fire, Boer Goats and Cattle on the Woody Component on Thornveld in the Limpopo Province, South Africa.

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Introduction

The use of Boer goats as bush utilizers and bush controllers has been well documented by researchers in the Eastern Cape (Du Toit 1972; Aucamp 1976; Teague et al., 1981; Trollope 1983; Trollope 1984; Trollope 1989). On the other hand, research relating to Boer goats in the Limpopo Province was undertaken by single researchers (Donaldson 1979, Jordaan and le Roux 2014), who supplied data relating to the use of goats as bush utilizers. Trollope (1984) indicated that bush encroachment was one of the main factors that depressed carrying capacity, and interest developed in the use of goats and fire as a method of bush control in the Limpopo Province, especially during the 1990's and early 2000's. However, increased negative publicity and the continued misuse of fire and post-fire mismanagement of veld again resulted in the blame being placed on fire for veld degradation. This was further influenced by the recent activation of the Working on Fire programme in the southern Limpopo region and the subsequent more severe implementation of the Fire Act. The shift from cattle to game farming in the province, with concurrent economical aspects (i.e. the susceptibility of infrastructure to fire damage) and general conservation viewpoints further added to anti-fire management practises. The situation has again come to a point where fire, in many instances, is again excluded from veld management; a similar situation as in the 1970's and 1980's, with similar associated problems occurring again.

The fire workshop at the 48th GSSA Congress at Modimolle, rekindled interest in the use of fire in veld management amongst farmers in the surrounding area. Unfortunately, the most recent data on fire research in the southern Limpopo Thornveld available are results published by Jordaan (1995) and this unpublished study, conducted during the early 1990's. This study started as a demonstration trial, and although it was not statistically orientated and only maintained for four years, it generated adequate results to illustrate the short-term influence of browsers (goats), grazers (cattle) and fire on the woody component of the Sourish Mixed Bushveld. This aspect was not incorporated in earlier studies on fire in the area.

Methodology

The study was conducted at the Towoomba Agricultural Development Centre, situated near Bela Bela, South Africa (28°21'E, 24°25'S; 1 184m elevation), during the period September 1990 to September 1992. The long-term annual rainfall for the experimental site is 630mm per annum. The rainy season usually extends from October to March, but rainfall distribution is irregular and unpredictable. The long- term daily average maximum and minimum temperatures vary between 30.2°C and 17.6°C for December and 21.0°C and 3.0°C for July. The vegetation is classified as Sourish Mixed Bushveld by Acocks (1988). At the time of the study, the woody layer of the plant community was dominated by *Dichrostachys cinerea, Vachillia* and *Senegalia spp,* and the grass layer by *Eragrostis rigidior*, *Panicum maximum*, *Themeda triandr*a and *Heteropogon contortus*. The soil is of the Hutton form (Stella family) (Soil Classification Workgroup 1991). Treatments involved different combinations of burning, grazing and browsing of eight sites, each 1.5 ha in size. Three adjacent sites were burnt with a moderately hot head fire during September 1988. The influence of this fire on the woody component was described by Jordaan (1995). The same sites were rested during 1988 and 1989 and again burned with a head fire during late September 1990. A pre-burn grass fuel load of 2.2, 2.8 and 3.8 tons ha $^{-1}$ was estimated on the different sites, respectively, by clipping 20 randomly placed quadrats of 1m x 1m in size within each site during early September 1990.

The sites were burnt at noon. An air temperature of 30.7°C, relative humidity of 34% and wind speed of 17 km h^{-1} was recorded during burning at the weather station, which was situated within 200 m of the experimental sites. Fire intensities were calculated as 2484 (hot), 3372 (extremely hot) and 4496 kJ s^{-1} m^{-1} (extremely hot) for the three sites, respectively (Trollope and Potgieter 1985). A 20 m x 5 m goat-proof enclosure was erected on each of the burnt sites after the fire. The other five unburnt sites were rested during 1988 and 1989. The eight sites were then subjected to the following nine browsing and grazing treatments during the 1991 and 1992 seasons:

i. Burnt plus continuous browsing by Boer goats (F+G(c)).

ii. Burnt plus rotational browsing by Boer goats and cattle (F+G(r)+C(r)).

iii. Burnt plus rotational grazing by cattle (F+C(r)).

iv. Burnt plus zero grazing or browsing (enclosures) (F).

vii. Unburnt plus rotational browsing by Boer goats and rotational grazing by cattle (G(r)+C(r)).

viii. Unburnt plus rotational grazing by cattle (C(r)).

ix. Unburnt plus rotational browsing by Boer goats (G(r)).

x. Unburnt plus zero grazing or browsing (Z).

Grazing and browsing treatments were applied during the growing season only. Sites were grazed and browsed from the first week of January till the last week of May. In the continuously browsed treatments, four mature goats per site were used, approximately twice the stocking rate recommended by Teague and Danckwerts (1984) for dry thornveld types of the Eastern Cape. Rotational browsing was applied by a flock of 20 mature Boer goats to the point where major diet changes from the woody component to the grass component were observed. Rotational grazing was applied by a herd of 30 steers to the visual point of more or less 60% defoliation of palatable grass species (*P. maximum*, *Brachiaria nigropedata* and *Schmidtia pappophoroides* (Jordaan, 1991)). Browsers and grazers were re-admitted after visual confirmation of full recovery of the woody and grass components.

Two randomly placed, 50m x 2m, strip transects were permanently marked at each site. Bush density, evapotranspiration tree equivalents (ETTE), tree volume, leaf volume, leaf mass, available browse and tree height were determined, using the BECVOL-model, developed by Smit (1989a and 1998b), during September 1988 (pre-burn), October 1988 (post-burn), September 1989 (post-burn) and September 1990 (post- burn). All trees were monitored in the enclosures.

Results and Discussion

The influence of fire on the woody component was similar to the results encountered by Jordaan (1995). The fire resulted in immediate post-burn decreases in ETTE, tree volume, leaf volume, leaf production, available browse and tree height in all burnt treatments. No tree mortality occurred. Recovery of the woody component of burnt treatments thereafter depended on the grazing or browsing treatments that followed (Figure 1a to f).

In the absence of goats in unburnt treatments, grazers had no effect on the woody component and tree growth continued normally. Overall, ETTE, tree volume, leaf volume, leaf production and available browse decreased in all treatments where goats were present. Decreases in ETTE, tree volume, leaf volume, leaf production and available browse were encountered in treatments where goats were present and fire absent This wasdue to the utilisation of browse being within the reach of goats. The woody component above the browse line was not affected. Decreases in above-mentioned tree characteristics were enhanced where goats were used in combination with fire. The F+G(c) treatment led to severe degeneration of the lower strata of the woody component. This was the only treatment where continuous downward trends in ETTE, tree volume, leaf volume, leaf production and available browse were observed. Other treatments that involved fire were less destructive. Although the F+G(r)+C(r) treatment depressed coppice regrowth to a bigger extent than the F+C(r) and F treatments, trees of the lower strata of this treatment remained vigorous.

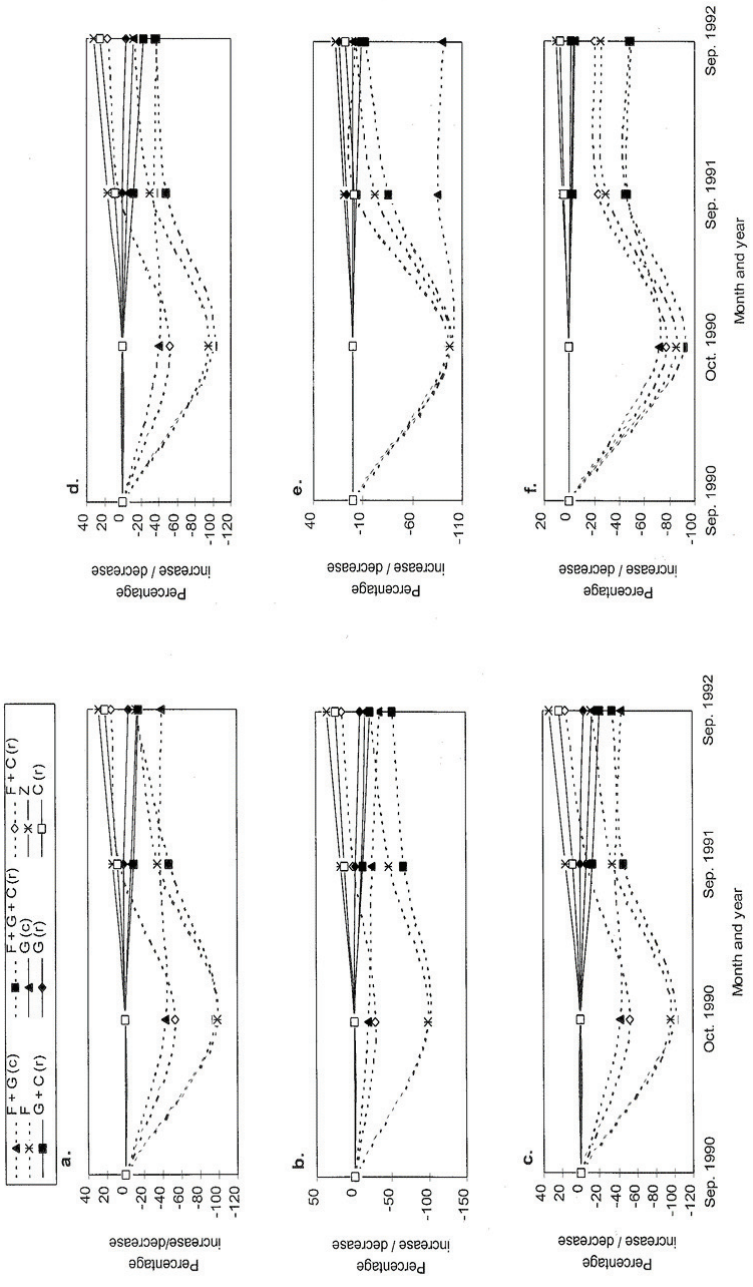

Figure 1: The percentage increase/decrease in a. evapotranspiration tree units, b. tree volume, c. leaf volume, d. leaf production, e. available browse and f. tree height. Dotted lines represent treatments included fire. Filled symbols represent treatments which included goats.

Treatment	Sept - 90 (trees/ha)	Sept - 94 (trees/ha)
Burned plus continuous browsing by Boer goats (F+G(c)).	4000	3700
Burned plus rotational browsing by Boer goats and cattle (F+G(r)+C(r)).	2400	2800
Burned plus rotational grazing by cattle (F+C(r)).	2000	2300
Burned plus zero grazing or browsing (enclosures) (F).	5200	8270
Unburned plus continuous browsing by Boer goats (G(c)).	1050	750
Unburned plus rotational browsing by Boer goats and rotational grazing by cattle (G(r)+C(r)).	6200	8250
Unburned plus rotational grazing by cattle (C(r)).	2150	2200
Unburned plus rotational browsing by Boer goats (G(r)).	3400	2600
Unburned plus zero grazing or browsing (Z).	2200	2650

Table 1: Increases/decreases in bush density (trees ha^{-1}) in different treatments

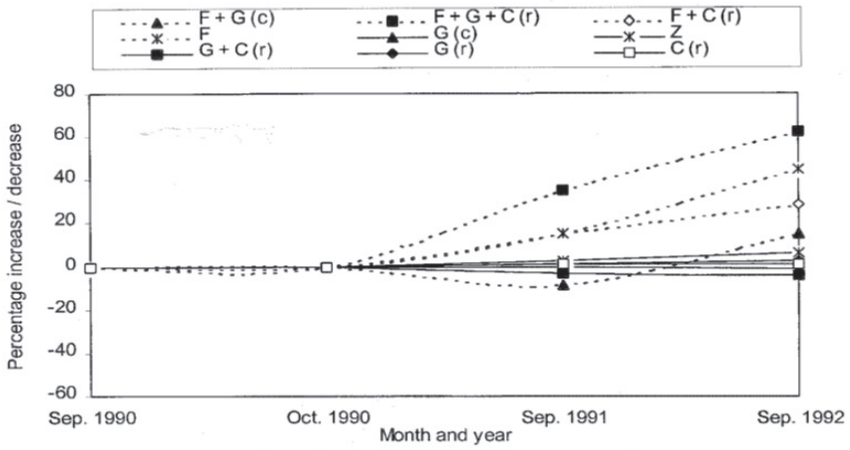

Figure 2: Percentage increase/decrease in bush density at the sites. Dotted lines represent treatments included fire. Filled symbols represent treatments which included goats.

Post-burn recovery of the woody component of burned treatments where goats were absent was similar to results as obtained by Jordaan (1995). In these treatments, unutilised coppice regrowth after the initial fire resulted in volume and production increases in the lower tree strata, as post-burn recovery commenced. Tree height was, however, not affected to such an extent than where goats were present . Different trends in regeneration rates of the woody component were observed between the F and F+C(r) treatments. Where grass layer competition was reduced through grazing (F+C(r)), regeneration was much faster than where grass layer competition was maintained (F).

Bush density increased in all treatments (Table 1, Figure 2). Similar results were noted in this area during a study in 1995 (Jordaan 1995). High increases were encountered in all treatments where fire was present. Tree seedlings on burnt treatments were partially controlled where goats were present in the absence of grazers of, but new recruitment occurred where goats were absent (F treatment) or where the grass layer was removed (F+G (r)+C(r) and F+C(r) treatments). Minor increases in bush density occurred in treatments where fire was absent. In these treatments, grass layer competition was maintained through the early part of the growing season and no compensatory growth was needed to overcome the effect of the fire. None of the treatments resulted in total control of smaller trees in the short term. However, partial bush control was obtained by the F+G(c) treatment during the two- year study period.

Conclusions

Despite restrictions, out of a statistical point of view, this study clearly supported the following findings of other searchers:

In the Limpopo Thornveld, tree mortalities after a single fire are usually low (Jordaan 1995). A single fire usually causes severe coppicing (Bond 2008), but repeated fires are necessary to obtain high tree mortalities. Bush encroachment can occur after a fire (Balfour and Midgley 2008, Balfour and Midgley 2009, Gordijn and Ward 2014). Heat treatment is a known means of lifting seed dormancy of various leguminous woody species (Mucunguzi and Oryem-Origa 1996). Where the grass sward was kept short by grazers after a fire occurred, as happened in this case, bush density increased, probably due to a combination of increased tree seed germination (O'Connor et al. 2010) and the absence of grass competition (Bond 2008). Where browsers are present over extended periods, a browse line develops over time (Aucamp 1976), and it will be necessary to lower available browse to within their reach, using either fire or manual coppicing (Teague 1984).

In the absence of fire, the presence of browsers does not imply that bush encroachment will not occur, especially when grazers are also present. If available browse is insufficient, utilization of the grass sward by both grazers and browsers will occur (Teague 1989). In this study a similar situation led to severe bush density increases, despite the presence of

goats, which accentuates the importance of adapting stocking rates to include both grazers and browsers.

Fire must be used in combination with browsers in the long term if bush control is the objective (Hester et al. 2006). The continuation of a burning and browsing programme and a seasonal post-burn rest period of the grass is essential. Removal of browsers or fire out of such a programme would promote re-encroachment (Trollope 1983). This type of management programme could thus be of great value as an after-care programme following chemical bush control, or as a long-term means of biological bush control.

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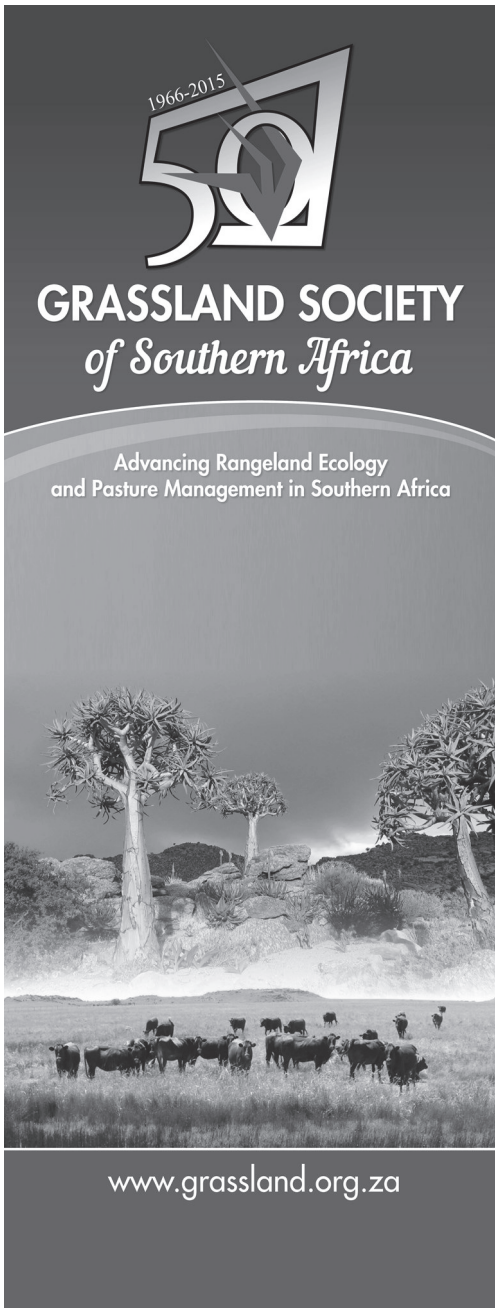

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Small Changes, Big Impacts
Prairie Conservation Strips

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Restoring the Balance

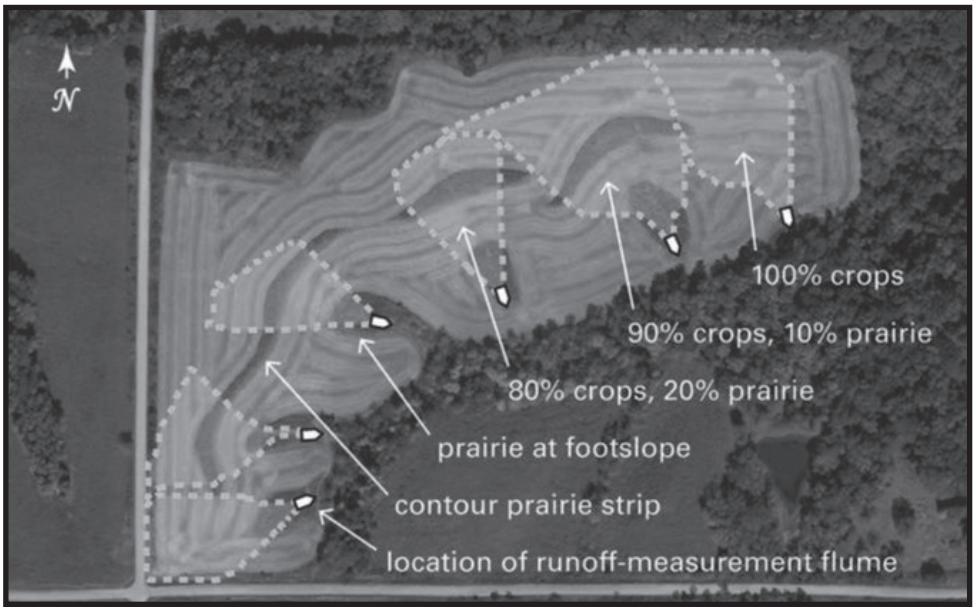
Agriculture in Iowa owes its immense productivity to an extreme trade-off. Once, perennial prairie covered 85 percent of the state, and its deep root network built and held together a fertile topsoil layer many feet deep. Now, more than 85 percent is in agricultural production, with the majority in row crops. However, shallow-rooted annual crops such as corn and soybeans cannot reproduce the soil-building capacity of a perennial prairie system. Other agricultural practices need to be implemented to keep soil, moisture and nutrients on the field. Without such practices, over half of the prairie-built topsoil of Iowa has been lost in the past 50 years, along with nutrient runoff and pollution of waterways. The large-scale conversion to row-crops also has drastically reduced native habitat and biodiversity. But agriculture in Iowa does not need to compromise between production and conservation. Scientists from the STRIPS research team (Science-based Trials of Row-crops Integrated with Prairie Strips) have shown that by strategically converting as little as 10 percent of a row-cropped field to perennial prairie—in narrow patches along contours and foot slopes—farmers and landowners can reduce sediment movement off their field by 95 percent, total phosphorus loss by 90 percent, and total nitrogen loss by nearly 85 percent. Establishing prairie strips involves minimal farmland conversion at relatively low cost, while offering multiple farmland and environmental benefits. The patches of prairie create landscape diversity that supports wildlife such as birds and pollinators, recreation, grazing, as well as other multifunctional purposes. Prairie strips promise to be an innovative and effective conservation practice that sustains both Midwestern farming and its natural resources. In other words, small patches make a big difference.

From experiment to practice
STRIPS in Iowa

The STRIPS research team established experimental study sites in central Iowa at the Neal Smith National Wildlife Refuge in Jasper County in 2007—twelve small watersheds of 1 to 8 acres, annually producing corn or soybeans on slope inclines between 6 and 10 percent. The researchers monitored each watershed for sediment, water, nitrogen and phosphorus movement off the field, greenhouse gas emissions, as well as plant, insect and bird biodiversity.

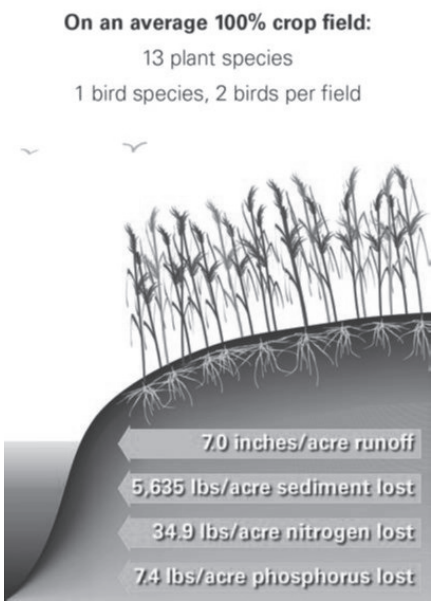
*STRIPS Research www.prairiestrips.org

Some of these watersheds were planted with tallgrass prairie vegetation in one or two contour strips among row crops, with separate prairie plantings at the footslope. The total land planted with prairie vegetation in a row-cropped watershed was either 0 (100 percent of the field in row crops), 10 or 20 percent. During 2007 to 2012, the STRIPS team found that watersheds with only 10 percent prairie reduced sediment export by 95 percent, total phosphorus export by 90 percent and total nitrogen export by nearly 85 percent when compared to losses from the 100 percent row-crop (no-till) watersheds. Meanwhile, financial assessment studies show that prairie strips are one of the most affordable conservation practices available to landowners. Based on these results, farmers have increasing interest in implementing this practice on farm fields in Iowa. The STRIPS research team and Iowa Department of Agriculture and Land Stewardship (IDALS) are establishing STRIPS demonstration sites on farms throughout Iowa. In December 2012 the STRIPS team worked with the first private adopter in Taylor County, southwest Iowa, to flag the boundaries of strips planted in June 2013. In addition to private land locations, STRIPS demonstration sites are planned for implementation at several ISU research farms. Field days will be held at all of these sites during which anyone interested in the practice can view the fields and interact with the landowners and land managers.

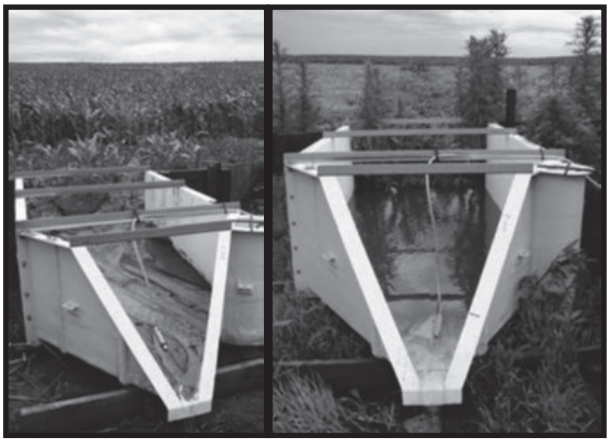


Tallgrass prairie: What roots hold

Tallgrass prairie is a diverse mixture of native grasses and flowering plants (forbs) uniquely adapted to the climate and soils of the central United States. Prairie strips keep vital soil resources in crop fields. Deep-rooted prairie plants increase soil organic matter and improve infiltration of water. The plants' stiff, upright stems slow surface runoff and help hold soil in place during heavy rains.



STRIPS researchers calculated average values for surface water runoff, soil and nutrient export from a field cropped entirely in corn, as well as various indicators of biodiversity.



These flumes measure runoff from the STRIPS watersheds. Note the amount of sediment displaced from a 100% no-till crop field (left) compared to a field enhanced with 10% prairie (right).

Biodiversity by numbers

The STRIPS watersheds demonstrate substantial biodiversity benefits. On average, 51 plant species were found in areas surveyed within prairie strips as compared to 13 species within all row-crop areas. This native plant diversity provides habitat that fosters conservation of native communities—not only of plants, but birds and beneficial insects such as pollinators and natural enemies of crop pests. STRIPS support several species of insect predators (e.g. lady beetles) that reduce insect pests of corn and soybean. The enhanced floral resources that prairie strips provide throughout the growing season supports a diverse community of pollinators (70 species of native bees along with the European honey bee). Catchments with prairie strips also provide habitat for 118 percent more bird species and 133 percent more total birds than those with 100 percent row-crops. Bird species documented using prairie strips include species of greatest conservation need, including the eastern meadowlark, grasshopper sparrow, field sparrow and dickcissel.

The cost of installing prairie strips

The STRIPS team has calculated that the average annual cost of treating a farm field with prairie strips ranges from $24 to $35 per acre. The USDA NRCS offers Conservation Reserve Program (CRP) contracts that can reduce the cost to farmers by more than 80 percent. Costs associated with prairie strips include site preparation, strip establishment and annual and periodic maintenance to prevent weed establishment while the prairie plants take hold.

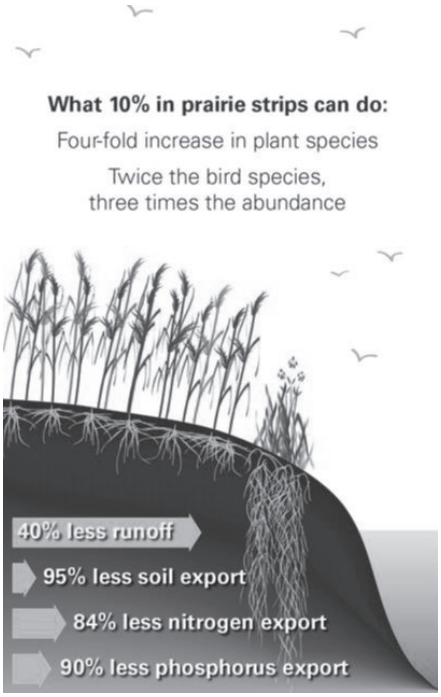
The STRIPS team calculates that the annual opportunity cost (of foregone rent or net revenue loss associated with land taken out of crops) represents over 90 percent of the total cost. Overall, it is one of the least expensive conservation practices available to landowners and farmers. The STRIPS team continues to conduct financial assessments of prairie strips. This year they will calculate the monetary value of environmental benefits associated with the conservation practice.

The future of agriculture in Iowa

Agricultural production in Iowa has grown to meet the demand for products that supply food, feed, fiber and fuel. But the continued expansion of row-crop agriculture has been accompanied by a profound loss of natural resources, including nutrient and sediment loss into waterways, as well as a drastic reduction of native biodiversity, especially of those species dependent on prairie habitat. The public as well as local and federal governments increasingly urge for measures that reduce the impacts of agricultural production on grassland biodiversity and water quality—from the Mississippi River Basin down to the Gulf of Mexico. Programs like the USDA's Mississippi River Basin Healthy Watersheds Initiative (MRBI), Iowa Nutrient Reduction Strategy (INRS) and Iowa's Wildlife Action Plan encourage farmers and landowners to voluntarily adopt practices that improve watershed and ecosystem health. The STRIPS study documents a conservation practice that can sustain agricultural production while also providing diverse and extensive benefits across a

broad range of ecological and economic criteria. Climatic extremes continue to put pressures on the productivity of monoculture cropping systems.

Landscape diversity in the form of prairie strips creates a natural buffer against soil erosion and nutrient loading of streams, and helps water infiltrate soil so it can later be used by crops. It also preserves important habitat for wildlife, including pollinators and natural predators of crop pests. The STRIPS team shows that planting prairie strips is a feasible and effective conservation practice with real benefits for farmers, landowners and society. Prairie strips provide disproportionate, multifunctional benefits that improve farmland and ecosystem health in the Midwest.



On a 10% strips field, all of the above-measured biological and environmental indicators show improvement. There is no appreciable loss of yield on land that remains in annual crops.

The STRIPS research team website includes information on partners and participants, as well as upcoming field days and demonstration site locations. Find more at:
www.prairiestrips.org
The Leopold Center for Sustainable Agriculture has compiled various multimedia resources, including: *A Landowner's Guide to Prairie Conservation Strips* and *The Cost of Prairie Conservation Strips*. Find more at:
www.leopold.iastate.edu/strips-research-team.

Meeting the Rehab Objectives

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One of Advance Seed's research goals is to identify which species physiology are more suited for the rehabilitation of different post- mining environments. Identifying the main challenges faced in rehabilitation of tailings and waste materials and facilitating possible solutions using commercial forage species, has been the focus of a research team from the University of Pretoria and North West University. These teams, led by Dr Wayne Truter and Prof Klaus Kellner, Piet van Deventer and Dr Anine Jordaan, respectively, have shown that some species are more suited to certain environments. In addition, the use of Agricote® can be beneficial to the establishment process in some of these extreme growing conditions. Lucerne is one of the species used in the research and results show that Agricote® coated seed had higher germination in acidic growth media, such as gold tailings and coal discard. These growth media are usually plagued by high metal contents with the acid growing conditions, which results in significantly lower germination and survival of seedlings of most plant species.

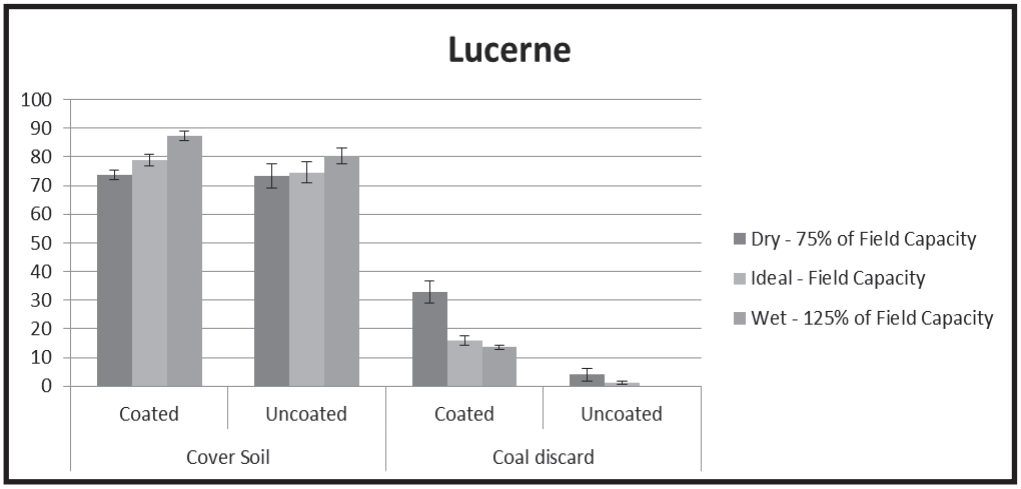

Figure 1: Germination and emergence results of lucerne planted in cover soil (Red Sandy Loam) and coal discard, treated with different soil moisture regimes

The balance between water availability and reducing water flow through a profile can also influence the success of a species. An example of this can be seen in the figure below (Figure 1). In cover soil, the higher water content was beneficial to the emergence of lucerne, while the opposite is true in coal discard. This is likely due to the acid generation potential of the coal discard and the high Aluminium content. It is however clear that the coated lucerne can improve the chances of successful establishment of plant cover for rehabilitation.

The micro environment created by the coating material provides a matrix which improves seed to soil contact and buffers the emerging radicle from chemical damage. Amelioration of the growth medium can significantly improve the results and ensure a better stand establishment. Successful establishment is the basis for successful rehabilitation and is very important when considering long-term sustainable vegetative cover.

Sustainable by Nature
Biofertilisers Pave the Way for Food Security

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Attempts are underway globally to increase food production in order to feed the burgeoning population, but it is unreservedly acknowledged that this should not occur at the expense of the environment

Although there is wide recognition for the role that fertilizers (and other agrochemicals) have played to subdue food insecurity of the global populace, through providing essential nutrients to crop plants, it has become apparent that the overuse thereof has compromised environmental integrity. Moreover, the low use-efficiency of chemical fertilizers has been well documented. Another undesirable outcome of the use of high levels of fertilizers is that current commercialized plant genotypes are responsive to high chemical fertility of soils, at the expense of biological fertility.

The supply of agrochemicals (pesticides, herbicides, fertilizers) has in part, de-linked the association between agrobiodiversity and agro ecosystem functioning. For example, nitrogen (N) fertilizers may partially replace the function of rhizobial (nodulating) or freeliving N_2-fixing bacteria within the N cycle, while phosphorus (P) fertilizers may partially replace the role of arbuscular myccorhizal fungi (AMF) associated with crop plants. Thus, the commercial varieties of plants used(other than legumes) do not readily benefit from microbial associations. Therefore, best management practices and nutrient decision support systems aimed at increasing crop yields that focuses on microorganisms known to improve soil fertility and enhance plant nutrition, ha sreceived renewed impetus. Biostimulants(or biofertilizers) in an agricultural context include diverse substances and microorganisms that stimulate crop growth. The global market for biostimulants is projected to have a turnover of US$2.24 million by 2018 and to have a compound annual growth rate of 12.5% between now and 2018. The use of biostimulants forms one of the mainstay tenets of integrated nutrient management, which may prove to be cost effective and renewable. In recent times, ecological approaches to improve both crop productivity and human nutrition have garnered wide appeal. Ecological approaches naturally implicate the interactions between several organisms and how their respective functionalities find expression in a wide spectrum of diverse environments.

*AgriKultuur/Culture no 24, May 2015, www.agrikultuur.co.za

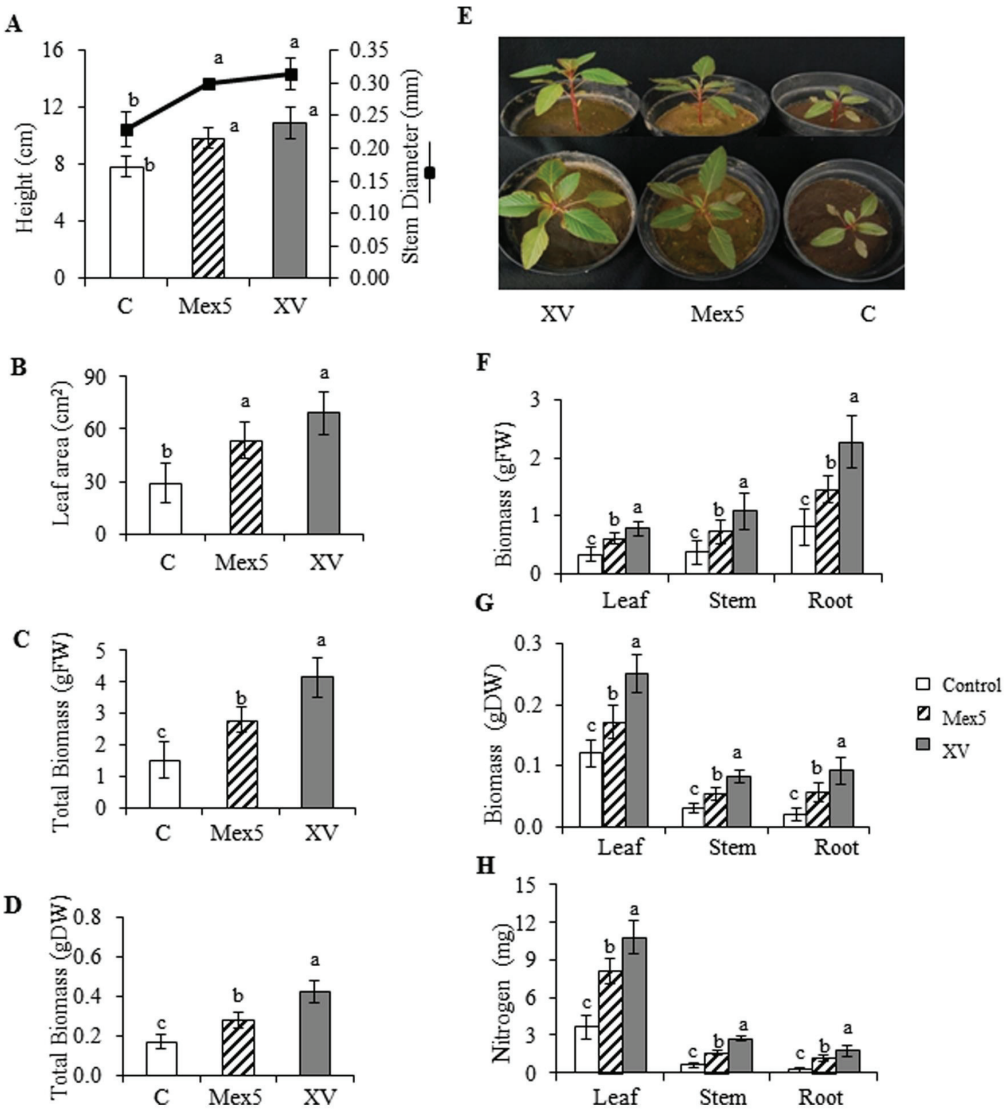

Figure 1. Effect of two different PGPR strains, *Burkholderia ambifaria* (Mex5) and B. *caribensis* (XV) on growth and nitrogen content of *Amaranthus cruentus* plants after 7 weeks of growth in low fertility soil (Source: Parra-Cota et al., 2014)

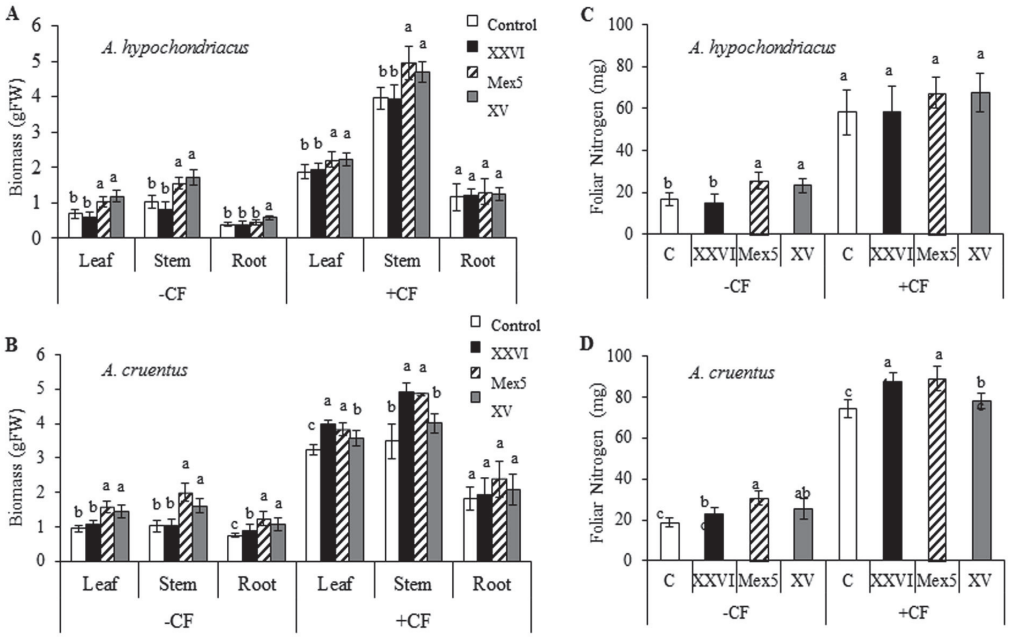

Figure 2. Effect of three different PGPR strains on growth and nitrogen content of grain Amaranth plants after 8 weeks of growth in a rich substrate with (+CF) or without (–CF) chemical fertilization; (Source: Parra-Cota et al., 2014)

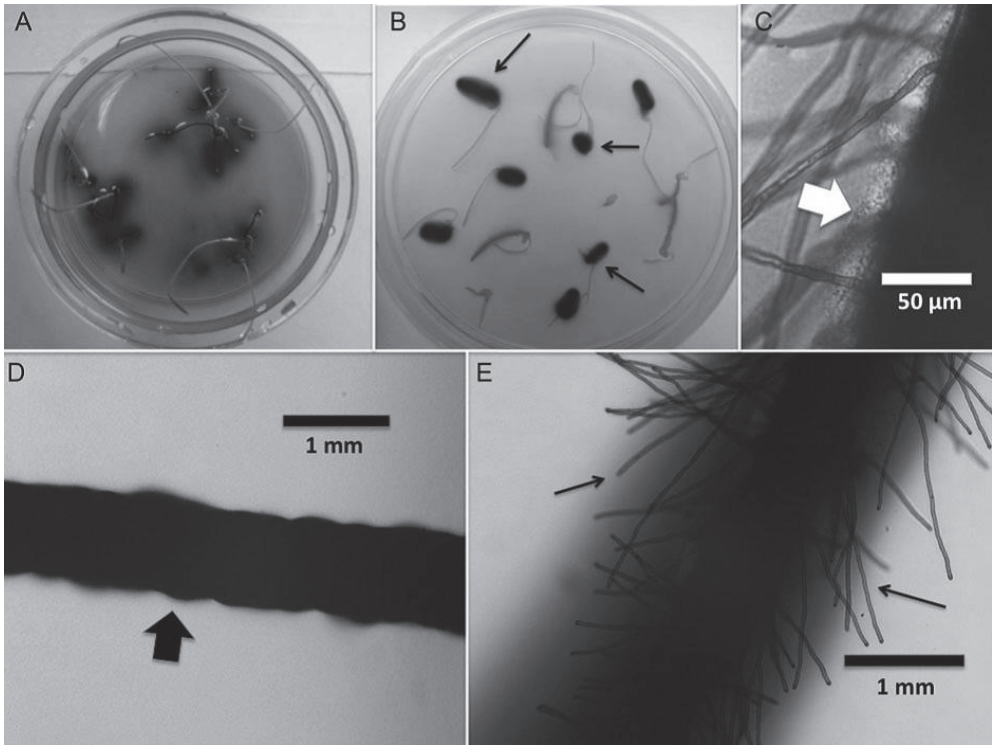

Figure 3. Poa annua seedlings showing reactive oxygen (H_2O_2) staining around roots. (A) Seedlings growing on 0.7 % agarose showing diffuse zones of reactive oxygen (brown) around roots. (B) Seedlings growing on 0.1 % albumin agarose showing dense zones of reactive oxygen (arrows) around roots. (C) Root surface showing root hairs and layer of bacteria (arrow). (D) Root without bacteria growing in 0.7 %water agarose medium, showing absence of root hairs. (E) Root with bacteria growing on 0.7 %water agarose medium, showing reactive oxygen zone and root hairs (arrows).

(Source: White JF, Chen Q, Torres MS, Mattera R, Irizarry I, Tadych M, Bergen M. 2015. Collaboration between grass seedlings and rhizobacteria to scavenge organic nitrogen in soils. AoB PLANTS 7: plu093; doi:10.1093/aobpla/plu093)

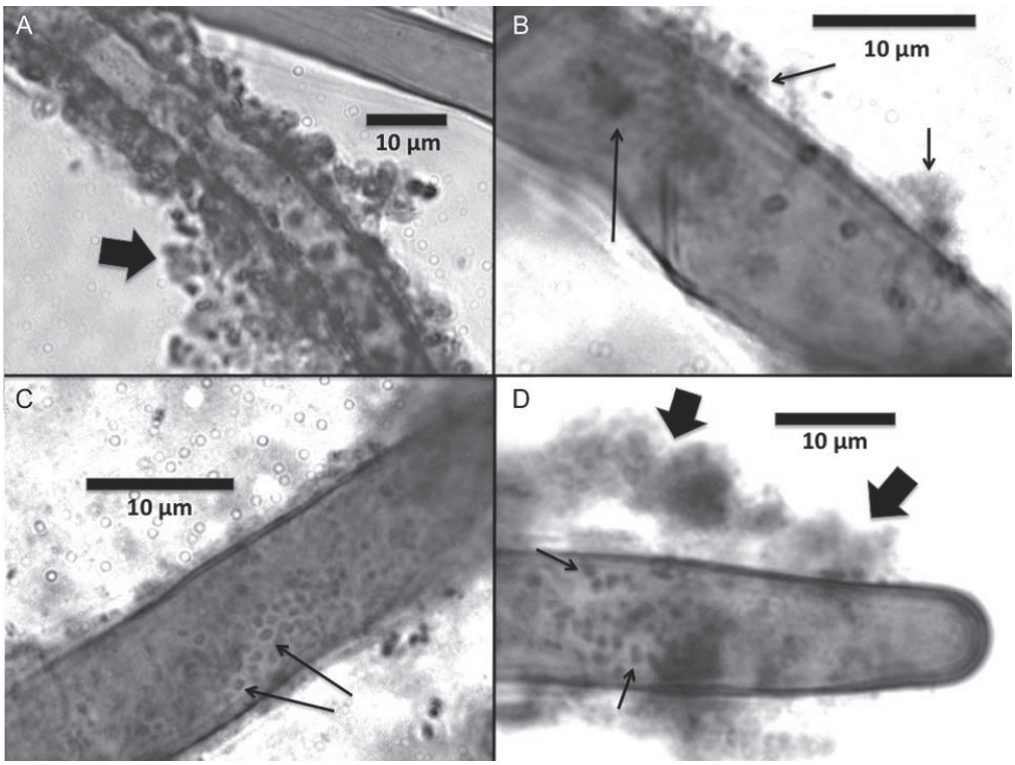

Figure 4. Bacteria on root hairs of cool-season grass seedlings; stained with DAB/ peroxidase for reactive oxygen (brown) and counterstained with aniline blue/lacto-phenol for protein. (A) Bacteria (arrow) on surface of root hair of Lolium perenne seedling. (B) Bacteria and bacterial protein (arrows) on surface of root hair of Poa annua seedling. (C) Bacteria (arrows) on surface of root hair of P. annua seedling. (D) Bacteria (small arrows) and denatured proteins (large arrows) on the surface of root hair of P. annua seedling.

(Source: White JF, Chen Q, Torres MS, Mattera R, Irizarry I, Tadych M, Bergen M. 2015. Collaboration between grass seedlings and rhizobacteria to scavenge organic nitrogen in soils. AoB PLANTS 7: plu093; doi:10.1093/aobpla/plu093)

Soils are recognized as a reservoir for various biotas that facilitate decomposition and nutrient cycling and provide the critical resources for sustained agricultural productivity. The biggest players, by virtue of numbers, are the plant growth promoting rhizobacteria (PGPR). These are free-living rhizospheric bacteria or endophytic bacteria that have been implicated in plant growth enhancement directly through better plant nutrition or indirectly through mitigating plant stresses, including disease control. Significant increases in growth and yield of agronomically important crops, likely due to increased N uptake (see Figures 1 & 2), nutrient use efficiency and disease-control benefits imparted by PGPR, have been reported. Moreover, PGPRs may substitute, at least partially, for the high fertiliser requirement of some crops, while showing equivalent or higher nutritive value compared to chemically fertilised counterparts. Thus, the potential for increasing agricultural productivity in a more natural and sustainable manner may be attainable through PGPR as advocated by several proponents of this 'biotechnology'. Breeding efforts over the years have aimed at improving crop plants, implicated in food security, and their responses to nutrient additions under ideal conditions, a situation under which nutritional mutualists have inevitably become redundant. An alternative complementary route to a more sustainable agriculture and one 'rooted' in a more ecologically intensive agriculture, is via so-called 'neodomestication' of plant germplasm that actively engage beneficial endophytic microorganisms. This should pave the way for improving plant mineral nutrition (also, water supply and other eco-logical functions) 'naturally'. Similarly, breeding of superior varieties has been done under high soil disturbances, which impedes the proliferation of soil mutualists. The practice of intensive tillage has been shown to decimate mycorrhizal numbers and prompted the now widely adopted reduced tillage methods under the auspices of conservation agriculture (CA). The latter has seen a steady recovery of AMF judging from the increased glomalin levels in soils. Breeding programmes should, then, also be tailored to exploit the myriad of above-ground-belowground interactions.

Finally, an over dependence on agrochemicals is not sustainable, and a moderate use of both fertilizers and ecological nutrient cycling will likely result in improved resource use, and nutrient use efficiency and hence profits in farming. In addition, diverse agroecosystems with their complex suite of all these aforementioned role-players may contribute to food security due to the complementary interactions among the various constituents of the system, without diminishing productivity, profitability and environmental health. Here, microbe-based 'symbioses' as a low-input, yet effective and highly productive sustainable agricultural system is promoted. The stakes have never been higher, but so too the impending rewards.

Acknowledgements:

The complete referenced text is available from the author at mrl@sun.ac.za

African Journal of Range & Forage Science Special Issue

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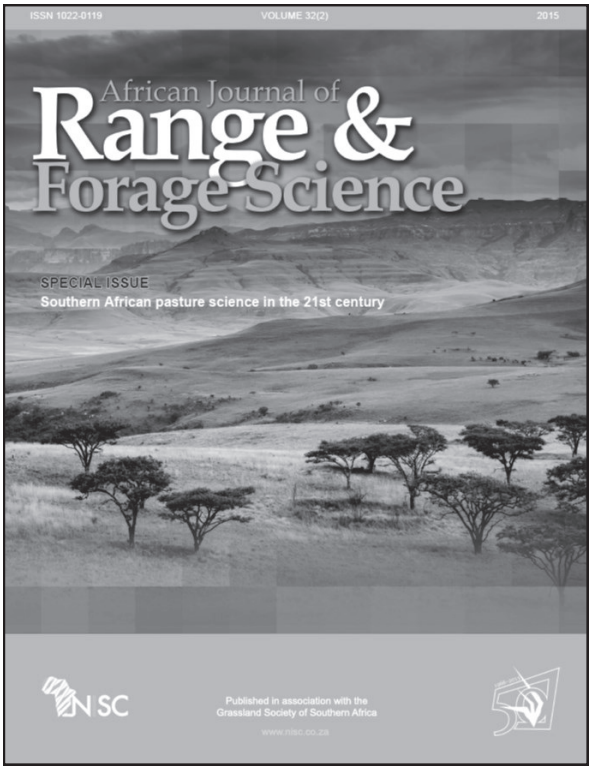
With the estimation of the world's population reaching nine billion people by 2015 challenges for agriculture have come to the fore with more food needing to be produced from smaller areas in ways that promote sustainability, both socially and environmentally. With the decline of areas available to produce agricultural products due to degradation, increased population pressures and urbanization, agriculturalists note these problems to threaten cultivated pastures or improved rangelands in Southern Africa, which contribute significantly to food security in this region.

The aim of this special issue, titled, Southern African Pasture Science in the 21st Century is to introduce past and current research on pastures in Southern Africa, to highlight the research priorities in pasture science and to provide an agenda for future research in this discipline. Approximately 151 million hectares of the Southern Africa's agricultural area is covered by permanent meadows and pastures. Although the majority of this area is natural grasslands and not managed to arrest successional processes, certain areas with lower agricultural potential have been intensified to improve pasture production for grazing animals, or to harvest forage. Research and development of technologies that either increase, sustain, or avoid losses of productivity is imperative to increase the efficiency of production from pastures and, at the same time, ensure environmental sustainability. Research on cultivated pastures is scarce or outdated despite the need to improve production from these areas.

The lead review paper of this special issue highlights the historical changes in research priorities relating to cultivated pastures from the early 1900's and addresses key future research priorities in southern African pastures (Truter et al. 2015). This paper titled, 'Southern African Pasture and Forage Science entering

the 21st Century: Past to Present' is freely available until the end of July along with another review paper entitled 'Managing cultivated pastures for improving soil quality in South Africa: Challenges and opportunities,' Read more of Doctor Swanepoel's Editorial of this special issue, on which this news article is based, here.

The special issue was officially launched at the 50th Congress of the GSSA, hosted at the Royal Agricultural Showgrounds, Pietermaritzburg from 19 to 23 July 2015. The research presented in this special issue will contribute towards a better understanding of potential to improve the productivity and efficiency of cultivated pastures in southern Africa.



Southern African pasture and forage science entering the 21st century: past to present

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South African Pasture and Forage Science has seen many changes over the years with regards to research priorities. The history of this science has created a steady foundation for the further growth and development of this discipline in the 21st Century. To make advances in this science; it is recommended that scientists revisit the past, as this will provide valuable insight and perspective. With over a 180 publications cited, this review has emphasised the important findings of such research, the thoughts of the past which can possibly minimise the risk of imitation, duplication and complication of future research. The majority of publications referred to in this review are from the Proceedings of the Annual Congresses of the Grassland Society of Southern Africa, Journal of the Grassland Society and African Journal of Range and Forage Science for the period 1965-2014. In the past 50 years, a wealth of knowledge has been generated on the function and value of our indigenous grass ". and legume species, especially in our diverse environmental conditions. This review paper has identified eighteen important research and development needs, of which pasture and forage breeding, pasture nutrition, water use and requirements, integrated animal production systems, the value of sub-tropical and tropical forage legumes and drought tolerant forage species are discussed in more detail. The latter research and development needs are interrelated to one another and are regarded as key principles for the further development of pasture and forage science, in changing environmental conditions in Southern Africa. It is conclusive to say that the 21st Century will embrace many new avenues in the development of Pasture and Forage Science in Southern Africa. This is all possible if we remember the words of Confucius, that once said, "There are three methods we learn wisdom; firstly by reflection which is the noblest; secondly by imitation which is the easiest; and thirdly by experience which is the bitterest

Managing cultivated pastures for improving soil quality in South Africa: challenges and opportunities

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Human interference by improving and managing natural systems (such as intensive cultivated pastures) may be beneficial in terms of increased agricultural output from a smaller area. This is ultimately important to increase food supply to be able to sustain global human population growth.

However, management of such intensive systems should be sustainable. Lowered soil quality through time leads to attrition of productive land for agricultural use. This may become a serious problem, especially for intensive cultivated pasture production in South Africa. Soil degradation as a result of mismanagement is a concerning issue. Examples of mismanagement include practising continuous tillage, improper grazing management, injudicious application of fertilisers and poor irrigation management.

It is proposed that soil quality (physical, chemical and biological properties of soil) should be used to monitor sustainability and protect soil in the long run. The aim of this review paper is to provide a synthesis of the challenges and opportunities in soil management of cultivated pastures. The value of measuring soil chemical, physical and biological parameters, rather than merely determining soil fertility status, is stressed.

Moving toward multi-herbivore species (MHS) in cultivated pastures

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Demand for animal products is growing faster than for any other agricultural product. As a result, pressure for greater output from cultivated pastures is expected. Assuming pasture area will decrease with land degradation, conversion to grain crops or urban expansion, the only alternative is to increase productivity per area. Replacing current one- or two-herbivore (usually cattle, sheep or goats) pasture systems with multiple-herbivore species (MHS) may be one approach to meeting demand. This becomes feasible only as cultivated pastures increase in biodiversity and canopy complexity. With diverse plants in our pastures, we can support equally diverse herbivores varying in vegetation preference (browsers vs grazers), metabolic rate, anatomy or habitat niche. Surprisingly little research has evaluated MHS on cultivated pasture so we must depend on rangeland or wildlife experiences for insights. Those natural pastures predict that if we introduce sequential or simultaneous MHS into cultivated pastures, this should result in greater productivity, diversity and resilience of plant as well as animal populations. The challenge is to encourage researchers, consultants and, above all, land managers to consider converting single-plant species pastures designed for a single herbivore toward MHS that require far more intricate science and management. Cultivated pasture scientists and managers in Africa may find it easier than the rest of the world to take this approach because this continent's natural ecosystems provide prime examples of how diverse vegetation populated with MHS increase carrying capacity. It behooves us to apply this experience to our own cultivated pastures as well as to those in the rest of the world.

A critical view on the soil fertility status of minimum-till kikuyu–ryegrass pastures in South Africa

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Cultivated pastures improve animal production systems and contribute, amongst others to food security. Initially, annual pastures were established by conventional tillage methods, but from the 1990s permanent pastures were established on a minimum-tillage regime. Lime and fertiliser guidelines, which were developed for annual pastures established by conventional tillage methods, were followed on minimum tillage systems, despite changes in the soil physical properties and stratification of biological parameters. Fertiliser management strategies and guidelines for minimum-till kikuyu-ryegrass pasture were assessed in a survey throughout the southern Cape region. From this survey, the importance of soil microorganisms to secrete enzymes to make soil nutrients available for plants was clearly observed. When considering mean soil fertility levels, which did not infer any information on specific pastures, all essential plant nutrients were within the requirements of kikuyu-ryegrass pasture, but from an environmental sustainability perspective, phosphorus and zinc levels were too high. The P concentration was 16 to 23 times higher in the 0–100 mm layer of the cultivated pasture than in virgin soil and Zn concentration between 26 and 53 times higher, depending on the district. Such high concentrations could cause deleterious effects on ecosystem health or sustainability of pasture production. This could be as a consequence of irresponsible sales-driven fertiliser advice to farmers, or the continued adherence to lime and fertiliser guidelines that were originally developed for conventionally tilled pasture systems. It is important to follow fertiliser management strategies strictly for a specific tillage systems for specific pasture crops. Chemical quality of soil can only be managed when taking soil samples at least every second year. Liming and fertilisation should also be managed strictly according to the guidelines for the specific crop. Beware of over-fertilisation – it is unnecessary and detrimental for environmental sustainability.

The seasonal dry matter production, botanical composition and forage quality of kikuyu over-sown with annual or perennial ryegrass

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Kikuyu (*Pennisetum clandestinum*) is a well-adapted, persistent pasture base that can support high stocking rates due to high pasture growth rates during summer and autumn. However, low winter and spring growth rates and low forage quality restrict milk production per cow. As result, kikuyu is strategically over-sown with ryegrass (*Lolium* spp.) to improve seasonal dry matter (DM) production and nutritive value. The aim of this study was to determine the yield and nutritional value of irrigated kikuyu over-sown with perennial (*L. perenne*), Italian (*L. multiflorum* var. *italicum*) or Westerwolds (*L. multiflorum* var. *westerwoldicum*) ryegrass. The three pasture systems reached optimum growth during different months and seasons. Winter growth rates were low compared to other seasons. Peak growth rates occurred during spring for the Italian ryegrass-kikuyu pasture, summer for the Westerwolds ryegrass-kikuyu pasture and late spring and early summer for perennial ryegrass-kikuyu pasture. The lower growth rate of the Westerwolds ryegrass during spring, compared to the Italian ryegrass, resulted in a higher kikuyu component during spring, summer and autumn. The high growth rate of Italian ryegrass during spring impacted negatively on the summer DM production due to the delayed commencement of kikuyu growth during spring and resultant lower kikuyu density in summer. The three pasture systems had similar total annual DM production during year 1, but total annual DM production was higher for perennial ryegrass-kikuyu pasture during year 2.

This was attributed to the ability of the perennial ryegrass-kikuyu treatment to maintain DM production during periods when other treatments underwent a decrease in production, namely spring for Westerwolds ryegrass-kikuyu and summer for Italian ryegrass-kikuyu. As kikuyu density increased in kikuyu-ryegrass pastures from winter to summer, the DM and NDF content increased, while the ME content decreased. As a pasture for high producing dairy cows, all pastures were deficient in Ca during all seasons and in P during summer and autumn.

Grazing capacity, milk production and milk composition of kikuyu over-sown with annual or perennial ryegrass

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Kikuyu (*Pennisetum clandestinum*) is a highly productive pasture species that supports high stocking rates and milk production per ha, but production per cow is low due to low nutritive value. The aim of this study was to determine the grazing capacity, milk production and milk composition of dairy cows grazing irrigated kikuyu over-sown with Italian (*Lolium multiflorum* var. *italicum*), Westerwolds (*L. multiflorum* var. *westerwoldicum*) or perennial ryegrass (*L. perenne*) during autumn.

The grazing capacity of the kikuyu-ryegrass systems was lower during winter and autumn than during spring and summer, with the seasonal grazing capacity of the perennial ryegrass treatment more evenly distributed than that of the Italian and Westerwolds ryegrass treatments. The perennial ryegrass treatment had a lower butterfat and milk production per lactation than the Italian and Westerwolds ryegrass treatments, but had the highest milk solids and fat corrected milk production per ha. The latter was a result of the higher annual grazing capacity achieved by the perennial ryegrass treatment.

It was concluded that because kikuyu over-sown with perennial ryegrass supported a higher number of animals and had a more evenly distributed fodder-flow, it achieved higher animal production per ha than kikuyu over-sown with annual ryegrass varieties.

Production potential of Italian and westerwolds ryegrass established at different planting dates

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Fodder flow planning is essential for dairy pasture systems, because the successful implementation thereof allows fodder to be available throughout the year. Italian and Westerwolds ryegrass (*Lolium multiflorum* var. *italicum* and *westerwoldicum*, respectively) are temperate annuals often planted in the southern Cape region of South Africa. The monthly production potential of these grasses can be manipulated by planting date. The aim of this study was to determine the pasture production potential of Italian and Westerwolds ryegrasses planted at different planting dates in the southern Cape. Planting date influenced the production potential of both Italian and Westerwolds ryegrasses. Italian ryegrass planted between December and June, is more productive than Westerwolds ryegrasses planted during the same period. If the requirement of a fodder flow programme is to provide fodder from May until November, which includes the critical winter months (June, July and August), Italian ryegrass is a better option than Westerwolds ryegrass and should be planted during February or March. If the aim is to have high production in spring and early summer (September to December), Italian ryegrass should be planted during May or June. Regardless of the variety, annual ryegrass should not be planted later than June. This will result in short productive periods (three to four months) and the annual production will be low. When ryegrass is established in pure swards, Italian ryegrass is a better option than Westerwolds ryegrass based on growth rate and annual production. The results highlight the importance of developing pasture management guidelines for specific regions based on research and clear set criteria.

In Memorium
Dr Dieter Reusch

Dieter Reusch was born to Pastor Willie Reusch and his wife Agnes nee Dieterich in Glencoe, Northern Natal on the 14th of September 1929. He had 2 older brothers, Werner and Martin. He was christened and confirmed by his father at the Lutheran church in Uelzen. As a young child he was already helpful delivering church notices, sometimes by bicycle, to the farmers. From being a mischievous young boy at Uelzen Primary, he matriculated at Dundee High School. He then studied at the University of Natal, Pietermaritzburg, where he qualified Cum Laude with a BSc Degree in Genetics and Plant Breeding. In 1953 he was awarded a Scholarship to study at Aberystwyth University in Wales. He travelled there by ship. In Wales he attained his Doctorate in Plant Breeding in 1956. After working in Cedara for a few years, he spent five years as a maize breeder in Lichtenburg in the Northern Transvaal. He was then appointed as Senior Lecturer and Researcher in Agricultural Genetics at the then University of Natal in Pietermaritzburg. He was a popular Lecturer, though also known for his strict discipline. Barefooted and noisy students would be sent out. He was ambidextrous - he would use his left hand to write on the left side of the blackboard, and then continue the notes on the right with his right hand. He could spin around and accurately target a disruptive student with a piece of chalk. Following his retirement in 1990, he consulted at Cedara, and became involved in the breeding and development of new varieties of foraging grasses, some of which were named after his grandchildren. At Cedara he also mentored and inspired young researchers. These proved to be some of his happiest working years. Dieter married his childhood sweetheart, Rosemarie Schroeder in 1957. The marriage was blessed with three daughters, Karin, Ingrid and Gisela. He was a devoted husband and father. He was also particularly proud of his four grandsons Gareth, Matthew, Daniel and Luke, and also of his two granddaughters Alex and Jenna. Even beyond work, Dieter was a man of the earth. He loved gardening and planting. He nurtured his children with the vegetables and fruits from his garden in Scottsville. In place of insects fertilizing the delicious pawpaws, he personally brushed on the pollen at night. When Dieter and Rosel moved to Montrose, he planted up a semiforest of indigenous trees in front of the complex, creating a beautiful park, for which he was recognised with a conservancy award. Every week he physically mowed the grass of the steep hectare-sized park, until he had a stroke at the age of 82. He loved the birds, which his plants attracted. The undulating flight of the Drongo birds, which he'd trained to catch morsels of cheese in midflight, was a delight to watch. Woodwork was his passion and the homes of his children were filled with the beautiful furniture and mirrors he made. He generously loved to give these to friends and family. He made painting easels and miniature ovens for his grandchildren. Dieter had a great sense of humour, and was full of fun. He enjoyed his beers and braais.

The fresh fish he caught and fried for breakfasts were delicious. Family music evenings became more festive when he accompanied songs on his mouth organ – a favourite being Muss i denn muss i denn zum Staedele hinaus ….. He was a friend to those in need. Dieter loved the congregation and community at large and found much joy in helping others who were in need and was a committed man of God. He served the Kirchdorf and Pietermaritzburg Church communities as an Elder for many years. He and Rosemary regularly visited the sick and needy. His daughters were sometimes amused and impressed about how heartily he would sing the hymns. With pride and joy he helped design and build a Church Altar, and planted the white roses along the path in the gardens.

Dieter was ready to meet his Maker. Significantly, he died on the eve of his 58th wedding anniversary on the 28th of May 2015. All these years Dieter and Rosemary had supported each other in sickness and in health. On the previous Sunday, when the Carers at Amberfield Frail Care carried him to the front, to hear the uplifting songs of this Church's Choir, Dieter asked Rosemarie in sincere belief, "Am I in Heaven?"

The family would like to sincerely thank the congregation, friends and the Amberfield carers for the all the care and support that Dieter and Rosemarie received.

Compiled by: Gisela Rushmere

In Memorium
Roddy Ward

Roddy Ward – Nxatshane - Bayete Baba, Bayete

Roddy Ward, a much loved and respected lecturer, colleague and friend to many, passed away in the early hours of Sunday morning 5th July 2015. At 88, he was possibly the oldest practicing ecologist in South Africa....having started officially with the then NPB in 1953! Despite having an ankle problem, he was still busy making plans to go down the Transkei coast with Keith Cooper, to look at some shifting dunes at the end of this month. The late Ian Player, with whom Roddy worked with amongst the other great Game Rangers of the 1953-1963 era considered him "the finest plant ecologist in Africa". Many people working in the fields of ecology, botany, conservation and other branches of the natural sciences will have fond memories of Roddy.

His incredible knowledge of plants, plant succession, ecology, his remarkable memory, amazing observation skills and attention to detail and above all his willingness and enthusiasm for sharing all he knew with anybody who was interested or came to ask his opinion. Roddy was a member of the Natal Parks Board from 1953 to 1963 and was the first ecologist employed by the Board. He formed close friendships with many of the game rangers and would accompany them on patrols collecting samples and taking photographs. His account of attending a Board meeting and telling them that they would have to "remove" animals because the vegetation would not sustain them is amusing. He was asked to leave the room whilst they discussed the options and on his return was asked if he actually meant shooting animals with a gun....to which he replied in the affirmative much to the contrary of the preservation principles of the time.

Prior to his NPB days, Roddy was botany lecturer at the Durban Tech – an occupation he returned to in 1963 when he joined the University based on Salisbury Island that subsequently moved to become the University of Durban Westville – position he held for some twenty five years. He was a perfectionist when it came to writing and thus his publications were not that numerous – in fact his MSc on the Isipingo area – which earned him the Captain Scott Medal - took twenty-two years to complete! His other credits and tributes during his life aside, we are remembering him as a colleague and friend, a perfect gentleman and one of a kind - always with a twinkle in his eye and kindly disposed.
Roddy was a member of the KZN branch of IAIAsa (International Association for Impact Assessment) and when attending functions, and when attending functions would sit quietly, reflecting, unless he was asked his opinion. Rod Bulman on one occasion made the remark that somebody like Roddy was a "living treasure"!

*Game Rangers Association of Africa www.gameranger.org/

In the recent past Roddy received several medals and awards. One that meant a great deal to him was being made an Honorary Life Member of the Game Rangers Association of Africa at the AGM at Cape Vidal in 2012. His certificate was an enormous sense of pride to him – displayed in the lounge and will be well cared for by his surviving son. Go well Roddy – Bayete! We like to imagine you are now in a place free from alien and invasive plants and know you will still discover things new and unseen by others to enthuse about with those interested. Hamba kahle! We will miss you.

Roddy Ward (left) with his friend Frank Farquharson.
(Photo by courtesy of Jim Feely)