

Linking nutrition to the
Data Revolution

Vivo and Agriprofiles:
A knowledge discovery tool

Youth: Coping with climate
change in the Pacific Island
region

Open Data



Policy Makers



Geospatial Data



Researchers



Data Revolution for Agriculture

Data Centres



Innovators



Agribusiness



Smallholder Farmers



Data Revolution for Agriculture

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Guest editor

Data Revolution for Agriculture

As mobile phones, tablets and improved connectivity spread across the world, the amount of data we are gathering and storing is increasing exponentially. With every satellite launch we add further data at ever increasing detail.

Knowledge is a core input to agriculture, while data and information are the foundation of knowledge. Is agriculture making the most of the data revolution?

In this issue of ICTupdate, we try to show it certainly is, although it seems we are yet to make progress in taking advantage of making data open for agriculture. A report by McKinsey in 2013 (1) suggests that open data could benefit the global economy by US\$3 trillion a year.

To cover this revolution, we have had our own revolution here at CTA and have turned this issue of ICTupdate over to our interns for a new perspective. This issue will also be accompanied by more content online.

Open data and the data revolution

There are various definitions of open data, including that from OpenDefinition.org: "Open data and content can be freely used, modified, and shared by anyone for any purpose." It means data is available, accessible and can be mixed with other datasets to be made universally accessible to all. By making data truly open, we also have to give context to the data.

Tim Berners-Lee, inventor of the web and linked data initiator suggests The Five Star system (2) which provides a more comprehensive, technical definition of open data describing five different levels of openness (on the web*, machine-readable data**, non-proprietary format***, Resource Description Format standards**** and linked RDF*****). However, very few agricultural data services achieve the five-star level of openness. A non-technical definition to the Five Star system was made by

the Open Data Institute (ODI). Dr David Tarrant (ODI) presented the approach at the GODAN workshop (20 January) as the following: available*, reusable**, open format***, use IDs for data - to link to data****, and all of the above and be able to link data to other people's data to provide context*****.

The data revolution is a UN post-2015 initiative which refers to the transformative actions needed to respond to the demands of a complex development agenda; improvements in how data are captured and used; building capacity and data literacy in 'small data' and big data analytics; modernising systems of data collection; liberating data to promote transparency and accountability; and developing new targets and indicators (3).

What does open data mean for agriculture?

In terms of agriculture and open data, we are not talking about strictly agricultural data, such as yields and inputs. Rather, we are including all of the data that could be used to support food security, nutrition and agriculture. This could be satellite and meteorological data or nutritional values of crops.

Open data can potentially play a role at both macro and micro levels. At the national policy level, for example, we have seen the use of indicators to measure investment in agriculture and resultant growth in yields. Open data can help bring transparency to government spending on agriculture.

At the farmer level, access to data affects how they are managing their

farms: for example, data can help farmers understand more about the threats of drought or to decide what to produce and when to take their produce to market. Farmers can also contribute to data collection and input; What are they planting? When will it be ready for harvest? When will it be ready for the market? The data value chain in agriculture

Having access to better data and better information on yields helps set targets for agricultural production at the policy level, as well as at the farmer level. The challenge is that data needs to be accurate, constantly updated and reliable. The ability to collect this data at different points allows for universal participation.

Why should people care about open data in agriculture and nutrition?

The agricultural sector is facing a huge demand to feed rapidly growing populations, while at the same time facing increasing threats from climate change. Agricultural production has to increase while reducing its impact on the environment – it cannot be just

more fertiliser, more land being ploughed under. Equally important, we need to ensure a fairer distribution of the food produced, which calls for investments in family farming, value chains and markets that enhance food security at all levels.

Open data can facilitate this. There is an enormous amount of knowledge available from a lot of different sources: the practices of indigenous communities, new technologies developed by research institutions, tacit knowledge, knowledge transferred between generations, policy implementation, the use of products by consumers and so on. Access to these data can help us understand all aspects of food production: soil conditions, land use, the dynamics of the value chain and to identify gaps in data.

More environmental data are available where we have seen openness increase. For example, satellite imagery can give us an idea of soil moisture levels by analysing infrared reflectance. Open data present fundamental building blocks to help us understand more about the land so we can improve production and/or market access.

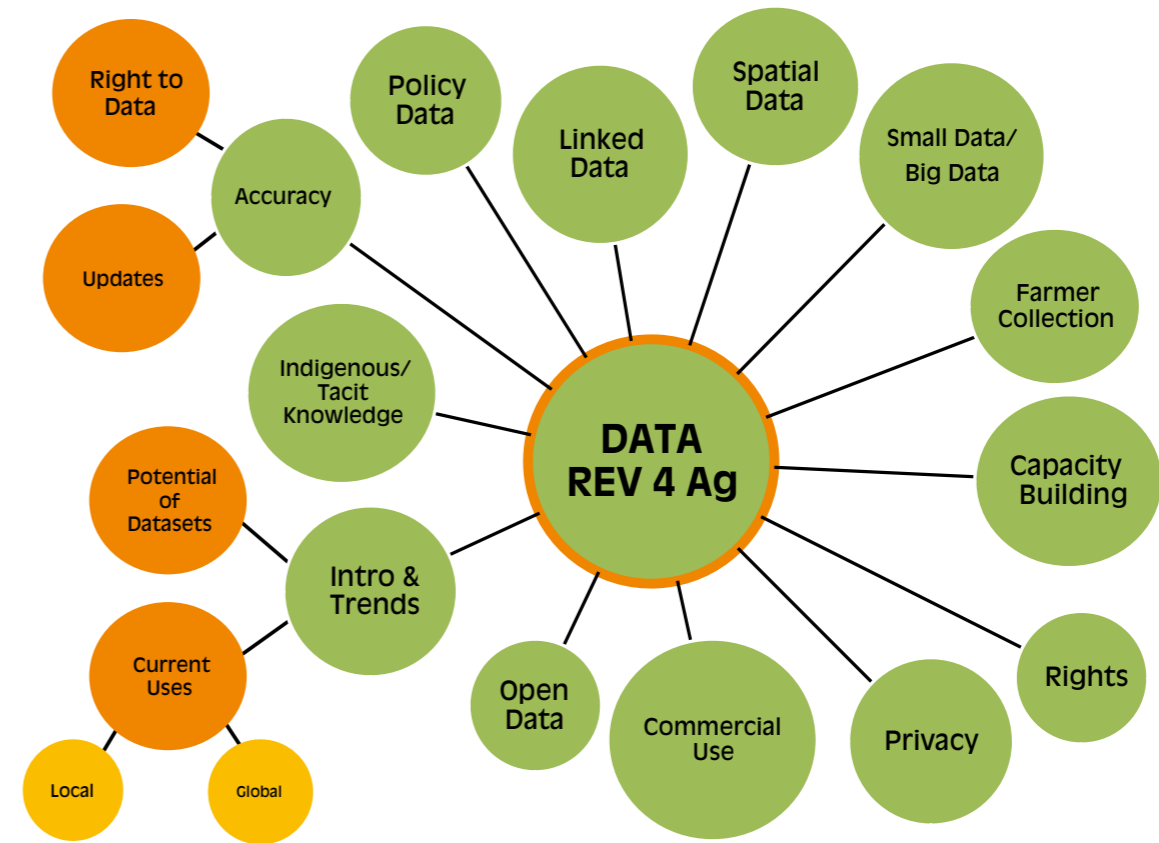
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- [2] Tim Berners-Lee. 5 Star (*) Open Data. <http://5stardata.info/>
- [3] United Nations. (2014). What is the 'data revolution'? <http://www.undatarevolution.org/data-revolution/>

With open data we can intensify the use of knowledge rather than intensify agriculture.

In this issue of ICT4Ag we give a voice to various stakeholders who talk about their ideas on how to face the various challenges, and we present some practical ICT tools in the data revolution for agriculture with potential to scale out.

We hope you enjoy reading our magazine! ◀



ICT Update



ICT Update issue 79, February 2015

ICT Update is a bimonthly printed bulletin with an accompanying web magazine (<http://ictupdate.cta.int>) and e-mail newsletter.

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 With thanks to FAO for distributing ICT Update through e-Agriculture (www.e-agriculture.org)
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<http://ictupdate.cta.int>





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Eva Huet holds a master's in Forestry, Nature Management and Tropical Agriculture from KU Leuven University, Belgium. She is an intern at CTA in the Learning, Monitoring and Evaluation Unit. She has been working on several projects in Latin America and West Africa. For the Belgian Development Agency (BTC), in cooperation with the Peruvian Ministry of Environment (MINAM), she was involved in developing the process of spatial planning at community level in the Andes. Her interests lay in rural development, spatial ordinance and sustainable agriculture with validation of local knowledge. Regarding this, she has experience with mapping land use, managing GIS databases, and analysing agricultural practices. For Eva, open data means that information and research is shared, assuring that it can be used at different levels to develop better agricultural practices and resource management.

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Laureene Reeves Ndagire

Laureene Reeves Ndagire is a Knowledge Management intern at CTA with a background in organisational behavior, Human Resource, knowledge management and learning. She holds an Msc in Human Resources and Knowledge Management from Lancaster University Management School, UK. Laureene worked in marketing controllership at General Electric, and was a research associate on Ethics and Biometrics for the EU FP7 projects (RISE/BITE), before relocating to the former soviet republic of Georgia to work with the Ministry of Education and Science among internally displaced persons in the Samegrelo region. She is currently remotely coordinating the Wakulima Young Uganda platform for young farmers in East Africa to build market connections and facilitate knowledge sharing across the region. Coming from a grassroots/community development background, as well as being a family farmer, open data in agriculture for Laureene signifies access to data/information for farmers and knowledge curation from national to local level. This ultimately translates into improved agricultural practices and better yields for farmers.

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Ana Brandusescu

Ana Brandusescu holds a master's in Geography from McGill University and has five years of research experience with geographic visualisation tools, Web 2.0 applications and participatory mapping. She has worked among various communities with a range of technical and non-technical audiences. Ana has led community development and crowdmapping projects (Montreal and Vancouver), communicated with trauma surgeons and researchers (Cape Town) to visualise trauma injuries via mashups, and marginalised communities (Mumbai). Currently, Ana is an intern at CTA for the Participatory Geographic Information Systems (PGIS) Programme, promoting participatory spatial information management and communication for empowering grassroots in climate change adaptation, advocacy, and policy processes. Prior to CTA, she has worked for the Web Foundation in collaboration with the World Bank and Omidyar Network on the Open Contracting Data Standard and legislative data specifications for Open North. For Ana, open data should be repurposable for technical and non-technical audiences. Her work with both open and closed (sensitive) data has sparked her interest in the challenges that the data revolution will face and what local and global communities will do to ameliorate them.

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Jean Claude Nduwimana

Jean Claude Nduwimana holds a Bachelor's degree in Information Technology from the Adventist University of Central Africa in Rwanda. For his final year project, he created a desktop application for Dream

Team Football Academy, which is currently used to register players and generate reports on collected data. He later joined the innovation hub kLab (Knowledge Lab) in Kigali, where he created a children's mobile application for entertainment and education purposes. He competed in the ICT4Ag hackathon, where his team placed second overall for a mobile application to improve communication between local farmers and policy makers. Jean Claude worked with the "Girinka" project (one cow per family) in Rwanda, to develop a platform that enables follow-up and evaluation of activities from project recipients. He is currently an intern at CTA integrating the ICT4Ag database to curate existing convergence applications to support policy, markets and value chain development. The database will be open access for various stakeholders from farmers to developers and will be available on different channels. Open data for Jean Claude is a primary key resource for the quick development of agriculture and social activities at large.

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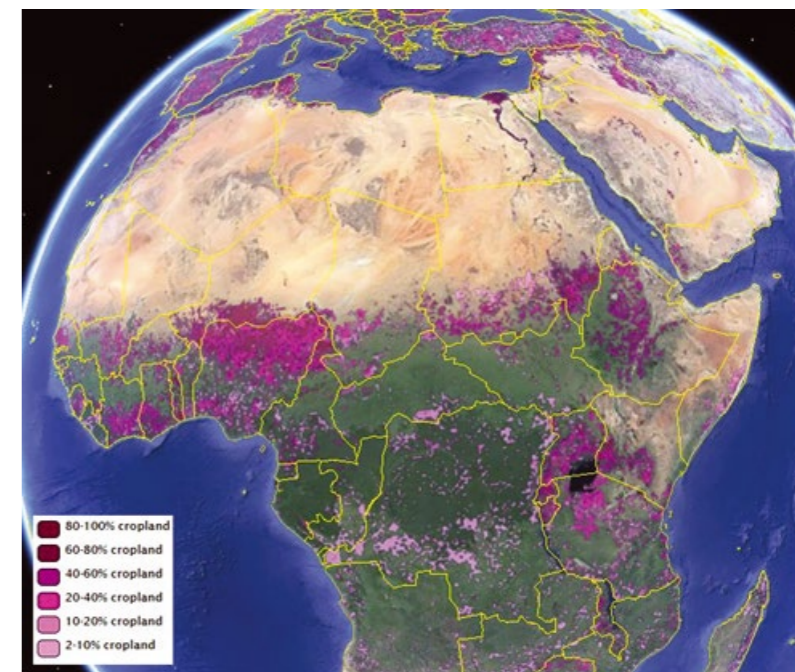
Mikaila Issa

Mikaila Issa is a journalist and communicator in social innovation and ICT for Agriculture from Benin and is an intern with the communications team at CTA. A social media strategist to engage, collaborate and innovate continuously for development, Mikaila is curious about topics related to ICT and new media for agricultural and rural development. He has strong skills in writing and reporting for print, web and broadcast media, online dissemination of information in both French and English. Mikaila believes that with the large amount and diversity of digital information available today, open data has the potential to visualise a complex story with clear graphics. Journalists must take advantage of this to better describe data and its effect on ICTs, agriculture, and education, to help make better decisions.

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Visualising global cropland in 3D

The new global cropland map that includes the first ever global map of field size released by the International Institute for Applied Systems Analysis (IIASA) and the International Food Policy Research Institute (IFPRI). It is freely available online at IIASA (www.iiasa.ac.at). ◀



CTA's view on open data

CTA is a member of the Global Open Data for Agriculture and Nutrition initiative which recently met in Wageningen to discuss the actual and potential impacts of Open Data on development (see p6). Here are nine things we learnt from the GODAN meeting.

1. GODAN aims to demonstrate the value of Open Data in Agriculture and convince more governments to encourage its availability. A timeline of the history so far was presented together with deliverables. *"I'm optimistic about the potential of open data if we can think about the work of projects like GODAN not just as a case of gaining permission to work with a few datasets, but as about building new open and collaborative infrastructures, through which we can use data to communicate, collaborate and reshape our world."* (Tim Davies, GODAN)
2. Open data for agriculture: Whilst there are thousands of sources of data relevant to agriculture (Dataverse, CIARD ring World Bank, Datahub) only satellite and weather data show examples of impact for smallholder farmers. The hackathon, ran alongside the conference, showed example applications from a variety of such sources.
3. Linked open data: The machine readable set of data in agriculture relies heavily on a common vocabulary. The FAO, National Agricultural library in the United States and CABI are linking their thesauri through the GACS project (www.slideshare.net/catecara/2015-01-godanwageningengacs)
4. Hackathons can work in just 2 days to generate and validate incredible ideas for applications using open data for agriculture. We saw what they are, how to run them and what's the result (futurefoodhack.nl).
5. Data value chain: We were introduced to the concept of a value chain for data and how this is rapidly changing. For example Cap Verde is using tablets for collecting census data, Samoa is digitising community 3D maps for decision making and open data is being published in the African open data portal by all governments. Surprisingly some parts of the chain still need manual interventions for processing such as removing clouds from satellite images.
6. Government data: We saw the scale of governments opening up their data in particular, hearing about the data portal run by the African Development Bank.
7. Lack of data: We heard that there was a lack of Nutritional data and problems with data accuracy in some areas (see interview with Lawrence Haddad, p8).
8. Many speakers saw open data as a public utility. The Gates Foundation specifically mentioned the need for more public funded research to make data open and adopted a policy earlier this year. *"Too much public money is sunk into inaccessible untested data."* (Woods, Gates Foundation)
9. Private Sector: New models are emerging to make it cost effective to open up data sources, and companies already use the same linked open data architecture within their organisations, so opening parts up can become more straightforward. *"Open data needs to leave the building use it to sell your companies services."* (Batienssen, Water Watch) ◀

GODAN, a vanguard global partnership

Data Revolution for Agriculture

In the era of open data, agriculture and nutrition are starting to push forward. Indeed, in this as in so many other sectors, free access to high quality data is of vital importance. The Global Open Data for Agriculture and Nutrition (GODAN) Initiative, which held its first conference in January 2015 in the Netherlands has demonstrated this.

A global momentum for open data

GODAN was officially launched during the World Summit on Open Government Partnership meeting in October 31, 2013. The initiative -- a global partnership of 100 governments, international organisations, research organisations, universities, private sector -- is a follow up process to the G8 meeting in June 2013 on open

data. GODAN project partners subscribe to a set of principles in lieu of a collective statement. The American, British and Dutch governments are helping spearhead the project as it is being set up, but all partners are placed on an equal footing. A secretariat has been established, which is supported by the international NGO CABI. Martin Parr, Programme Head of Knowledge Management for International Development for CABI, who is responsible for GODAN secretariat operations, explains: "the secretariat is not an implementing body for GODAN activities. It is rather there to support GODAN; to help partners to shape their open data approaches in different ways. "Specifically, the GODAN Secretariat will organise, with partners, several events, conferences and hackathons to present the project. It also aims to help identify champions and ambassadors of open data in the fields of agriculture and nutrition and give them the information needed to tell success stories of open data."

Agriculture and nutrition, specific issues

Other thematic areas are more advanced in on the road to openness; such as the health sector, where significant progress has been made in exchange and collaboration around the data. Agriculture and nutrition have not been the subject of significant attention from the international community until quite recently, which partly explains the delay. Optimistic about the development of open data in

the field of agriculture and nutrition, Martin Parr says "because of the connexion between openness of data and improved accountability and better management systems, there is now a greater drive to open up data in other areas, this is often seen by governments as a real boost economic development."

The data in question are many and varied. Martin Parr takes as an example data on plant pests and diseases. Although this data might be available, they may not be shared more widely or made open access for fear that disclosure would have a negative impact on business markets and decisions.

A matter of trust

Open data is a sensitive issue. It is not just a technical challenge. One of the main obstacles it faces is fear. Martin Parr says "It is not just about making data sets open. It is about issues of trust. Recognising that although there might be risks in opening data set there is also value in doing so because it allows you to plan for the future; it allows to create new tools, services and applications, which can help address underlying issues".

Another big barrier to opening data is being fearful about the quality of data because opening data without ensuring also its quality would be counterproductive.

Build local capacity to prevent a new technological gap

GODAN aims to promote the value of open data to economic growth and to

feed a growing world population. These issues concern the entire international community. Southern partners are numerous among GODAN signatories. At a time when GODAN is still in the development stage, Martin Parr draws attention to a possible rift that could open up if the data provided by Southern countries benefit the Northern countries alone. "There is a need to involve developing countries in the open data community to make sure they are the beneficiaries of data that is being provided. I don't think anybody wants a situation where data is being opened up and the beneficiaries of open data are distant from the source of it. For this it is necessary to support capacity building."

Asked about his hopes for the future, Martin Parr wishes, above all, that data be open by default, "unless there is a very good reason to protect them". A change in mentality will be needed to achieve this. GODAN hopes to accomplish this with the help of

governments (including engaging at high level international political meetings including the G20), and the media. So that everyone talks about the need to open data and understand the usefulness of building such a revolution.

A first meeting focuses on impact

GODAN organised its first meeting in Wageningen (The Netherlands) January 19th-20th. The meeting brought together 50 participants drawn from its membership to look at cases of impact of Open Data in Agriculture.

In their keynote at the meeting, CTA shared the findings from a report commissioned from Alterra on open data benefits for smallholder farmers where the authors identified the main potential areas for open data use. The report aimed to answer the following questions: What is the actual impact of the Open Data movement on the food and nutrition security of

smallholders in the developing world? What opportunities does it present, and which remain unfulfilled? This was complemented by the results from their report on a Caribbean study looking at specific open data activities and infrastructure used in agriculture highlighting in particular the role of Jamaica's government in promoting open data use for agriculture.

The meeting then comprised a series of workshops with speakers from around the world in areas ranging from participatory mapping to "Big data" in mobile agriculture. Alongside the meeting, a hackathon was held to build demonstrator applications illustrating the use of Open Data for agriculture. The winner was Cromptizer a proposed application that allowed farmers to see what had been grown previously in a field and hence take a decision on what could be planted, using both government open data on land use together with local knowledge on crops. ◀

Participants during the GODAN workshop in Wageningen, January 2015.



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IT'S HARD TO MEET NUTRITION GOALS IF YOU DON'T HAVE DATA ON NUTRITION

At a 2012 meeting of the World Health Assembly, all 193 UN member nations committed to achieving global nutrition targets by 2025. So far, the number of countries on course to meet the global targets is much too low. This is complicated by the fact that too many countries lack the data necessary to even evaluate their nutrition progress against the global targets.

COUNTRY STATUS: ● No data ● Off course ● On course



Infographic from the Global Nutrition Report 2014 by IFPRI. (Source: http://www.ifpri.org/sites/default/files/publications/gnr14_infographic.pdf)

Linking nutrition to the Data Revolution

Interview

An interview with Lawrence Haddad, senior research fellow at IFPRI.

Why is nutrition data currently in the spotlight and what is at stake precisely?

The Second International Conference on Nutrition (ICN2), a high-level intergovernmental meeting held in Rome in November 2014, focused global attention on addressing malnutrition in all its forms. The first-ever Global Nutrition Report of an

international consortium of experts, was released on this occasion. It provides a comprehensive narrative on levels of malnutrition across the world (including 193 country profiles). We more than ever need a nutrition data revolution, because the malnutrition problem affects every country and it is not going to get resolved without concerted action. We need data to guide and stimulate intensified action.

You say we need a nutrition data "revolution"? What do you mean when you say data systems are stuck in the 20th century?

Basically, data collection in the field of nutrition today is the same as it was in the 1990s or even in the 1980s. We have nutrition surveys every five years,

and micronutrients surveys even less frequently. Economic policies are based on up to date data, nutrition policies, apparently can do without this. They can't. We need to take advantage of mobile technologies—cheap android tablets, internet, mobile phones should be used. Simple surveys could be done every year using them.

When I speak about a revolution I also think about a revolution in our mindset. We need to be more inventive. Technology can facilitate but it is not enough. We must stimulate the demand for data. Here again, technologies have a lot to do; I think about social media, which can help civil society to express itself.

The data revolution is a call for better data, but also a different way of thinking about data in terms of costs

and benefits and also in terms of supporting effective actions and suspending bad actions due to better data.

Who will implement this revolution? Who will use the data?

Willing government agencies will implement this revolution. UN agencies can also help in the field of capacity development. On the demand side, civil society has a vital role to play. I would like to give you an example. I was in Zambia recently. The Civil Society Scaling Up Nutrition Alliance, a group of CSOs (Civil Society Organisation), has just tried to see what part of the national budget was dedicated to nutrition. They managed to get the figures, even if they had to deal with the national budget document (a massive document with thousands of pages). Even though it was difficult, they could calculate that only 0.2% of the budget was spent on nutrition. They disseminated the figures on the web, and many people could see them. And many people actually reacted. So data can be used to put pressure on and help governments. I am not only thinking in terms of naming and shaming governments, but also guiding them.

Data is expensive. How can we justify a return on investment when governments are cutting back funding for research?

Very recently, a new article by the economist Morten Jerven, published under the Copenhagen Consensus Centre banner, asked the general question: is a data revolution for the SDGs (Sustainable Development Goals) a good investment? His answer is a resounding "no". Jerven estimates the data collection necessary for the MDGs (Millennium Development Goals) at 1 billion dollars per year (all MDGs included, for all countries, and throughout the period). If he thinks this is a lot, I tend to think it is not that much, particularly for all countries for all MDGs. Any development project in the world allocates at least 1% of its budget to monitoring and evaluation. Why shouldn't this be the case when it comes to data and nutrition? I think the cost side is a non-argument. Furthermore, what is the alternative—guessing?

It is vital to have more precise data. India for instance has until recently based its policies on 2006 surveys.

There has not been a national survey of stunting for nearly 10 years. Nevertheless, things are changing in India and I hope we can be a lot more positive about nutrition data in the country in the near future.

What do you mean by "democratisation of nutrition data"? How can data be turned into actionable knowledge for communities?

The first part of democratisation is to get access to data. Much information is simply not in the public domain. When it is available, information is often difficult to find: specific nutrition data are often buried in big documents, they are unprocessed and fragmented. A lot of work needs to be done to make it useful and understandable.

The research community has an obligation to process this information and make it available. I think institutions that are funded by public funds (research institutes, UN agencies, governments, many NGOs) should all make available the data behind their research and make it easy to use. It is harder for the private sector to do this, obviously for legal and commercial reasons. The second part is to get data in the hands of

communities. Activists need data, or governments may simply dismiss their influencing efforts. We need more innovation in communities. In Uganda, some work has been done to assess whether community feedback mechanisms improved health service delivery. They did -- and very significantly so. We don't do this in nutrition and yet we should try as we need to improve nutrition programme delivery.

You recently published an article on your blog asking where nutrition fits in the SDGs. Why is it important?

It is important because SDGs are the main accountability mechanism for the world and governments. They will guide investments in the next 15 years. Nutrition is in real danger of missing the boat. There are two indicators included at the moment, but the 6 WHA (World Health Assembly) indicators should be included as well as an indicator measuring dietary diversity for adult women. Having 2 out of 169 SDG indicators for a condition that leads to 45% of all under 5 deaths and diminishes GDP by 8-11% -- there is something drastically wrong with that picture. ◀



Coping with climate change in the Pacific Island Region, a matter of survival

Interview with Isso Nihmei, young Ni-Vanuatu deeply committed to his community

Can you tell us about yourself?

→ My name is Isso Nihmei. I am 24 years old. I was born and raised up in the remote island of Futuna, Vanuatu, in a traditional household. After High School I attended the Australian Pacific Technical College and graduated with a Certificate in Community Service. When I came home to Futuna from schooling I became the youth president in my community and started social activities with youths to involve them more in agriculture.

In 2012, I attended the "Ready Blong Wok" programme at the Vanuatu Youth Challenge and was placed for an internship with the SPC-GIZ on a national Climate Change Adaptation Program. I started building my career on climate change and agriculture.

I spend a lot of time with my community after work and on weekends trying to learn

and practice custom skills that help us develop sustainably into the future.

What inspired you to start working with the "Coping with climate change in the Pacific Island Region" (CCCPIR) programme and what does it consist of?

→ Climate Change is a reality in the Pacific and Vanuatu is facing a lot of challenges especially in agriculture. The sector experiences low yields and crop failure due to high temperature, heavier rainfall and longer drought period. This has changed my life to focus on assisting, helping and work very hard to improve life expectancy in local communities and find possible ways to minimize the effects of climate change within rural and local communities.

Changing rainfall patterns, longer drought periods, increased cyclone intensity and rising sea levels are likely to

affect all communities and key economic sectors. Addressing climate change is therefore an urgent priority in the Pacific and countries have consistently highlighted their needs at regional and international forums. The CCCPIR programme aims to strengthen the capacities of Pacific member countries and regional organisations to cope with the impacts of climate change.

What contribution does your programme have towards Data Revolution for Agriculture?

→ From my point of view grouping agriculture technologies, methods and sharing information is important to better access to research data, improved visibility into development initiatives, data sharing across organisations and these advances can help unite efforts in the fight against global hunger and climate change. ◀

Q&A



Isso Nihmei

"AgriKari". Market place and platform to exchange information on agriculture

An interview with Jeanvier Jong Loy, determined young Surinamese developer and entrepreneur

Can you tell us about yourself? What inspired you to start the UniCode NV venture?

→ I am Jeanvier Jong Loy. I live in Suriname, South America. I am a 30-years-old software/web/mobile app developer and entrepreneur. I am also studying for a degree in Software Engineering.

My company started as a group that participated at the Suriname National Hackathon organized by IT-Core on the 23rd of August 2014. We won first place. This made us applicable to represent Suriname in the AgriHack, in which we won 3rd place. After this success we decided to develop our skills and make a business out of our passion. Out of all the success as a team, the company UniCode NV was born. Our team gathers 5 people, 4 men and a woman.

Can you tell us about your company and what it does specifically?

→ Unicode NV is a software development company, which for now has one main product "AgriKari". AgriKari is an application that enables farmers to bring their products directly to the buyer. We have built a marketplace, whereby the buyers can place their orders. The application also enables users to exchange information on agriculture. This can be related to marketing or advise on the purchase of products for managing pests and diseases in the field.

The application is built on web-application technology. The future plans are that we will provide web development and software solution services to clients.

What contribution does your innovation have towards Data Revolution for Agriculture?

→ Our innovation will record statistics for the agriculture. Because of the data that will be available from these statistics, farmers will be able to put out more efficient strategies and get the maximum output available. Since Suriname is our home base and the product will be launched there, we can also say that we will make it possible to globalize the Surinamese statistics.

Which event do you plan or intend to attend about Data Revolution for Agriculture?

→ There is a "Made in Suriname" ICT & Agriculture fair in April 2015. This is the first official event I will attend regarding agriculture. ◀



Jeanvier Jong Loy

AgroTrack and e-Haho, bridging the gap between farmers and buyers in Rwanda

An interview with Davis Mugira, young "full-time passionate" entrepreneur and software developer from Rwanda who founded the Spiderbit start up.

Can you tell us about yourself?

→ My name is Davis Mugira I am an entrepreneur, a software developer and a UI designer from Rwanda. Currently, I am the CEO at Spiderbit. Since 2012, I have been a developer and a designer at Spiderbit, where I work on software development projects and design art works.

What inspired you to start this venture/company and what does your company do specifically?

→ I started freelancing when I was at University developing websites and apps for small enterprises; the drive came as a desire to do something I am passionate about full-time. Again, it has always been a lifelong dream to run my own company. At the end of my studies in 2012, straight

away I founded Spiderbit Ltd.

Spiderbit is a startup company specializing in software development. Currently, we are working on an agriculture solution called AgriTrack/e-Haho. It is a mobile-based e-Commerce platform that connects farmers to buyers. E-haho is a complete solution to enable farmers to list their product prices to wide network of buyers on both mobile and web platforms.

What contribution does your innovation have towards Data Revolution for Agriculture?

→ AgriTrack/e-Haho enables farmers connect to the local, regional and global market despite the fact that there is limited access to the Internet in rural villages in Rwanda. With this system Farmers use

their mobile phones to send the data about their product prices, quantity and location. This information is stored and made accessible to crop buyers upon request in real-time manner..

From your personal experience, what is necessary to succeed in your field and when will you count success?

→ Some of the characteristics to success for a start-up is identifying a niche, Innovative ideas and great personalities (determination, resilience,.. etc) of the founders and the team are important, and of course good skill set of the team. We will count success when the system bridges the gap between farmers and buyers, and at least 80% of the farmers in Rwanda are using the system as mode of selling for their products. ◀



Davis Mugira

Syecom Ltd: Providing ICT services to agricultural research in Ghana

Interview with a "passionate changemaker", Solomon Elorm Allavi, Chief Operations Manager and Geographic Information Systems (GIS) Specialist at Syecom Ltd (Ghana)

Can you tell us about yourself?

→ I am the Chief Operations Manager at Syecom Ltd, an agricultural research and geospatial survey and mapping consultancy company in Ghana. I am an active young professional in agriculture close to five years, with interest in geosciences and geospatial technologies use in agriculture.

What inspired you to start this company and what does it do specifically?

→ I am a passionate changemaker. Providing employment for others and myself in this fast-paced and highly competitive knowledge economy has been my ambition during and after my tertiary education. I am inspired by the opportunities that abound in the midst of all the challenges in Ghana and in other emerging economies. Constraints in

agriculture that require deployment of productive ICTs has been my inspiration to start Syecom Ltd. Over the past 4 years, we have been engaged in the provision of agricultural research and Geographic Information Systems (GIS) consultancy services for a wide range of local actors in agriculture and international development organisations. Our services include: farmland geospatial survey and mapping; provision of AgroClimatic information services; soil testing services, and agricultural research documenting value chains approaches and ICTs in agriculture.

What contribution does your innovation have towards Data Revolution for Agriculture?

→ Through support from CTA, we are finalizing work on an E-farms platform to profile farmers' data to enable them and

other interested stakeholders request access to such data. This data is intended to be private data for our farmer clientele but will be made open subject to data usage agreement(s) for the benefit of the big data community. Syecom Ltd is very open to support collaborative efforts to collect data for agriculture for the benefit of the sector at large.

Agriculture in Africa has huge growth potential. I envision more orientation towards large scale commercial agriculture and an increasing number of graduate youth taking up professional farm activities. I intend to improve and strengthen the growth trajectory of Syecom Ltd in the next 5 years in this regard. Partnerships with institutions in agriculture for big data services will also be expanded. ◀



Solomon Elorm Allavi

Rebuilding the link between librarians and farmers

Open data may not just be figures or indicators, but metadata describing documents. Jacinta Were describes how African libraries should not be sidelined in the efforts to make more open data available and that open access documents are an important resource in the data revolution for agriculture.

African libraries are goldmines in terms of indigenous research output. Nevertheless, in an effort to revolutionize methods of managing and disseminating knowledge, libraries, in recent years, have been mistakenly re-defined and viewed in terms of physical structures and books. This unfortunate development has attempted to distance libraries from knowledge resource centre initiatives in the agricultural sector. Librarians who should take the lead in knowledge management are getting sidelined in the current open data revolution. Professional librarians are greatly to blame for shying away from the challenge. Hopefully, the current revolution by open data systems and large information projects, like the University of Nairobi Digital Repository (UoNDR) are steps towards narrowing

the gap. Rebuilding the link between farmers and librarians will be key to revolutionise agricultural information.

Libraries do not deal with books only, rather they are custodians of Access to knowledge in different formats and librarians are best trained to manage this knowledge. Efforts in data revolution for agriculture should take advantage of what is on the ground and build on it. Globally, libraries play a leading role in advocating for freedom of access to information. Academic libraries do this through advocating for open access. As traditional focal points for provision of information, libraries continue to encourage free dissemination of information to support development agendas worldwide. Farmers can greatly benefit from libraries and from the professional skills of librarians in dissemination of information.

University of Nairobi Digital Repository: A commendable milestone in the Data Revolution

Academic libraries are rich in indigenous research output that could be used to improve data revolution initiatives in agriculture. At the moment, this information is not accessible due to poor visibility and traditional retrieval methods still being used in many African academic institutions. However, universities are aggressively advocating for open access to enhance the visibility of this valuable output. The initiative on open access is bearing fruits in African

universities. Through open source software, a lot of African universities are now uploading their indigenous research output online to be shared globally.

The University of Nairobi is the largest and oldest university in Kenya and hence has rich information. The University of Nairobi Digital Repository is a good example of the open access initiatives in Africa. Launched in December 2013, it is one of the most successful library repository projects in Africa, thanks to the commendable and rare support from the top management team. Lack of support from top management is a major contribution to the poor visibility of indigenous research output in most universities in Africa. However, the University of Nairobi Digital Repository collects, preserves, and disseminates scholarly output of the University of Nairobi. The main aim is to share this output at the national and global level free of charge. It currently has over 75,000 entries of theses, dissertations, research projects, journal articles, conference papers, speeches, videos and other media. All the six colleges of the University are participating in the project. The College of Agriculture and Veterinary Sciences (CAVS) of the university is one of the largest agricultural information centres in Kenya and hence one of the highest contributors. Anybody who is looking for information on agriculture can benefit from it. A lot of people are using the information at the national and global level.

Library collaboration in provision of information in Kenya

A commendable revolution in libraries is the establishment of consortia to facilitate collaboration in the provision of information. A major challenge to libraries over the years has been the escalating cost of accessing information resources. The current development in establishment of consortia has helped libraries to address the challenge of cost. The Kenya Library and Information Services Consortium (KLISC), established in 2004 is a success story in the collaboration of libraries in Africa. The consortium membership currently stands at 100 institutional members consisting of universities, research institutions, government libraries, national museum, national archives and large government tertiary colleges. The main objective of KLISC is to facilitate cost sharing for accessing electronic information resources. This has made access to information affordable for member institutions. Through their efforts other university libraries are taking the challenge of availing their research output through digital repositories.

Development of library consortia in Africa have been instrumental in establishment of university digital repositories to enhance visibility of indigenous research output. The author, Jacinta Were, has participated as a facilitator in workshops in several African countries to strengthen library consortia and encourage establishment of digital repositories.

One major mistake the world continues to make is to view farmers in Africa in terms of low literacy levels. This definition is no longer the case in Africa. A greater percentage of the current farmer in Africa consists of high school leavers who have the capacity to repackage information for themselves. Given the opportunity, they can tap on the information in the academic libraries and retrieve what is useful to them.

The challenge of access

Nevertheless, access to information is still a tricky area in Africa. Traditional methods of storing information hamper efforts in accessing the information particularly in libraries. Poor ICT infrastructure on the ground is another challenge. There is need to focus on strengthening ICT infrastructure to



revolutionise dissemination of information to the farmer. Repackaging of information to suit the needs of the farmer has been discussed in several global forums over the last couple of years yet very little has been done about it. This is an area that requires urgent attention to facilitate access to indigenous research output in universities in Africa. A lot of attempts have been made in the past by different organizations like FAO to increase visibility of research out in universities. The Imarc project of FAO created a platform for universities in Africa to upload their agricultural research output. These efforts should be re-evaluated to identify impact and improve on strategies where needed.

Bridging the gap

There is need to bring librarians on board and encourage close collaboration between libraries and agricultural knowledge management resource centres to enhance dissemination of information to the farmer. A lot more can be achieved through this collaboration. Strategies should be identified to assist agricultural knowledge management centres to access the rich quality information held in university libraries and other academic institutions to benefit the

farmer. Librarians could be re-trained to strengthen this collaboration. Professional librarians have very special and unique skills in classifying documents for easy and effective retrieval. This knowledge should be tapped to enhance dissemination of relevant information to the farmer.

The public library network is key in the provision of information at the grassroots. In Kenya for example the National Library Service has penetrated almost every county. People in rural area can go to the nearest library station to get the information they want. These library stations can be used to get relevant information to the farmer. They need to be sensitized on what is relevant to the farmer and can be stocked with this information to assist the farmer. Librarians in public libraries can be re-trained to assist the farmer more effectively. The National Library Service is a member of KLISC and provides access to both print and electronic sources which can be accessed at the grass roots. Attention should be paid to taking advantage of public library stations where they exist. ◀

References

<http://erepository.uonbi.ac.ke/>
<http://www.uonbi.ac.ke/>

Library users at Kenyatta University, Nairobi, Kenya



GIACOMO RAMBALDI

Woman contributing data to the 3D model. (Villages of Telecho and Oromia in Ethiopia, 2010)

Participatory data

Participatory 3D modelling is a community-based tool that builds on local and indigenous knowledge for a variety of purposes, such as land use planning, watershed management, disaster prevention, communication and advocacy.

Tools 2.0

Participatory 3D modelling (P3DM) is a community-based tool – better defined as a ‘process’ – that integrates local spatial knowledge with data on land elevation and sea depth to produce a physical model. Local communities participate in the model building of the territory that they rely on for their livelihoods and cultural practices. The kind of data that the P3DM process generates are extremely diverse, but essentially are data that are relevant for local knowledge holders: from land cover and land use

to infrastructure – all of which are intimately related to a given people’s culture, their sacred sites, and burial grounds.

Local knowledge holders may be interested in sharing data, but there may also be data that they may consider private and sensitive. However, they may like to locate and document this data solely for their internal use. They may wish to maintain strategic control over the information that is shared, how it is released and to whom.

P3DM has already been used in a variety of contexts: claim land ownership, transfer knowledge across generations, and manage conflicts. It has recently started to take off in the Pacific region, enabling people in small island countries – where rising sea levels are posing a serious risk to many people’s livelihoods – to take informed

decisions about how best to manage risk and adapt to climate change.

Origins of P3DM

P3DM was initially used in the late 1980s in Thailand, to demonstrate where the Royal Forestry Department was developing plantations for catchment rehabilitation. As such it was a conservation-based demonstration tool, not a participatory tool. Dr Uraivan Tan-Kim-Yong, an anthropologist at Chiang Mai University, was running a research programme involving hill tribe people. She invited her students to make small Styrofoam models and bring them to the villages to discuss soil conservation and soil erosion issues.

These models proved useful and eventually drew the attention of other parties, who began to develop and deploy the P3DM process. The Thai-

German Highland Development Programme (TG-HDP) (1981-1998) funded by the German Agency for Technical Cooperation was on the forefront in making use of the tool [1]. For the first time the 3D models began to be used on a village-to-village basis and in a participatory manner. 3D models started to shift from being a demonstration tool to an education tool, and finally a planning tool. In 1993, a workshop was held in Thailand attended by several NGOs from Southeast Asia. Organisations such as the Philippine Association for Intercultural Development (PAFID) and Green Forum Western Visayas began to embrace P3DM and started using it with indigenous people. It enabled them to address the demand coming from tribal minority groups to generate a great deal of data to prove their ancestral occupancy of land and waters in order to get their customary rights of tenure and use recognised by the government. Over the years, P3DM has benefited from the creativity of the many practitioners who have been engaged in the process.

Initial challenges

All new technologies face implementation challenges. With P3DM, the initial one is posed by the availability of sufficiently detailed, up-to-date and accurate digital elevation models (DEMs). For example, some DEMs were produced decades ago. So if a blank model is constructed based on an obsolete elevation model, knowledge holders may point out landscape features that have changed, such as an eroded coastline, a mutated river’s course or slope that was altered by a landslide. Once the DEM issue is solved, the model is populated by local knowledge holders, where they share and visualise their spatial knowledge. People have a lot of fun doing this kind of exercise and get a great deal of gratification from it.

Another challenge is the difficulty of applying P3DM to map out large areas, such as an entire country. P3DM requires substantial preparation and logistics. As a result, the tool is often deployed in hotspots, or critical areas. In small island countries it is a useful tool used to map land and seascapes, and eventually large parts of an entire country.

The community decides what to do with the data as it is generated and used by and for the community for local development and local issues.

In certain countries the use of P3DM has had a definite impact on policy. In the Philippines, the government has adopted the process in many different contexts, from conflict resolution to awarding indigenous tenure on land and water. In 2001 the minister of the environment and natural resources signed a memorandum circular that recommends the use of P3DM in “protected area planning and sustainable natural resource management” [2]. As of November 2014, in the Philippines 165 models were made that provided critical data for policy making. Samoa is a more recent case where the government has embraced the process in the context of



Elders discussing features on the map and youth watching carefully. (Villages of Telecho and Oromia in Ethiopia, 2010)

GIACOMO RAMBALDI



climate change adaptation and community-based risk management. At international levels, P3DM has been cited as a recommended process by CTA, UNDP, IFAD, GEF, UNESCO and more recently by IUCN in the context of the 2014 “Promise of Sydney”.

From physical to digital
Custodianship of the 3D model is important to determine where the models are stored and who is responsible for their conservation, use and updating. A model is useless if it is locked up in a room where people cannot access it, or if it is stored under a glass cover and becomes a museum piece. The models have to be part of everyday life. They are used to educate children about local geography and history. This is true of physical models which are usually under the direct control of the knowledge holders. However, their digital representation follows a different path and has usually different custodians.

Once the data goes from physical to digital there is a risk that it will be misused or unwittingly shared. It is crucial that the intermediaries appointed as custodians of the data, are a trusted and reliable entity that will protect the data and respond to the community’s wishes in terms of data sharing. Trust and ethics play an important role in this. Research work may be extractive and could fail to consider that the mapping process should first and foremost benefit the knowledge holders. Unscrupulous individuals may entice people to share data to exploit resources. P3DM implies that a high level of ethics is applied and trust established between the actors involved: the knowledge holders and the technology intermediaries/facilitators.

In 2006 the community of practitioners focusing on Participatory GIS practice has developed a guideline [3] on practical ethics for PGIS practitioners, facilitators, technology intermediaries and researchers to stimulate the adoption of good

Knowledge holders discussing the outline of a dirt road on the model. (Villages of Telecho and Oromia in Ethiopia, 2010)

practice. It has been published in 12 languages and governs the way people doing participatory mapping should behave in the process of generating, handling, storing and sharing data. The code recommends that knowledge holders remain in full control throughout the process and that data are gathered and eventually shared with their free prior informed consent (FPIC).

For the most part, P3DM data have been well protected. But there have been cases where data entered into a model were misused. In South-East Asia, there are accounts that graveyards located on a 3D model were plundered because such data were not removed and left accessible to the public. Therefore, it is important to make people aware of the implications of geo-locating sensitive data and making it public. They can then decide what to visualise, what to leave or remove from the model.

One of the most important components of a P3DM process is to involve external agencies from the very beginning. This can raise awareness among “outsiders” about the depth, accuracy and relevance of local knowledge. This may induce a new sense of esteem for local knowledge holders. ◀

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“Aquacrop”, crop water productivity model

Intended for agricultural researchers and stakeholders, “Aquacrop” is a crop water productivity model developed and distributed by FAO since 2009. By evaluating different parameters, it enables yields to be improved in an environment where water is scarce. A robust model that is easy to use and produces rapid results whose usefulness increases in line with the scope of challenges related to global changes.

A simple and robust model

Developed by a team of physiologists and engineers, the Aquacrop model is an intuitive and easy-to-use tool that extension workers can use to achieve optimum efficiency. The data required by the model are simple and need no complex calculations. This includes details of the crop, the climate, the condition of the soil, management and yield, etc. Once the data have been entered into the Aquacrop system, a calculation (highly complex) is automatically performed, and the results are almost instant: at that point, information is provided on how and when to irrigate corn to get the best yield, etc. A computer is all you need to use the model, which is available as a free download from the FAO website. The model can be used anywhere in the world, for any type of crop; for example, beans, sugar beet, etc. A large number of crops are modelised and calibrated in the model, but Aquacrop allows the data to be very finely contextualised. Dirk Raes, one of the main developers of the Aquacrop model, a researcher and teacher at the Division of Soil and Water Management at the KU Leuven University (Belgium), explains the richness of the model in the case of corn in this way: “Aquacrop includes a ‘general’ model for corn that incorporates the generic characteristics of this plant (sensitivity to drought, soil salinity, etc.). However, the model also includes questions to refine the analysis (Is it a long-cycle or short-cycle corn? When was it planted? In what density? etc.).”

Training, at the heart of the development of Aquacrop

Aquacrop’s promoters are not content simply to distribute it without support for users. Particular attention is therefore given to training. Workshops are held worldwide (in English, French, Spanish, and even in Russian) through the intermediary of FAO. Dirk Raes has led a number of these courses, in China, Egypt, South Africa, Burkina Faso, etc. The five-day training courses and workshops for thirty people combine theory and practice. On completion of the workshop, the participants are able to use Aquacrop independently. These workshops also provide FAO with the opportunity to test its model, which is constantly being adapted in order to make any necessary improvements. The software is currently in English. There is a user manual in French, and translations into the official languages of FAO are planned (as well as French and English, there will be Spanish, Chinese and Arabic).

Success and limitations of the model

The success of the model is undeniable. This is unanimously agreed in the world of research, as evidenced by the numerous scientific publications in which it features annually. As further proof, the Aquacrop website is extremely popular (1,200 visits per month to the Aquacrop page, according to recent estimates). Nevertheless, Dirk Raes wonders if the original target of the extension workers and agricultural development agents has been reached: to date, FAO has received little



feedback on the use of the model and its real impact from these key stakeholders.

Young farmer in a field of maize, Trinidad and Tobago.

Furthermore, the researcher, who is focused on constantly improving the model, also sees its limitations: “We may well have a wealth of data, from which we make detailed analyses and recommendations, but Aquacrop does not make the policies. The next step is the creation of a model that goes even further, new software that translates the results into practical advice that is even more precise.” ◀

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<http://www.fao.org/nr/water/aquacrop.html>

VIVO and Agriprofiles: A tacit knowledge discovery tool

Time has become a scarce resource for those who live 'connected' lives and make daily use of the internet, social media, e-mail, mobile services and information alerts – and the rise of big data is putting further pressure on our ability to consume such large amounts of explicit knowledge. Indeed, the amount of explicit knowledge available on the web related to agriculture alone is too overwhelming for anyone single person to process.

There has been a recent move in ICT4Ag circles to focus not only on capturing explicit content in databases but also capturing tacit knowledge – 'brain knowledge' that is more difficult to transfer because of its captivity inside humans and the complexity for skills, such as playing the violin, flying an aeroplane or growing crops. Sharing this knowledge in a 'community of practice' creates more opportunities to collaborate and generate better knowledge.

Semantic web tools

Imagine using a regular search engine to look for the Spanish word 'papa'. The results would be dizzying and cover at least three different connotations of the word: potato, father and pope. This is a typical example of the limitations of searching through non-structured

data. Open-source semantic web tools such as VIVO – which links information that can be easily read by machines – overcome this limitation, however. VIVO was developed by Cornell University in 2004. It can be downloaded for free and allows organisations and their professionals to populate it with research and other information.

VIVO's potential as a useful tool for the agricultural sector was first discussed during a 2009 meeting of the Agriculture Network Information Center, a voluntary alliance of US universities, the US Department of Agriculture and the Inter-American Institute for Cooperation on Agriculture. Soon after, VIVO appeared with increasing frequency on the web and has improved over time – so much so that international institutions such as the Food and Agriculture Organisation of the United Nations (FAO), the Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA), the Global Forum on Agricultural Research (GFAR) and others started piloting the tool for use in the agricultural sector.

VIVO is essentially a simple directory of individuals, but its machine readable technologies give it numerous advantages. Its semantically structured data facilitates research discovery. The visualization of linked data shows networks and maps. And it

is 100% interoperable and Open Archives Initiative-compliant.

Implementing VIVO in developing countries may face familiar obstacles to those encountered in information management and knowledge in agriculture: first, information is a low priority compared to other more urgent needs. Second, the interoperability between databases or information services (unstructured data) is poor. Third, there is a lack of data about human resources and inexperience with semantic tools. And finally, the IT infrastructure in public agricultural institutions is in most cases inadequate.

A tool for all

To meet these challenges and discuss how to upscale VIVO and other pilot initiatives, representatives from FAO, GFAR, Cornell University, CTA and IICA met in 2014. The discussion led to the creation of what is expected to become the largest discovery tool of tacit knowledge for agriculture in the world: Agriprofiles. This initiative,



Federico Sancho, IICA

and the future pathways to implement it, take into account developing world realities and identify at least three kinds of potential users.

First, organisations with a well-developed infrastructure, robust IT services, and hardware and human resources systems that work in a similar way to VIVO. In these cases, the intention is to have export protocols that will allow data to be shared from any system to Agriprofiles.

Second, organisations with a semi-developed infrastructure, some IT services, and hardware that is limited to already existing services, human resource databases, directories and spreadsheets. The goal with such organisations is to export the data into a VIVO system of their own (local or in the cloud), for example,

to allow information to be shared with Agriprofiles.

Third, organisations without a developed infrastructure. These lack updated servers and IT resources to maintain a semantic web tool, and do not have a human resources database or automated service to present their human capital capabilities. In these cases, Agriprofiles would open up a private space in the cloud for each organisation so they can manage their professionals, link them up at the national or regional levels and have them appear on Agriprofiles.

The main idea is to collect and generate tacit information from as many agricultural professionals as possible. Professionals will be able to update their profiles, just as easily as any individual can do on LinkedIn or Facebook. And users can generate

visual maps and networks of the information submitted by these professionals.

Agriprofiles is an exciting development in information and knowledge management in the agricultural sector. It gives organisations that produce knowledge a better opportunity to work together and follow common procedures that will allow search engines and discovery tools to reuse and link information more effectively. It will make it easier to know who is doing what in order to avoid duplicity and collaborate towards similar goals. And finally it will enable agricultural policy makers to see what their countries know and who manages this knowledge, and strengthen their commitment to sharing knowledge more openly. ◀

Related links

VIVO

→ www.agrivivo.net

Agriculture Network Information Center

→ www.agnic.org

Inter-American Institute for Cooperation on Agriculture

→ www.iica.int

FarmDrive, a win-win system

Tools 2.0

African smallholder farmers face a recurring problem of access to finance and credit. Financial institutions, for their part, do not have access to many potential customers, considered as too risky. Young Kenyan computer scientists have developed FarmDrive, an application that aims to promote access to credit and financial services for smallholder farmers. Banks remain to be won over, but the project is on track.

Linking supply to demand

Most smallholder Kenyan farmers are excluded from the financial system because they do not have a satisfactory credit profile. Without access to formal credit systems, they use alternative systems providing credit at high interest rates, which, in addition, are not well suited to support their farm and off-farm activities.

Having done this, the FarmDrive team met banks and organisations financing smallholder farmers to better understand the reasons for exclusion. They discovered that it is often the lack of information that locks farmers out of the financial system. They decided to try to fill this gap by collecting information from farmers, and analysing the data obtained, establishing their credit profile. Once this is done, farmers can apply for a loan via the platform FarmDrive.

Four Kenyan young entrepreneurs are at the origin of this project, three women, all who have studied Computer Science at the University of Nairobi. Peris Bosire, in charge of Business Development at FarmDrive, demonstrates the commitment of this young team, who wanted to use their knowledge and skills to help smallholder farmers. Being from a farming community, Peris Bosire has noted that few applications were available for family farmers in Kenya, hence her interest and desire to help.

Banks and small producers, "users" of FarmDrive.

The project is currently deployed to a group of dairy farmers from Githunguri Village, who are the early adopters and testers. The next phase will incorporate poultry farming and afterwards capture all types of production. The information collected from milk producers helps to establish an accurate profile of the farms: farm size, number of cows, milk yield, monthly expenses, income etc. FarmDrive also collects more general information on climate, and soil type etc. from the Kenya Agricultural Research Institute (KARI).

Established in May 2014, the project already includes 2,000 producers, who are mostly geographically isolated farmers that FarmDrive will canvas

during field visits. The majority of these users are not equipped with high-end phones, but simple cell phones. FarmDrive technology is suitable for this equipment, and currently uses mobile web and SMS technology. The USSD and native Android are in the development process. The team organizes training to villages to educate producers and explain the benefits of the developed service. This training is an opportunity for farmers to ask questions and give feedback on the innovation, which is constantly being improved.

Initially, founders of FarmDrive thought they would manage peer-to-peer loans, but given national regulations, they had to work with recognized financial institutions to better understand adoption incentives. At present, FarmDrive founders are discussing a potential partnership with a Kenyan bank.

Looking forward

The section devoted to information on farmers has been developed. The FarmDrive team is now working on the financial part, to establish credit profiles. This step is crucial but complex in that bank requirements are stringent. The team is mostly facing financial difficulties in the project development phase. However, FarmDrive has attracted the interest of many actors beyond Kenya. Various stakeholders from the Caribbean and Japan were interested. A Nigerian company is exploring the possibility of having the system deployed locally. Peris Bosire is convinced that the idea is viable and she is optimistic: small producers represent a niche market that has not been explored by financing companies. Using FarmDrive, thanks to the data they acquire on producers, they will both be able to be reassured and better adapt their credit supply. ◀



Members of FarmDrive team at the ICT4Ag hackathon, in Kigali, Rwanda, 2013.

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Fisheries data: Could it be caught by mobile apps?

Milton Haughton, Executive Director of the Caribbean Regional Fisheries Mechanism (CRFM), discusses the importance of accurate fisheries data, why this is so difficult to collect and the need for new models in collecting, validating and distributing the data. He also talks about the future role of mobile apps in filling this role.

Why data is so essential for Caribbean regional fisheries policy

Having good data and information regarding the status of the fish stocks and knowing exactly what is going on in the waters with respect to the fisheries and the marine ecosystem is vitally important. We need to make decisions on the basis of good evidence, that is, good data and information on what is going on in the fisheries. It is clear that for most commercially important species, we do not have required data and information. There is very little room for further expansion of many of the wild captured fishes and so we need to better manage and conserve these resources to ensure long term sustainable use and to protect the livelihoods of the thousands of fishers and coastal communities, so we need better data in these cases.

There is a commitment to work towards improving the quality and the quantity of basic data and information regarding the species that are captured, the quantities that are captured, the number of fishers that are involved in the fisheries, their earnings, as well as to be able to track the trends in these resources. At the moment it is very expensive and difficult to get this type of data. It is not as easy as collecting data on land where, for example, you can easily go out and count livestock. Fisheries by its nature, is conducted in a very difficult environment. You need research vessels, and you need persons with specialized skills and expertise in fisheries and statistics. However, in the past the responsibility for providing data and information rested on government fisheries officers and that is a problem, because they do not have

direct access to the information in most cases, while the fishers, fish processors and exporters are handling the product from harvesting all the way through to the marketing. If we are able to work more closely with these stakeholders, we could see significant improvement in both the quality and the quantity of data and information that we have regarding the status and the trends in these resources.

Our problem is that many times we try to do stock assessments to make projections and to develop management and conservation measures but come up against this wall of not having adequate data. The credibility of the data is also very important, and stakeholders will have more confidence in the management measure when they know that they have been involved in providing the data, and they have confidence in the process by which the data is generated, analysed and the management recommendations put together.

Why Mobile applications might provide a solution to data capture

At the last ICT4Ag conference we heard a lot about a mobile application for fisherfolk called mFisheries. This software not only had many features that supported their role in fishing but it also helped fishers to record their own catches.

Although it's not yet making an impact on the overall scheme of things, it has tremendous potential and there is interest in using it more widely in the region. The experimental work continues so we have not yet incorporated it into our formal process of stock assessment. We are very keen



in supporting the use of mFisheries, and to get more fishers involved with it. This means not only using the application for providing information for their own personal immediate benefit in terms of finding their fishing sites and then linking up with the markets to sell their catches, but also to generate the type of scientific data and information that is needed by researcher and fisheries officials. They can then use this information in order to monitor the wider trends in the industry and conduct stock assessment analyses. So, we do have plans to scale up to national and regional level using ICT tools such as mFisheries and similar apps. ◀

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Flickr/NEIL PALMER/CIAT

Cloud Cover: A Favorable Forecast for Open Access in Agriculture

The cloud is no longer an overhyped IT buzzword or even just a trend to consider.

These are inspiring times for Open Access in agriculture. The last decade has brought game-changing advances in ICTs – smartphones/tablets, broadband Internet, and open-source platforms for openly publishing just about any type of information/data product – and a significant increase in their availability to both researchers and farmers. There are positive signs that many of the gaps at the core of the digital divide are being filled not only by broader access to devices and connectivity, but also by employing information standards to provide meaning – semantics – to information products that are made open.

In fact, with open access and open data, the focus is naturally on suitable

repositories and both syntactic and semantic standards, ensuring the greatest potential for use, innovation and knowledge transfer.

But despite the advances in the availability and accessibility of ICTs, does making information products available and accessible in suitable, standards-based repositories guarantee that open access knowledge products are within the reach of those who can benefit most?

Reliable technology infrastructures, scalable resources and worldwide availability are the sine quibus non of ensuring the best accessibility and availability of Open Access information products.

What is the cloud

The cloud is not a new concept – it has been around for many decades, using terminals to share access, computing power and storage among users over a network. Again looking at the last decade, the cloud too has seen focus and refinement, and Cloud Computing has emerged to support reaching the

goals of the open access and open data movements in Agriculture.

Today the cloud has evolved into a flexible, cost-effective and highly scalable infrastructure of computing power and storage, and it can provide scientists and researchers the missing link between opening access to knowledge and data and making it more practicable to use.

Cloud Computing – pioneered by Amazon Web Services and recently more competitive with players like Google Compute Engine and Microsoft Azure – has won acclaim by allowing IT professionals to quickly and efficiently “spin up” services, storage, computing power and IT networks, allowing for cost-effective use of the services.

However, there is one important aspect of the cloud that is often overlooked, and in my opinion, will allow open access and open data for agriculture to thrive in achieving the fullest access and availability possible: the cloud’s global infrastructure.

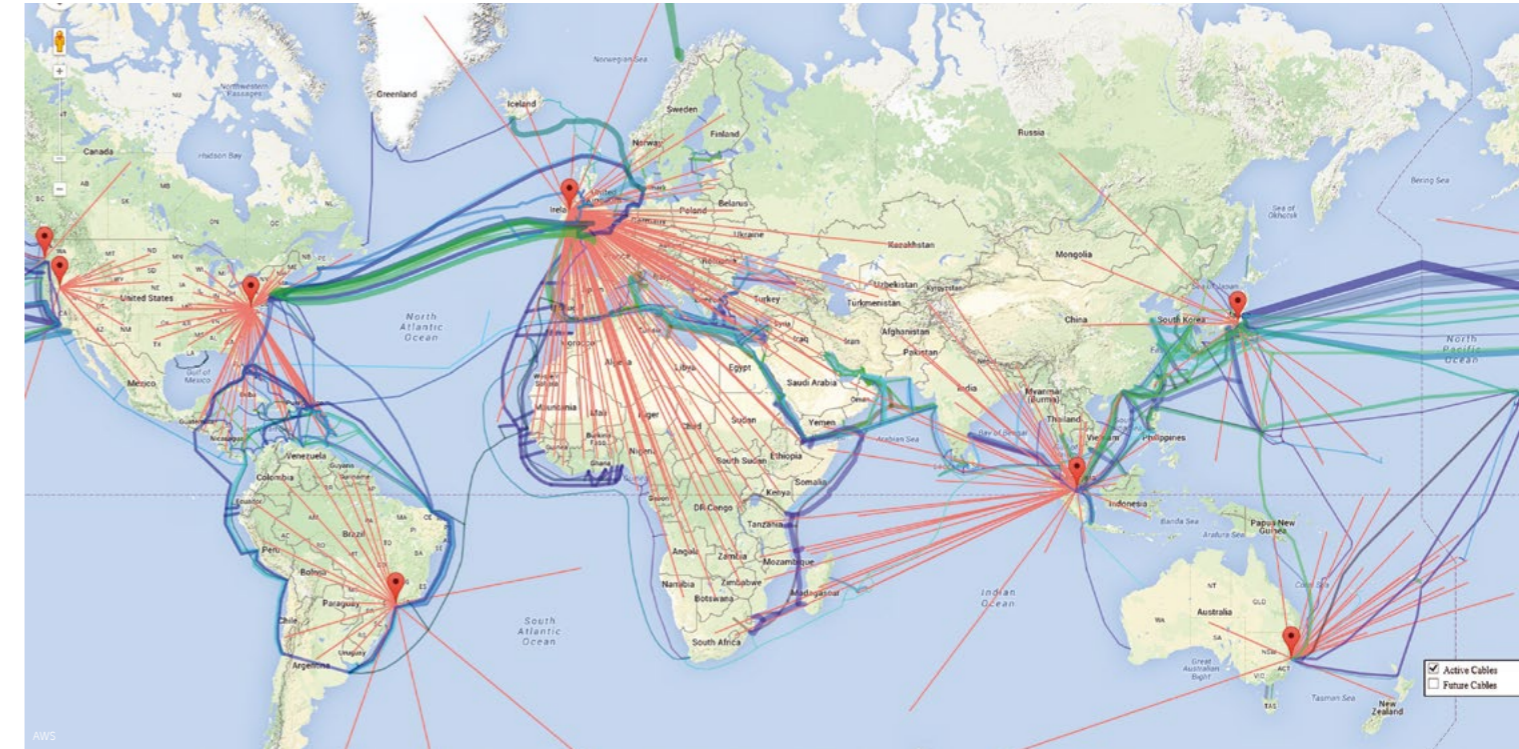
Cloud providers’ infrastructures make services and storage accessible via Availability Zones across geographic regions. For end users across the globe, regardless of their physical locations, access to services, data, and knowledge stored in the cloud can be achieved at the highest level possible.

the reach of most of the world, even to those in low-bandwidth locations. Both depend on the cloud and Availability Zones to guarantee the best possible access based on the end user’s location, making the platforms practicable to use and access.

Open access and open data are for the global public. Users’ proximity to

Change and Food Security (CCAFS) on the Amazon Cloud, AWS.

The 7-terabyte GCM datasets are considered one of the most important instruments in climate research, providing researchers tools for making climate change impact assessments with future climate projections. Today, the GCM datasets are more accessible



How is the cloud improving open access and open data in agriculture?

The cloud is playing an important role in improving global access to knowledge resources. For example, collaboration platforms for decentralized teams was once a real obstacle. Traditionally with IT platforms, one criterion used when selecting where to host data, documents, and applications is proximity, and hosting platforms in proximity of users – possibly the same network – can greatly improve users’ ability to access resources by reducing the “Internet travel” distance and time. With decentralized teams, difficulties dealing with proximity are quickly disappearing.

Google Apps and Microsoft Office 365 – two well-established cloud-based collaboration platforms – are within

open repositories is an unpredictable concept, and the cloud offers the best proximity to the public at large.

With open data, in particular, storage can easily become a liability, mainly due to data growth and the amount of data to store and deliver. Cloud storage is scalable and reliable, and most importantly, data stored in the cloud can be processed using the computing power of the cloud.

In CGIAR, our open access and data management policy clearly requires the permanent access to our research products. We believe that widespread dissemination of our research products is key to achieving the maximum impact.

In December, we took a major step forward to making data more accessible. We published the Global Circulation Models (GCM) from the CGIAR Research Program on Climate

globally because of the cloud.

Many non-IT professionals tend to shy away from using cloud technologies and feel that the cloud is out of reach. But I see this changing rapidly, as tools and statistical analysis packages for scientists and researchers are becoming available in cloud marketplaces. And with open data stored in the cloud, researchers will no longer be constrained by their own limitations to download large data sets – processing to obtain results and produce innovations will not depend on a researcher’s Internet connectivity or individual, local processing capability.

For the open access and open data movement in agriculture, I believe the cloud is essential to achieving one of the key goals of making agricultural knowledge and data open: available and usable for worldwide use. ◀

Existing global connections (‘Active Cables’) between Amazon Web Services (AWS) data centres. To view this map and ‘Future Cables’ locations visit <http://turnkeylinux.github.io/aws-datacenters>

Tools 2.0

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2015 Upcoming Open Data4Ag key events

18 February (Brussels, Belgium): **40th Brussels Briefing** on "Data: the next revolution for agriculture in ACP countries?". By looking at significant trends, approaches and experiences in using open data for food and nutrition security, this Briefing shall shed light on the impacts of the global data revolution for agriculture. Over 120 key stakeholders includes ACP-EU policy makers, regional organizations, representatives of EU Member States, European Commission services, Members of the European Parliament, private sector, civil society groups, European research and development practitioners and international organizations.
→ <http://brusselsbriefings.net/> @brubriefings
#BrusselsBriefing

21 February : **International Open Data Day**. A gathering of citizens in cities around the world to write applications, liberate data, create visualizations and publish analyses using open public data.
→ <http://opendataday.org/>

9-11 March (Abu Dhabi, United Arab Emirates): **Global Forum for Agricultural Innovation** on "ICT for Sustainable Agriculture". This conference will focus on how ICT can promote sustainable, climate resilient agriculture and promises exciting solutions for food producers.
→ <http://www.innovationsinagriculture.com/>

27-29 March (Addis Ababa, Ethiopia): **Data Revolution in Africa** on setting the scene for a sustainable development agenda powered by Data Revolution in Africa. The process of bringing together diverse data communities to embrace a diverse range of data sources, tools, and innovative technologies, to provide disaggregated data for decision-making, service delivery and citizen engagement; and information for Africa to own its narrative.
→ <http://www.uneca.org/datarevolution>

15-18 May (Singapore): **7th International Conference on Information and Communication Technologies and Development (ICTD 2015)**. ICTD is the world's premier conference examining the role of computers and communications in social, economic and political development.
→ <http://ictd2015.org/>

27-29 May (Ottawa, Canada): **3rd International Open Data Conference** on "Enabling the data revolution". It's time to explore a wide variety of open data issues and collaborate on charting the future of open data.
→ <http://opendatacon.org/>

June 29 to July 2 (Poznan, Poland): **European Federation for Information Technology in Agriculture**, EFITA, INFITA, WCCA, CIGR 2015 Conference.
→ <http://www.efita2015.org/>

Flash back to 2014 successful key activities

Expert consultation on KNOWvember

During the month of November, CTA held a #KNOWvember campaign with a series of training workshops in Knowledge Management (KM) and an expert consultation on the future of agriculture knowledge resource centers. This came hot on the heels of Open Access Week held globally each year in October. To strengthen the capacity of ACP institutions in Information, Communication and Knowledge Management, CTA developed and piloted two courses and launched the online KM scan.
→ <http://www.cta-kmscan.nl/>

Facilitating the Convergence of ICT Channels for Agriculture

The CTA Experts consultation took place from 29 to 31 October 2014 in Rheden, the Netherlands and gathered together experts using channels such as mobile phones, web, radio, video, interactive voice response (IVR), telecentres, animation and print with farmers, researchers, extension specialists, and donors. A key recommendation from the participants was that, to achieve real impact on the intended beneficiaries, stakeholders should develop partnerships and collaboration that build on existing models and approaches. Contact us and follow the event at
→ bvdm@cta.int and #ITconverge4Ag

CTA's leadership in ICT4Ag is bearing more fruits

A new report released by the UK All Party Parliamentary Group (APPG) on Agriculture & Food for Development – "Harnessing the potential: ICTs and Knowledge Sharing in Agriculture" recognized the 2013 International Conference on ICT4Ag by CTA and partners. 10 key recommendations of the APPG report which agree with the policy pointers of the ICT4Ag Conference will be released in few weeks. CTA has been at the forefront of promoting the use of ICTs in agricultural value chain development, extension and advisory services, and agriculture and rural development policy processes.
→ www.ict4ag.org

Web 2.0 for Development and Social Media spread like wildfire in Vanuatu

Undertaken by the Secretariat of the Pacific Community in collaboration with the Vanuatu Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity specifically the Department of Forests (DoF) and the Office of the Government's Chief Information Officer (OGCIO), the five-day learning opportunity took place in Port Vila. Twenty-three participants – fifteen men and eight women – from different organisations were in attendance.
→ www.web2fordev.net

CTA's latest Policy Pointer "ICTs for Agriculture: Making it Happen"

This publication is the voice of the over 500 participants of the 2013 Kigali International Conference on ICT4Ag from the private sector, public sector, international organizations, farmer organizations, NGOs, etc. on the future of ICTs in agriculture.
→ publications.cta.int/en/publications/publication/1817

D8 Open Data for Agriculture: G8 Side Event at IFPRI

Open Data is a hot topic in agricultural development. The topic has garnered so much interest that G8 leaders held an International Conference on Open Data for Agriculture two years ago in Washington. The event featured eight speakers, each with a five-minute ignite presentation to stimulate awareness, thought and action on Open Data.
→ <http://www.ifpri.org/event/open-data-agriculture-side-event-ifpri>