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## Citizens Needed to Help with Data Collection

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**Members of the public have the chance to contribute to scientific research by taking photographs of landscapes that were photographed decades ago.**

For years, Timm Hoffman and his team at the University of Cape Town's Plant Conservation Unit have been collecting thousands of old landscape photographs from South Africa and Namibia, some dating back to the mid-nineteenth century. They have managed to relocate and rephotograph a small percentage of the photos, giving us some fascinating insights into how landscapes have changed over the past decades, and allowing us to better understand how fire, grazing, human activities and climate change affect vegetation. The task is enormous and now they are enlisting the help of the public through a citizen science initiative called rePhotoSA <http://rephotosa.adu.org.za/>

Anyone can join and contribute to improving our understanding of how the vegetation in our beautiful country changes over time. Some of the comparisons are eye-opening. What you might consider to be natural today looked completely different fifty or a hundred years ago. Timm and other scientists can use your photos to understand why. The rePhotoSA website gives clear guidelines on how you can participate, and how to use your knowledge of an area as well as Google Earth to track down the locations of decades-old photos.



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## Cropping Africa's Wet Savannas Would Bring High Environmental Costs

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**With the global population rising, analysts and policy-makers have targeted Africa's vast wet savannas as a place to produce staple foods and bioenergy groups at low environmental costs. But a new report finds that converting Africa's wet savannas into farmland would come at a high environmental cost and, in some cases, fail to meet existing standards for renewable fuels.**

**W**ith the global population rising, analysts and policymakers have targeted Africa's vast wet savannas as a place to produce staple foods and bioenergy groups at low environmental costs. But a new report published in the journal *Nature Climate Change* finds that converting Africa's wet savannas into farmland would come at a high environmental cost and, in some cases, fail to meet existing standards for renewable fuels.

Led by researchers from Princeton University's Woodrow Wilson School of Public and International Affairs and Department of Ecology and Evolutionary Biology, the study finds that only a small percentage of Africa's wet savannas (2-11 percent) have the potential to produce staple crops while emitting significantly less carbon dioxide than the world's average cropland. In addition, taking land conversion into account, less than

1 percent of these lands would produce biofuels that meet European standards for greenhouse-gas reductions. "Many papers and policymakers have simply assumed that Africa's wetter savannas are expendable from an environmental standpoint because they aren't forests," said co-lead author Tim Searchinger, a research scholar at Princeton's Program in Science, Technology and Environmental Policy (STEP), which is based at the Woodrow Wilson School. "Governments have used this assumption to justify large leases of such lands to produce food for the outside world and large global targets for bioenergy. But when you actually analyze the realistic potential to produce food or bioenergy relative to the losses of carbon and animal biodiversity, the lands turn out not to be low cost."

Even if these lands are converted for agricultural use, the only way Africa

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could become an exporter of crops is by depriving its own people of food, the researchers report. Farming a large expansion of Africa's savannas - nearly half of the world's remaining savannas - would also have negative impacts on the rich and diverse population of tropical birds and mammals.

The results highlight the need for policies that influence where and to what extent cropland expansion occurs. Likewise, any new cropland that is created for growing staple foods should be prioritized to meet Africa's growing food demands, the researchers report. "Our paper does not merely analyze the climate costs of different lands, but does so relative to their potential food benefits," said co-lead author Lyndon Estes, associate research scholar at Princeton's Wilson School and STEP. "Because of Africa's rapidly increasing needs for more food, and the high environmental costs of agriculture, it is important to perform this analysis on a more detailed level in each country to determine which lands would produce the most crops for the least environmental cost."

### Studying the Guinea Savanna

Using a map from the World Bank, the researchers examined the "Guinea Savanna," a region in Africa that includes a wide range of savannas, shrublands and woodlands. Given the area's relatively high rainfall, the region has good potential for growing crops, especially maize and soybeans, which the World Bank cites as the optimal staple crops to grow in sub-Saharan Africa.

The researchers examined the potential environmental impacts versus the benefits of growing maize and soybeans. Using a variety of existing global datasets and simulation methods, they found that, on average, current global maize croplands emitted 20 tons of carbon for each ton of crop grown annually. For soybeans, it's 44 tons for each ton grown. This means that only 2 percent of lands in the Guinea Savanna could be considered high-benefit/low-carbon-cost maize farmland, while between 9.5 and 11 percent would qualify for soybeans.

According to past studies, the Guinea Savanna could also serve as a large potential source of land for low-carbon biofuels. But those studies don't take into account the costs of carbon released by land conversion, what the researchers call "carbon payback time." This is the number of years it takes for greenhouse gas savings to justify the initial cost of releasing carbon through land conversion. Factoring in this land-use change, the researchers find that it would take more than 50 years to recover from converting half of the Guinea Savanna's wet savannas into cropland. This doesn't meet the European Union 2017 standard -- that biofuels must produce 50 percent less greenhouse gas than gasoline over 20 years. They also find that less than 1 percent of the land would be recovered in less than 10 years.

Even if Africa's wet savannas could provide some staple crops at low environmental costs, sub-Saharan Africa can only become an exporter of crops by stripping its own people of food.

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Africa's population is expected to double by 2050 and so, for sub-Saharan Africa to become self-sufficient in food production, the amount of crop calories would need to grow 4.7 times the 2007 levels, the researchers report. This means that Africa would need to expand its cropland by 345 million acres (140 million hectares), releasing 33 billion tons of carbon dioxide. This is the same amount released globally in 2013.

"Because of Africa's rapidly increasing needs for more food, and the high environmental costs of agriculture, it is important to perform this analysis on a more detailed level in each country to determine which lands would produce the most crops for the least environmental cost," Estes said. In terms of biodiversity, agricultural conversion nearly always has large impacts. In the Guinea Savanna, there is a high diversity of animals that are distinct compared to other continents. In addition to this richness, the Guinea Savanna supports some of the last large mammal migrations and provides key habitat and freshwater flows to critical biodiversity areas such as the Okavango Delta, which is located outside of the region. Because many of the factors related to the biodiversity costs of agricultural conversion are unknown, researchers did not make a calculation.

"What we show is that for a few key taxa - birds and mammals in particular the Guinea Savanna is almost as biodiverse as the world's wet tropical forests, and has a species richness as great as all of Africa's protected areas outside the Guinea Savanna," said Dan

Rubenstein, a professor in the Department of Ecology and Evolutionary Biology and director of the Program in African Studies. "Transforming this habitat into cultivated landscapes not only will release high levels of previously stored carbon, it will also engender high costs in terms of lost species, some of which are seriously endangered and unique to the Guinea Savanna."

### Considerations for Expanding Cropland

Overall, the findings seem to suggest that it is important to limit cropland expansion, but that is not what the researchers stress. Instead, they point toward creating policies that influence where cropland expansion occurs. With such a rapidly growing global population, particularly in Africa, where agriculture is the primary livelihood, creating additional farmland is inevitable and necessary. But undertaking more finely-tuned analyses - with even more precise data than what these researchers used here - can help to better target specific regions ripe for less environmentally costly conversion.

"One basic lesson is that Africa's wet savannas deserve more environmental respect than they get," said Phil Thornton, a co-author and senior researcher with the CGIAR Research Program on Climate Change, Agriculture and Food Security.

## Great Gains for Conservation of SA's Grasslands and Wetlands

WWF South Africa

A major milestone for the conservation of South Africa's grasslands and wetlands was reached on 22 January 2014 when the MEC for Economic Development, Environment and Tourism, Ms Pinky Phosa, declared five new protected areas in Mpumalanga. South Africa's grasslands are poorly represented in formal protected areas and this declaration will now add over 73 000 hectares of important grassland habitat to the network of protected areas within the province. The new protected areas are:

- The Chrissiesmeer Protected Environment (60203 hectares);
- The Kwamandlangampisi Protected Environment, near Wakkerstroom which is extended by 3 094 hectares;
- The Mabola Protected Environment (8772 hectares), also near Wakkerstroom; the Tafelkop Nature Reserve (1 208 hectares);
- The first community-owned protected environment in Mpumalanga, known as the Mndawe Trust Protected Environment (826 hectares), near Lydenburg.

Our grasslands are of vital cultural and natural importance. Read about them at [wwf.org.za/grasslands](http://wwf.org.za/grasslands)



Grassroots

May 2015

*African*  
Journal of Range  
and Forage  
Science

Publishing  
Relevant, High Quality  
Research

 **GRASSLAND SOCIETY OF SOUTHERN AFRICA**  
[www.grassland.org.za](http://www.grassland.org.za)

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## Supporting Future Earth with Global Geo-information

Jun Chen  
ISPRS President

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**F**uture Earth is a newly launched 10-year research program by the International Council of Science (ICSU). The major goal of the Future Earth program is to deliver, at global and regional scales, the knowledge that societies need to effectively address global change while meeting economic and social goals, by answering the most pressing questions in the context of securing human development in an era of rapidly escalating global environmental risks. *The Dynamic Planet, Global Development and Transformations towards Sustainability* are the three key research themes of Future Earth. Since its official launch in 2012, Future Earth has received strong support from international communities and is becoming a global research platform.

The implementation and success of the Future Earth program depends critically on the availability and utilization of geo-information at multiple scales. Nowadays, people are producing/generating more and more geo-data sets at both local and global scales with earth observation, web-sensors, crowd-sourcing and other technologies. Landsat data is the most well-known image data which has been widely used by international communities. GlobeLand30 is the first open access 30m global land cover dataset with 10 classes for the years 2000 and 2010

([www.globeland30.org](http://www.globeland30.org)) However, a better understanding and sustainable development of our planet has asked us to provide more detailed and up-date geo-information about the Earth and its environment and other physical objects and processes. For examples, GEO (Group on Earth Observation) has identified a group of critical variables to be derived for the nine Societal Benefit Areas (SBAs). The bio-diversity people have also defined a set of Essential Biodiversity Variables (EBVs) and some of them can only be obtained with the help of remote sensing and GIS technology. It is becoming a huge challenge for us to provide the right geo-information, in the right place, at the right time, and the right people for making appropriate decisions at both local and global scale.

With the dramatic increasing of the geo-data volumes, we are entering a data-intensive world or an era of so-called big data. People wish to share all data resources distributed across regions or have an easy access to the massive quantities of data. This can be facilitated by setting up a web-based spatial information platform for easier access to diverse and distributed data. Effective analysis tools are requested to derive meaningful knowledge from these large data sets. With the recent development of Model Web, it would be possible to find

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The desired algorithms and models from the internet catalogues, and re-use them using a combination of complex workflows and an execution over a distributed architecture. In addition, advanced visualization, animation and interaction tools are also needed to enhance the understanding of the massive and dynamic datasets. Supporting Future Earth with reliable global geo-information provides our geo-spatial professionals a good opportunity for advancing photogrammetry, remote sensing and geo-spatial sciences, for promoting spatially enabled government and societies, and facilitating easier access to geo-spatial education. However, a number of key issues remain to be examined, such as the user requirements, the major challenges and key gaps, and cross-boundary collaboration. ISPRS plans to organize an international workshop on this subject

(<http://ngcc.sbsm.gov.cn/article/en/GLC2015/>) from 9-10 June, 2015, in Beijing, jointly with other sister organizations. This workshop will present the latest development of global spatial data production and sharing, exchange successful application experiences of global geo-information, examine up-to-date user requirements and key gaps, and identify major challenges. It aims at promoting the multi-disciplinary collaboration towards providing reliable global geo-information to support Future Earth. A special issue has also been planned in International Journal of Digital Earth (IJDE) and will be published at the beginning of 2016 as the output of this workshop. You are welcome to join us and to support Future Earth!

“It is becoming a  
huge challenge for us to provide the  
right geo-information, in the right place,  
at the right time, and the right people  
for making appropriate decisions at both  
local and global scale.”



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## National Veld Forest Fire Amendment Draft Bill, 2015

Agriculture, Forestry and Fisheries

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**The Department of Agriculture, Forestry and Fisheries  
invites you to comment on the National Veld Forest Fire  
Amendment Draft Bill.**



agriculture,  
forestry & fisheries

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

**T**he Bill seeks to amend the National Veld and Forest Fire Act, 1998, so as to:

- Amend and insert certain definitions;
- Provide for the facilitation of the formation of fire protection associations by a municipality or a traditional council;
- Compel a municipality, state owned enterprise, public entity or other organ of state which owns land to join the fire protection associations;
- Empower the Minister to develop a framework for monitoring, evaluation, assessment and reporting in respect of veld and forest fire management;
- Amend the title of the Act to National Veldfire Act;
- Amend the short title and substitute the long title.

More information of the gazette is  
available online at [www.gpwonline.co.za](http://www.gpwonline.co.za)





## Launch of the Green Technologies in South Africa Report

ASSAF

The report on The State of Green Technologies in South Africa was formally launched and handed over to the Department of Science and Technology (DST) on 28 January 2015 at the Hyatt Regency in Rosebank, Johannesburg.

Prof Eugene Cloete from Stellenbosch University and chairman of the panel that conducted the study presented on the findings and recommendations of the study. The event was attended by stakeholders in the private and public sectors, amongst whom were Dr Thomas Auf der Hyde and Mr Imraan Patel, both Deputy Directors-General of the Department of Science and Technology (DST) who commissioned the study.

Subsequent to the launch, the DST and ASSAF have embarked on a plan to ensure broad-scale dissemination and exposure of the report, with the goal to impact the highest levels of policymaking.

The study presents the following recommendations:

- Ensure that policies are enabling and regularly review policies to allow for learning
- Prioritise niche areas for local development of green technologies based on existing innovation capacity
- Government should look to shaping the market
- Strengthen the NSI to ensure coherency between role players and skills development
- Target communication strategies to promote uptake of green technologies by the public and plan for the export market, particularly within Africa
- The country's development needs should inform and direct but not prescribe green technology investments
- Conduct a follow-up study to identify a set of indicators for the M&E framework for green technology uptake in South Africa
- Sub-national considerations at developing green technologies hubs
- Systematic reviews of projects, particularly failed or discontinued projects, so that learning can be enhanced.



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## 2016 IRC Second Announcement

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**You are invited to attend the X<sup>th</sup>  
International Rangeland Congress in  
Saskatoon, Saskatchewan, Canada July 17-22, 2016  
*The Future Management of Grazing and Wild  
Lands in a High Tech World*  
CALL FOR PAPERS**

**W**e invite you to present a paper - oral or poster presentation - featuring your research on range/grassland related to one of the topics listed below. If you are a rancher, grass farmer, extension agrologist, range manager, land reclamation specialist, parks or wild lands supervisor, modeller, remote sensing specialist or a person interested in the management of the world's grazing and wild lands you are also invited to make an oral or poster presentation involving your work or operation. Below is a list of the topic categories that you can present in.

### **1. State of Global and Canadian Rangeland and Pasture Resources**

Eco site descriptions, Historical developments, Conservation, Grazing management, Genetic resources and forage development.

### **2. Ecological Goods and Services of Rangeland and Pasturelands**

Nutritional links from soil to plant to livestock to people, Carbon sequestration, Water supply and quality, Wildlife

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habitat , Aesthetic and spiritual value of wild lands.

### **3. The People of the Grasslands**

Changes to pastoral systems, Private and leased, Urban and sub-urban grassland societies, Professional extension and technology-transfer, Social justice issues in rangelands.

### **4. Multiple use of the Rangelands Resource Extraction Impacts in Asia and North America**

Energy development and reclamation, Fire management and restoration, Revegetation with perennial forages, Invasive species impacts, Wild land conflicts in tourism.

### **5. Range and Forage of High Latitudes and Altitudes including Arctic and Sub Arctic North America and Europe, Ande An/Patagonian or Tibetan Plateau**

### **4. Climate Change in Rangeland**

Climate change impact on Plant, Livestock and grazing system, Water supply

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and quality, Historic & cultural response, Modeling future human and climate change response.

### **7. Grazing Land Assessment and Management in a High-tech World**

New Technology in: Remote sensing for land resource data acquisition and modeling, Social and psychological data, Animal movement data, Education and extension, new developments in fencing, water supply, and livestock health.

#### **Rancher/Stockman/Cattlemen/ Herdsman Forum**

Management of grazing lands has changed over time as knowledge of grassland systems increase and new challenges, opportunities, innovations, and technologies emerge. This Forum will include presentations from ranchers and grassland farmers on the Canadian prairies as well as from ranchers, stockmen, and grass farmers in other regions of the world.

### **Tours**

There will be two 4 day pre-congress tours in Saskatchewan visiting rangeland projects, ranches and farms. The 7 day pre-congress tour will visit the rangelands and ranches of southern Saskatchewan and Alberta in Western Canada including the Rocky Mountains. In addition, several local full day tours, mid-week (Wednesday) during the Congress will visit research facilities, farms, cattle ranches, historical and cultural sites. There will also be programs for accompanying persons.

For detailed information and if you would like to continue to receive email updates about IRC 2016, please go to our website: [www.irc2016canada.ca](http://www.irc2016canada.ca) and sign up.

We hope to see you in Saskatoon in July 2016!

