



## FROM THE DG'S DESK

It is with pleasure that we produce the second edition of our bi-monthly newsletter.

In this issue, we cover some of the milestones that we have hit this season. Of particular interest would be the “coming of age” of our Land Potential knowledge system (LandPKS), hosted under Servir project at the Regional Centre for Mapping of Resources for Development (RCMRD) and funded by the US Department of Agriculture-Agricultural Research Services (USDA-ARS) and USAID. The LandPKS team has developed a cloud-based, land-potential knowledge system powered by geospatial datasets that allows the potential of land to be defined explicitly and dynamically for unique and constantly changing soil and climate conditions. A very exciting project indeed!

We have also hosted a lot of capacity building sessions at the Centre, seeing a good portion of them focus on teams within the Centre. More of the courses offering for the remainder of the year can be found on our website [www.rcmrd.org](http://www.rcmrd.org).

Kindly mention it as a source of information in your correspondence. There are also various web-links for accessing more information from our website ([www.rcmrd.org](http://www.rcmrd.org)) or other sources.

**I Wish You a Happy Reading**

## LAND POTENTIAL KNOWLEDGE

As the threat of food shortages and hunger loom over families in many areas in Africa, there is need to increase the productivity of Africa's agricultural systems to alleviate over-reliance on food aid. The Land Potential knowledge system (LandPKS), hosted under Servir project at the Regional Centre for Mapping of Resources for Development (RCMRD) and funded by the US Department of Agriculture-Agricultural Research Services (USDA-ARS) and USAID, provides a solution to this crisis.

Agricultural growth is more important for Africa than for any other continent. About 70 percent of people in Africa and roughly 80 percent of the continent's poor live in rural areas. These people depend on agriculture and non-farm rural enterprises for their livelihoods, and are increasingly unable to meet their basic food needs as population pressure on land grows, while land and water resources become scarce or degrade therefore agricultural productivity stagnates.

To solve the problem of food shortages, agricultural production must increase significantly to meet the needs of the rapidly growing population by either increasing crop yields in areas where there is farming, changing the crops to suit the changing climate or changing the use of the land to more suitable activities. The largest gains will occur in lands which are underutilized but have the potential for crop production or which currently have low crop yields. FAO estimates show that between 1995/7 and 2030 about 75 percent of the projected growth in crop



production in Sub-Saharan Africa will come from intensification in the form of yield increases (62 percent) and higher cropping intensities (13 percent), with the remaining 25 percent coming from arable land expansion.

The LandPKS team has developed a cloud-based, land-potential knowledge system powered by geospatial datasets that allows the potential of land to be defined explicitly and dynamically for unique and constantly changing soil and climate conditions. The land potential assessments will be updated based on new evidence regarding the success or failure of new management systems on different soils. The knowledge engine, together with mobile phone and cloud computing technologies, will also facilitate more rapid and complete integration and dissemination of

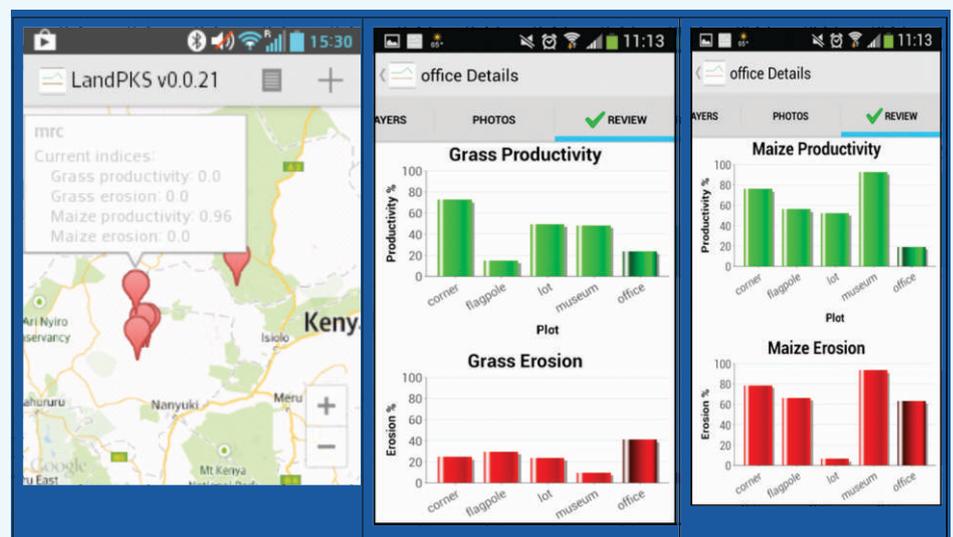
local and scientific knowledge about sustainable land management.

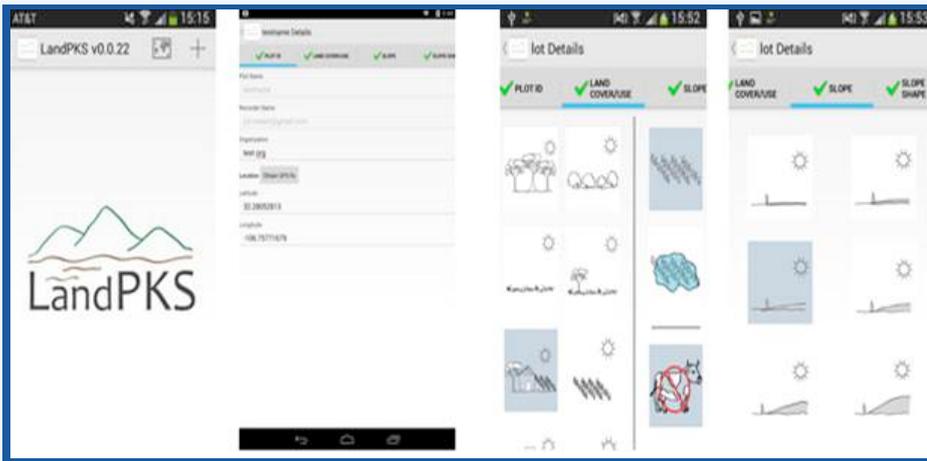
Land potential can be understood as the capacity of the land to support ecosystem services required to meet the needs of people without compromising the ability of future generations to meet their own needs or the capacity of land to support more specific land use objectives,

An understanding of the lands

potential and its ability to recover is an important aspect that allows determination of areas where land is not meeting its productive potential (for example low crop yields or fodder), where unrealistic expectations by land owners are driving unsustainable development investments which lead to further land degradation and where proposed plans to intensify land use may be detrimental and are likely to lead to irreversible degradation. LandPKS solves these problems by allowing farmers, development organizations, extension workers and national governments to share, access and apply the best available knowledge and information at field, regional, and national scales while increasing accessibility to knowledge and information on land.

To evaluate land potential, users will measure soil depth (up to 120 cm) and provide a simple description of surface and subsurface texture, land cover and use, and observations of slope,





slope shape and general soil conditions. A geo-tagged photograph of the excavated soil combined with an internal calibration reference will be used to determine soil color, while an oblique photograph will be used to confirm the land cover and use descriptions. The photographs and documentation will also serve as benchmarks for future monitoring. Users will have the opportunity to provide additional information through a tiered, iterative series of questions based on both their initial inputs and additional information (e.g. temperature, precipitation and elevation) which can be accessed using the GPS location provided by the mobile phone. Integration with additional information on local crops and management system, this information will be used to provide a set of site-specific management options, with an indication of potential production, degradation resistance and resilience across a range of additional inputs.

LandPKS can be used to assess the

potential of an agricultural land and suitability for crop production. This will take technology at the grassroots level and allow farmers to access information on their lands potential. This will help them make informed decisions on land use and management. It can also be used for vegetation monitoring programs in combination with the RHM tool (Rangeland Health Management) for assessing the productivity of a site for restoration purposes to enable channeling of resources in areas with higher productivity potential. LandPKS is currently being tested in the Northern Rangeland Trust Conservancies. Our Researcher David Kimiti is training grazing coordinators on the use for the

tool for site identification and tracking of rehabilitation projects.

Future developments will allow addition of other module and allow incorporation of local working practices from farmers while allowing for global interconnectivity of farmers in similar climatic conditions to enable them share working land use and management practices. Incorporation of local knowledge in the knowledge engine can also promote better decision making and formulation of policies that are actually effective at the ground. As at now, implementation is being done in pilot sites in northern Kenya and northern Namibia with further tests to be done in RCMRD member states after completion of the pilot phase.

How will LandPKS help determine land potential?

Initial outputs for the pilot version of LandPKS will provide the user with three data visualizations:

- Map that displays all plot assessments submitted by the user.



Images from left: LandPKS screenshot for soil texture by feel; Mzee Lesachore, N'gutuk N'giron Group Ranch, and Alex Lekaila, Northern Rangelands Trust grazing coordinator (Kenya) assessing soil texture; LandPKS screenshot with embedded tutorial.

- Chart displaying relative production indices based on user and global inputs and analytical modeling.
- Chart displaying relative degradation resistance indices based on user and global inputs and analytical modeling.

A basic version of LandPKS will be released in February 2015 to serve as a site characterization tool for use by land managers in north-central Kenya and northeastern Namibia. Design modifications are ongoing, and are implemented

based on user feedback from field crews. Currently, LandPKS provides users with an easy to follow monitoring process, involving 4 unique features: LandPKS Application for Android

**Feature 1:** The LandPKS Android application offers a simple user interface, graphical displays, and a logical work progression to allow individual users with no formal soil science training to assess soil characteristics at the point level.

**Feature 2:** Embedded tutorials will guide the user through soil texture evaluations, land cover

assessments, and photographing plot features.

**Feature 4:** User inputs are then uploaded to the cloud, integrated with global climate and soils databases, and run through predictive models to provide relative estimates of potential productivity and degradation risk. Graphical displays are delivered to the user's phone and formatted spreadsheets are delivered to user email addresses to allow for more detailed analysis. Uploaded data will also be available for open use via [www.landpotential.org](http://www.landpotential.org).

## WORKSHOP ON MODERN SURVEYING INSTRUMENTATION & PRACTICES OPENS AT RCMRD IN PARTNERSHIP WITH INSTITUTIONS OF SURVEYORS OF KENYA – LAND SURVEYORS CHAPTER

**A** Technical Workshop for Surveyors opened today at RCMRD to elucidate modern

surveying techniques and instrumentation. This initiative is part of Institutions of Surveyors of

Kenya – Land Surveyors Chapter bid for continuous development of its members.

## AFREF/GNSS COUNTRY TRAINING OPENS AT RCMRD

**T**he African Geodetic Reference Frame (AFREF) was conceived as a unified geodetic reference frame for Africa to be the fundamental basis for the national and regional three-dimensional

reference networks fully consistent and homogeneous with the International Terrestrial Reference Frame (ITRF).

As part of the initiative RCMRD hosted staff from National Mapping

Agencies of RCMRD Member States at a two week workshop on geodetic modelling and establishment of National Geodetic Reference Networks and Global navigation Satellite Systems

## TESTING ANDROID APP IN SAMBURU

**T**he Land Potential Knowledge Systems team recent tested the newly developed Android app in Samburu, at the Westgate

Community Conservancy. The Land PKS team worked with Community influencers and grazing coordinators under the leadership

of Ioana Bouvier, the USAID Geospatial Management/Program Analyst from Washington, DC.

## RCMRD GOVERNING COUNCIL VISITS BURUNDI

The Chairperson of the Governing Council of RCMRD accompanied by the Director General visited Burundi. The objectives of the visits was sensitize top government

officials of the services available at RCMRD and the obligations of Member States to RCMRD. The Chairperson Mrs Inutu Suba and the Director General held fruitful discussions with the Deputy

Minister of Water, Environment and Urban Development Hon Ndarufatiye and the Permanent Sectary Eng. Ndagijimana on closer cooperation between Burundi and RCMRD.

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officials of the services available at RCMRD and the obligations of Member States to RCMRD. The Chairperson Mrs Inutu Suba and the Director General met with the Minister of Lands and Urban Development Hon Daudi

Migereko and the Commissioner of Surveys and Mapping Mr. Kajumbula. It was agreed that the good relations between the Ministry and RCMRD be further strengthened.

## MONITORING AND EVALUATION

Members from RCMRD attended a training session on Monitoring and Evaluation held in Arusha, Tanzania. The training hosted a team from DAI, Dr. Oleksandr Rohozynsky and Dr. Leona Ba as the training facilitators. 28 members from RCMRD went through intensive training that covered topics such as USAID approach to project Monitoring and Evaluation, Theory of

change, M&E concepts and definitions, How to conduct evaluations, The role of M& E in helping the end-users of SERVIR products understand their usefulness, Comparisons between monitoring and evaluation and USAID M&E expectations.

The training was coached under the objectives of training SERVIR staff on USAID approach/requirement for M&E,

how to Work with SERVIR staff in defining SERVIR development indicators as well as training SERVIR staff on data collection and reporting.

Ms. Mutiga, the M & E officer stated that Monitoring and Evaluation is an important part of any project, a good understanding of the workings of these will lead to successful implementation of projects.