

Workshop Report

Geo-data for Agriculture and Water (G4AW) Workshop

Theme: *"Seeking Partnerships that can Increase Agricultural Output by Providing Food Producers with Relevant Information and Financial Products through the Use of Operational Information Derived from Satellite Data"*

Date : Wednesday the 18th of June 2014
Venue : DST Building (Building No. 53, Bunga Auditorium) CSIR Main Site,
Meiring Naudé Road, Pretoria, South Africa

1. Opening and Introduction

Opening

Mr Angels Sibindi opened the workshop by thanking delegates for dedicating time to attend the workshop.

He also thanked SANSA for hosting the workshop.

Introductions

Each delegate attending was given an opportunity to introduce him or herself, their organizations and to provide a brief description of how their activities are linked to agriculture and water. The introductions were brief and completed in less than 20mins.

2. Guest of Honour – Representative of the Dutch Ambassador

Presenter: Mr Wouter Wessels

The representative of the Ambassador of Netherlands, Mr Walter Wessels, opened by extending the Ambassador's apology for not being available at the workshop.

He noted the importance of water in South Africa primarily as a result of its scarcity in this part of the world. Mr Wessels stressed the Dutch government's renewed focus on economic cooperation with South Africa. Four economic priorities were outlined namely:

- Energy
- Agriculture
- Water
- Transport and logistics

In explaining the importance of the relationship of the Netherlands and South Africa, Mr Wessels revealed that Netherlands is currently the biggest importer of South African food.

By combining Agriculture and Water, Mr Wessels acknowledged the importance of innovation in making geo-data applicable. He stressed the need to use technical expertise in the implementation of development.

Mr Wessels closed by inviting the delegates to reach out to the Netherlands should they be in need of assistance that is within the Dutch embassy's mandate.

3. South African perspective on the art for Earth Observation – Addressing Unemployment, Poverty and Inequality (SANSA)

Presenter – Mrs Dr. Olwoch (Managing Director-SANSA)

Mrs Dr. Olwoch welcomed everyone on behalf of SANSA. She then indicated that the Minister of the Department of Science and Technology had encouraged that science and technology should be able to address Unemployment, Poverty and Inequality challenges in South Africa.

Mrs Dr. Olwoch then acknowledged the importance of innovation in addressing some of South Africa's biggest problems: Unemployment, Poverty and Inequality. She shared SANSA's background and explained its three divisions namely: Earth observation, Space operations and Space science.

Importantly Dr. Olwoch explained how SANSA is using Earth observation to address the three challenges that South Africa faces. In summary the following were her key points:

Poverty

- Rangelands – SANSA's earth observation operations are helping poor farmers located in rangelands to map grazing lands. Importantly earth observation is helping to map the capacities of different areas and indicate how much and how livestock should be accommodated in these areas.
- Electrification planning- In collaboration with Eskom, SANSA is providing information to locate areas where infrastructure is required for people being redistributed. By migrating thousands of low income people from fossil fuels to electricity is a major step in poverty alleviation .
- Integrated Water Management Systems – Satellite earth observation has the capacity to portray water related pictures in different areas. Examples include: water quality, quantity, vegetation, water flows and dangers of erosion.

Inequality:

- SANSA is championing the provision of free access to Satellite imagery to National Stakeholders.
- Open software through the Fundisa portal which is made available to universities.
- The Fundisa student portal is a facility being used to allow students to communicate and share information on earth observation.

Employment:

- SANSA's collaboration with industry is an important channels for creating jobs

4. Presentation of the Quick-Scan Overview

Presenter – Mr Clemence Hwarira

Mr Hwarira provided a comprehensive background of South Africa including the population, climatic zones, soils, waters and lands.

His presentation emphasised the needs and applications of geo-data per climatic zone. Mr Hwarire also presented the main crops planted per province.

Importantly, he discussed the major potential challenges to implementing Geo-data. Among them he explained in detail the following:

- Fragmented and lack of geographical concentration
- The dominance of subsistence agriculture
- Resource constraints including finance, user-ready geo-data

Some of the potential upside that Mr Hwarira discussed included are:

- Mobile telephone penetration
- Conversion of geo-data into operational user-friendly information.
- Training and capacity building

Mr Hwarira provided a framework of stakeholders that are likely to benefit from working together on geo-data for agricultural development. The four classes of stakeholders included:

- Knowledge institutions
- Government departments
- Local enterprises
- Not for profit making organizations

5. Satellite based information services for smallholders

Presenter – Mr Adri Bakker

Mr Adri Bakker introduced the G4AW programme which is in 14 countries on three continents. Mr Bakker further introduced the programme by playing a trailer video clip.

He showed the delegates the existing satellites in space which are used to capture data about earth. Mr Bakker outlined several services that the satellites could be used for. Such uses included:

- Weather information
- Monitoring (e.g. vegetation growth)
- Irrigation / nutrient supply advices
- Insurance (crop and livestock)
- Early warning (drought, floods)

He also outlined the three potential areas that could benefit from geo-data application. In most of these applications smart phone devices would be useful.

- Mapping (GIS)
- Farm management (Crop calendar)
- Risk management (index weather-based insurance) and early warning

In explaining further how these associated services could be provided, Mr Bakker provided a depiction of the smart ICT infrastructure required. He also shared information on the partnership ecosystem required. This will involve at least:

- Government
 - Agricultural industry
 - Intermediaries
 - Producing parties
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To help the delegates understand and appreciate how the same technology had been used in East Africa, Mr Bakker played a video clip on Kilimo Salama, a successful Kenyan risk management (weather-insurance) application for small holder farms.

Reference for further details

www.waterandclimateservices.org

Coffee Break

6. Identification of needs on information services for small holders/food producers in South Africa

Presenter – Group work and presentation

Delegates were randomly put into three groups to discuss the following questions:

- Do you recognize the results of the Quick Scan and what are your comments?
- Which topics can be determined for Geodata use in South Africa to bridge the last mile
- What are the biggest challenges?
- What are the major threats?

Each group was allocated in total 30minutes to discuss each of the questions and come up with possible responses.

Key outputs from the group presentations included:

Do you recognize the results of the Quick Scan and what are your comments?

- Most group members acknowledged and confirmed most of the findings that came out of the Quick Scan. There were a few objections on some of the background data including the source data. Metrics such as population numbers were questioned.

Which topics can be determined for Geodata use in South Africa to bridge the last mile?

- Productivity in zonal areas
- Settlement trends
- Risk and disasters
- Land suitability

- Early warning system
- Crop area estimation
- Crop monitoring
- Grazing capacity
- Water availability
- Extension services e.g. information

What are the biggest Challenges?

- Financial – South Africa is not a wealthy country therefore financing the initiative might be problematic .
- Demographic ages- traditionally it is the older people who are cultivating the land and involved in other farming activities. The younger generation is less interested in agriculture.
- Size of farm holdings are still small and substance
- Shortage of skills particularly in the rural areas
- Language usage as many rural dwellers may not be able to converse in English
- Dissemination of data can be a challenge
- Data integration with other inputs such as market access, distribution
- Data interpretation – If we say there will be rainfall can different people understand it in the same way
- Big data is usually available at global level but not applicable to small holder farmers. Its quality and dissemination may be sometimes unfit for small farmers.

What are the major threats?

- May be little buy-in from the users
- Political pressure may drag implementation
- Developments in technology may overtake implementation
- Inaccurate information may threaten the programme
- Sustainability of the financial model is a threat
- The interface of the technology and the community. Does the community want to experience the technology
- The general challenge with accessing ICT infrastructure can be a threat
- Lack of infrastructure

Before lunch break, Mr Bakker played a video showing how mobile technology can enhance communication and information sharing as assets of a value chain approach. This was done to support creative thinking along G4AW.

Lunch Break

7. Introduction of the programme procedures of G4AW Partnership(s) and Tendering

Presenter – Mr Adri Bakker

Mr Bakker provided background to the G4AW programme. He started by laying out the aim of the programme as follows:

-to increase the agricultural sector output by providing food producers (> 3 million smallholders) with relevant information, advices or (financial) products through operational information chains using satellite data

The total grant for the 2nd Call is 30 million euros and spans over a 3 year period. Interested parties are required to contribute 30% of the funding for partner country's and 40% for partner transition country's (tentative policy rules 2nd Call), (Notice tentative up to announcement in Government Gazette)

Some of the key principles of the programme laid out include:

- Solid and sustainable presented in form of a business plan
- User driven model – Suggests that there should be a demonstrable need at the small holder farmer level
- Sense of ownership
- Partnership is critical
- Satellite data use should be at the center of the proposal

Time frame for the programme rollout:

- Request for advice on making the application due by October 2014
- Application deadline, March 2015
- Applications has to be delivered at the Netherlands Space Office

Mr Bakker indicated that information on the distributed leaflets was out of dated, therefore updated information is on the NSO website as soon as the 2nd Call is launched and open: www.spaceoffice.nl/g4aw

8. Question & Answer Segment

Following the presentation by Mr Bakker, the floor was opened for questions and answers on application for funding and the G4AW partnership. Mr Bakker responded to three questions:

1. Question In what form should the 50% contribution(notice it will be possibly 40% own contribution) by a South African be?

Answer It can be in kind and other assets. But when it comes to Government we are not subsidizing what Government already has to do as part of the services .

2. Question FPZ (Funding Programme for Research) and Horizon 2020 have origins in the European Union funding. Are there any conflicts in applying in this programme while benefiting from them?

Answer There is no conflict of interests in applying for all these programmes except when its are funds of the Dutch Ministry of Foreign Affairs themselves. They are not subsidizing twice.

3. Question Are the seeds provided to farmers genetically modified seeds - we have cases where some organizations prescribe genetically modified seeds that are sterile and do not reproduce. Are your seeds like that?

Answer The seeds provided should follow the legislation of the country. Seeds are not genetically modified neither are they sterile.

4. Question What is the correct definition of a small holder farmer?

Answer Mr Bakker acknowledged that the definition is vague, however indicated that it generally refers to a farmer who farms on a land less than 0.5 hectares.

9. World Café

World Café is a structured conversational process in which groups of people discuss a topic at several tables, with individuals switching tables randomly and getting introduced to the previous discussion at their new table by a "table host".

Delegates were requested to begin the World Café conversation in their original groups. There were free to move from one table to the other. Group/Table hosts were as follows:

Table 1 Topic : Land-mapping

Table Host : Dr. Mangara

Table 2 Topic : Farm/Crop Management

Table Host : Mr Sibindi

Table 3 Topic : Risk Management

Table Host : Mr Bakker

Under the different topics each group was asked to address the following questions

- What is in it for me and you? This pertains to the three topics. For example, in using Geodata for risk management, how am I expecting to benefit as an individual or organization?
- What level and nature of commitment am I expecting to make for what I stand to benefit?

- What kind of partnerships do you envisage which would work in the context of G4AW
- How would one's involvement fit in the development of the small holder farmers.

The groups were allocated 40 minutes each to the groups presented their contributions.
The consolidated responses were as follows:

Coffee Break

10. World Café (Continued)

Table 1 Summary of Findings (Land-mapping) - By Dr. Mangara

- Sound business model has to be developed and presented to smallholder farmers
- The model will show the return on investment, linkage to market and funding support
- Smallholder farmers will then become micro commercial farmers and this will lead to appreciation of geo information provided
- Several products from Geodata can be developed, to mention a few; grazing capacity, disease maps, etc. however these will require automation so that less manual work is performed on them
- Possible partners are: SANSA, International Water Management Institute, CSIR, ESKOM, UKZN, ARC, ICCO

Table 2 Summary of Findings (Farm/Crop Management) - By Mr Sibindi

- Stellenbosch University already have experience and on-going projects on crop mapping
- ARC has developed already irrigation models, precision farming, etc.
- South African Sugarcane Research Institute provides Geodata, that led to precision farming
- The major question was how do we make it viable to smallholder farmers
- Partnerships: There was a lot of synergies
- The challenges included: time factor related to production of datarotation farming
- Communal land management, lack of telecommunications

- Hybrid seeds other than GMO have potential to enhance productivity in some areas

Table 3 Summary of Findings (Risk Management) - By Mr Bakker

- There is a risk of flooding for farmers practicing on land which is in close proximity to a river due to lack of information
- There is a need to link the G4AW with on-going governmental programmes
- Provision of reliable information will improve trust in Geodata by smallholder farmers
- Youth (population) usually are not smallholder farmers, therefore the elder are less accepting new technology. Therefore acceptability of geodata may be a problem
- Risk insurances at present do not pay directly to the farmer but to retailers.
- Mr Chiso indicated that there is a range of funding already allocated to assist smallholder farmers but not utilized

Appendix 2 contains a summary of the general Land Mapping World Café Discussions

11. Way forward

- Mr Bakker presented what he believed are the steps that need to be taken from now: ICCO will be the point of contact for any individuals and organizations interested in taking the programme forward
- It is important for SANSa, ICCO and the Netherlands Space Office to work collectively from this point onwards. It is the collaboration of these three parties that will make the programme work.
- The Netherlands Space is prepared and would organize to start assisting stakeholders with starting and implementing the programme.
- The Netherlands Waterpartnership will contact organizations/people to challenge them to start considering putting together ideas for eligible proposals for submission to the G4AW facility 2nd Call.

12. Closing

Mr Sibindi officially closed the workshop and asked Mrs Judith to provide closing remarks. Mrs Judith thanked all delegates for taking time to be at the workshop. She thanked the South African office ICCO director for providing invaluable support in organizing this workshop.

She also expressed gratitude for SANSa's support and representation at the workshop. Mr Bakker's valuable facilitation and knowledge shared was acknowledged and appreciated.

Appendices:

1. Resources Shared

The following resources were supplements to the workshop proceedings.

Videos (MP4) files:

- ▶ Interview with a farmer in Rwanda
- ▶ Movercado Eco-System
- ▶ Youth, ICTs and Agriculture
- ▶ Big Ideas- Syngenta Foundation's Kilimo Salama
- ▶ Grameen Foundation AppLab Uganda Launch
- ▶ The Tech Awards 2013 laureate Kilimo Salama Syngenta Foundation

Power-point presentations

- Food security Satellite info_ SA1 -
- G4AW Introduction -Partnership and How to Tender - SA1
- G4AW Overview Dutch partners_SA2
- G4AW_SYMPOSIUM_JOlwoch
- Workshop Programme1
- Quicksan G4AW

2. Summary of the general Land Mapping World Café Discussions

Land mapping activities should focus on satellite derived biophysical variables indicative of crop condition, plant healthy and rangeland condition that are important to the smaller holder farmer.

Biophysical parameters such a leaf area indices, vegetation indices, nitrogen content and biomass net productivity indices were considered critical in crop yield prediction and estimation, disease mapping and is assessing rangeland grazing capabilities. The integration of current and upcoming open and free satellite datasets such as Landsat 8, Landsat 7, Sentinel-1, Sentinel-2, CBERS 4, SPOT 6, PROBA-V, MODIS and EO-SAT1 provide users with an opportunity to map crop and rangeland types and conditions at various spatial and temporal scales. SPOT 6 has spatial resolutions of 1.5m and 5m, Landsat 8 has 15m and 30m, CBERS 4

has spatial resolutions which range from 5m to 60m that are all adequate for small holder farming mapping applications.

The integration of the various datasets will allow the user to improve the temporal resolution for crop mapping. Satellite remote sensing was considered a reliable and consistent method of assessing crop and rangeland conditions with capability to provide accurate records of crop and rangeland conditions over time. Earth Observation is a proven technology that has been operationalized and has yielded successful results in agricultural monitoring globally. Other land mappings applications were considered relevant for small holder farmers were land degradation and settlement density.

To realize the full benefits of an operational monitoring system for small holder farmer the following approach was considered relevant.

- Development of automated algorithms to extract biophysical parameters to assess crops
- Provide the small holder farmers with a value proposition that clearly indicate the benefits terms of increased productivity and articulate the return on investment. Farmer need to be motivated by demonstrating a sustainable growth model which dividends of increasing crop productivity and how they will migrate from subsistence farming to micro commercial farming.
- Mapping out the agricultural supply chain process with clear linkages to markets, banks and insurance houses.
- Integrate the project into existing government programs.
- Demonstrate the value of earth observation to farmers by profiling their crop and rangeland productivity over the last 10 years.
- Efficient communication of information using mobile telecommunication devices such as smartphones was considered critical.

Identified Partners

The partners should include earth observation data providers, NGOs, science, knowledge and research institutions, telecommunication, government departments, banks and insurance companies and private companies. The following organisations have already expressed interest in the project.

SANSA, ICCO, IWMI, ARC, University of KwaZulu-Natal, University of Stellenbosch, Cell-C, Department of Agriculture.