ICT Update

a current awareness bulletin for ACP agriculture

CTA
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Global Open Data
for Agriculture & Nutrition
e-agriculture

Researchers need to interact to ensure that their data-based knowledge and expertise is used and useful.

Gender citizen-generated data has been uploaded to mobile phones and distributed to women leaders in Kenya.

See the renewed multi-stakeholder action agenda to create impacts with open data in agriculture and nutrition.

Open data benefits for agriculture and nutrition

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Editorial

Why focus on data? Why GODAN?

In September 2016, the first Global Open Data for Agriculture and Nutrition (GODAN) summit took place in New York. And in February 2017, the third international workshop on impacts with open data in agriculture and nutrition was held in The Hague, the Netherlands. Both events showed progress made to provide better access to accurate, timely information for policy-makers, farmers and private sector to shape a more sustainable agriculture future.

About one in nine people on earth suffer from hunger and malnutrition. To tackle that data has risen high on the food security policy agenda. How can something abstract as data tackle such a real global threat as hunger and malnutrition?

In the last decade, an exponential increase in the volume and types of data has become available. First, there is the everyday flood of "big data" that has been created by interactions of billions of people using computers, GPS devices, cell phones, and medical devices in all countries, including developing and emerging economies. Secondly, it is about making data about agriculture and nutrition available, accessible and useable. According the Open Data Institute, open data is data that anyone can access, use or share. The last findings of the Open Data Impact Map show that just five sectors account for over half of the organisations that make use of open data in the last decade: agriculture, data/information technology, governance, healthcare, and housing and real estate.

The benefits for agriculture are potentially huge. Releasing the enormous stock of data will encourage cooperation and collaboration to solve long-standing and evolving problems, benefit farmers, provide informed based decision for businesses and policy-makers and will improve the health of consumers. It is believed that providing better access to accurate, timely information for policy-makers, farmers and private sector, can help

Open data can support in improving data in agriculture and nutrition at global scale

in shaping a more sustainable agriculture future with evidence-based solutions, contributing at the same time to a more transparent decision-making. Open data can support in improving data in agriculture and nutrition at global scale – by tracking progress better and increase awareness of what works – and how to share the best practices and innovations in open data that eventually could improve governance.

GODAN
From this premise, the GODAN initiative was created. It was the result of the April 2013 G8 International Conference on Open Data for Agriculture, when the leaders of G8 nations obtained commitment and action from nations and relevant stakeholders to promote policies and invest in projects that open access to publicly funded global agriculturally relevant data streams. They also aimed to make data readily accessible to users in Africa and worldwide. GODAN is a worldwide growing initiative with currently over 403 partners from national governments, non-governmental, international and private sector organisations that focus on building high-level policy, public and private

institutional awareness and support. The aim is that proactive sharing and linking data should make information about agriculture and nutrition available, accessible and useable to deal with the urgent challenge of ensuring world food and nutrition security.

The first GODAN Summit was held on 15 and 16 September 2016 in New York and brought together world leaders, researchers, businesses, farmer organisations, NGOs, students, international media and many others. They discussed and raised awareness about open data as a mean to advance the UN Sustainable Development Goal on ending hunger, achieve food security and improved nutrition, and promote sustainable agriculture, in order to change policies, and to illustrate best practices of making agriculture and nutrition data available, accessible and usable in all sectors and all nations.

After the GODAN conference, in February 2017 the third creating Impact with Open Data in Agriculture and Nutrition international workshop took place in The Hague. Where the GODAN summit showcased progress at a policy level, The Hague workshop shared experience of practical interventions across the world. It focussed on some big wins in the sector and the next steps that can be taken to put these wins in place, with an emphasis on private sector actors. (See more on the third international workshop on page 4)

Different perspectives from users

One important target group that plays a vital role in the success of open data development, are App developers who bring new ICT services to the market based on data collection, data dissemination, and data sharing. Also, journalists, campaigners, and farmer organisations are important intermediaries between the supply and demand of data. They take the data and transform it into accessible information best adapted for local context. A focus on the users' perspectives, therefore, should prevent policy-makers from open data becoming a goal on its own.

Open data promoters need to overcome many challenges such as difficulties in data access, institutional barriers, poor data quality, lack of adequate technical skills, lack of regulatory frameworks or simply out of time data. So far, many questions have been arisen around the use of open data: how

Panel discussion at the GODAN 2016 Conference in New York (Perry Bindelglass)

do we ensure that no one is excluded from this open data revolution? How to avoid the trap of contributing to reinforce the digital divide between those who have access to data and those who don't have? How to ensure an inclusive open data ecosystem that can benefit end users such as practitioners, developers, data managers, policy officers.

Elements of consideration

Maximum impact can only be created if the promotors of open data are willing to work on a comprehensive policy approach on open data in agriculture that includes all stakeholders. An adequate infrastructure is needed for countries to leverage and upscale the work on open data. When referring to emerging countries, this shall comprise an adequate regulatory framework, where people are capacitated to access and use open data, and where challenges such as affordable and reliable internet (especially for emerging countries) are considered.

Promotors of open data need to provide robust recognised guidelines on data standards, data sharing, and data quality, to enhance data interoperability that enable users and producers of open data in agriculture and nutrition to work more effectively and in a more coherent way. At the same time, it is important to stress that because of their traditional role as a source of information, intermediaries can create the necessary linkages to fill the frequent mismatch between open data supply and open data demand. For instance, journalists or extension workers, can bring data and information closer to local realities.

Handling the amount of data

It is important to ensure that the beneficiaries - from government officials to representatives from

the business sector, to farmers and journalists - are technically prepared to handle the huge quantity of data that is produced on a daily basis, so that they are able to identify the best approaches that are most appropriate to guarantee impact on food security and nutrition.

Finally, there is no one-size-fits-all solution when it comes to open data. Instead, local solutions are needed that can address the real needs and challenges within the local context and demands from end users.

This issue of ICT Update, therefore, portrays how GODAN and other stakeholders are creating a global open data movement in agriculture and nutrition from the perspectives of its users by showcasing some of the best practices and the most common challenges in this field. ◄

About the authors

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Related Links

About GODAN
➜ http://www.godan.info/
Open Data Institute website
➜ http://theodi.org/
Open Data on CTA website
➜ http://www.cta.int/en/tag/open-data.html

Actions to turn the power of open data into real impact

At the third international workshop on the impact of open data for agriculture a new action agenda was discussed by a mix of organisations. They concluded that more focus is required on benefits for the less favoured actors, that open data should become a vehicle for multi-stakeholder collaborations, and that assessment of data driven organisational change is required. Further actions to achieve impact were also discussed in relation to business innovation and capacity building.

Brainstorming open data best practices at the 3rd international Workshop on open data impacts.

Open data benefits for agriculture and nutrition

In February 2017, the third international workshop 'Creating impacts with open data in agriculture and nutrition' was held in The Hague, organised by the Dutch Ministry of Economic Affairs, CABI, GODAN, CTA, and Wageningen UR. A total of 120 participants from key players at national, international and global level (governments, businesses, consultants, universities, research organisations and NGOs) took part in the workshop to share their views, practices, success stories and failures, and business cases. The third edition of the workshop particularly searched for Big Wins towards impact in agriculture and nutrition, the link between open data and the Sustainable Development Goal 2 (End Hunger), and business models for innovation with open data in agriculture and nutrition. It is the follow-up on the first workshop that recognised the need for an action agenda, and the second workshop that had drafted the initial action agenda.

ISAURA LOPES RAMOS

Renewed action agenda

The workshop resulted in an overall action plan for the coming years to be implemented by all the stakeholders that consider open data as important. One important action that was discussed is to develop frameworks and models for benefit sharing across the data value chain, incorporating the rights of the least-favoured. For example, farmers in the developed and developing world, who see others using their data feel that they are not experiencing the benefits equitably. A similar situation applies to smaller organisations, like cooperatives or local NGOs, who might lack the organisational capacity to obtain the benefits. For open data to succeed, models and frameworks that make benefits explicit and sharing them across the data chain, need to be developed, just as the rights of all players need to be ensured.

A second action is to activate open data as a tool for collaboration in multi-stakeholder environments. During the workshop, several sessions concluded that open data can bring actors together across the supply chain or in multilateral or multi-institutional government processes, like in roundtables on sustainable palm oil and soya. By jointly sharing and discussing the importance of data, the parties can build trust and examine new models for collaboration.

Another action is to develop storylines of data-driven organisational changes. With more data available, and more options for data-based decision-making, organisations might need to change their own organisational structures.

A second action is to activate open data as a tool for collaboration in multi-stakeholder environments.

Big wins

Next to these overall actions, specific actions were defined during the different sessions at the workshop – as well as many insights were gained. In the sessions on Big Wins three cases were examined: weather data, nutrition data, and biodiversity data. It became apparent that, although impact is substantial for open data on these three topics, the roads to achieve big wins were very different with different users, beneficiaries and mechanisms.

Take for example weather data. The chain to impact is quite simple for

GODAN SECRETARIAT

weather data: the more open weather data is available through met offices, intermediaries (e.g. small and medium enterprises, farmers' cooperatives) will build services on these data, which in turn can be used by farmers to plan their farm operations, and result in a de-risking of agriculture. In contract, in nutrition data, the chain to impact is much more complex, as many different steps can be measured in the distribution and processing of food and many links are possible to health, hygiene and agriculture. Often data is residing with different agencies and institutions (also universities), and to get it all together is a complex task. However, there is lot of potential to achieve impact in the better targeting of nutrition interventions by public bodies.

Finally, with biodiversity data related to agriculture, there are large networks of crowdsourcing and citizen-driven science at work that gather a lot of observations on biodiversity. These observations could potentially offer insight on local-specific contributions to agriculture productivity, for example, assessing the degree of a bee-friendliness as a crucial pollinator for agricultural crops.

Actions for private and public sector
The private and public sector have different organisational processes towards impact. For private sector firms, business models and value-adding services are important to enable them to invest in open data and data driven innovations. In a dedicated session, four actions were identified in relation to business innovation with open data. First, to document stories of data sharing, shifting revenue models,

In the public sector, the Sustainable Development Goals (SDGs) have been widely recognised as an important goal setting mechanism towards sustainability

benefits and risks in the private sector. Second, to develop thought provoking materials on supply chain changes and industry collaboration through (open) data/digitisation. Third, to establish a cross sector focus group on private sector to open-up their own data. And fourth, to disseminate successful business models based on open data to firms in the service sector.

In the public sector, the Sustainable Development Goals (SDGs) have been widely recognised as an important goal setting mechanism towards sustainability. In a session, the link between SDG2 (End Hunger) and open data was discussed, and a paper was launched by the GODAN Secretariat for an "Accountability Framework" for SDG2 linked to data that was developed jointly with the One Campaign, which focuses on monitoring the achievement of SDG2. Further actions identified in the session were on developing a paper on the mechanisms with which open data can help to reach the SDGs, building partnerships for transforming agriculture towards SDG2 with open data, and developing innovative show cases of private sector, project and programme contribution towards SDG2

with new data sources.

Capacity building
A final session looked at capacity building in organisations that work with open data. Capacity building was discussed from two angles: those that want to use the open data that is available (demand) and those that produce open data and intermediaries which consume open data to develop different services (supply). Participants identified that local conditions and context are extremely important to tailor efforts in capacity development, and that there is still a lot to be gained in training basic skills in data literacy, also as part of school curricula. Finally, capacity development should be done from the perspective of the end-user, so that he or she is ultimately helped in achieving the desired impacts.

During the workshop a number of important pledges by participants were made. Muchiri Nyaggah, Executive Director of LDRI, announced that G77 Ministers of Agriculture Conference on Open Data will be held In Nairobi, Kenya, with GODAN as co-host of the event. Wisdom Donkor announced the Second Africa Open Data Conference to be held in Accra, Ghana, in July 2017, in which agriculture and nutrition is one of the tracks. Malick Tapsoba from Burkina Faso announced a Francophone Africa Open Data Event to take place in June 2017, while finally, ISRIC and WaterWatch Foundation highlighted their commitments to open data as they are making available soil data and vegetation data respectively. These pledges and the renewed action agenda mean significant steps forward have been made to create impacts with open data in agriculture and nutrition in the years to come. ◄

The opening of the 3rd annual international workshop on 'Creating impact with open data in agriculture and nutrition, that took place on 13, 14 and 15 February 2017 in The Hague, Netherlands.

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Related links
See on Twitter: #GODAN #impact PowerPoint presentation on the outcomes of the 3rd workshop
➜ https://goo.gl/1RbhhB
Read about the outcomes of the 2nd international workshop
➜ https://goo.gl/HYTZjk

Kenya opens up agricultural data

The Kenya government initiated the Open Data Initiative in 2011 on the idea that Kenya's information is a national asset. Agriculture is one of the main pillars, because food security and economic development can only move forward if decisions on agriculture are evidence-based. To be successful, data needs to be available, accurate, and open for all.

Willy Bett is Minister of Agriculture, Livestock, and Fisheries in Kenya. He was one of the main speakers at GODAN 2016. (Perry Bindelglass)

PERRY BINDELGLASS

Open data benefits for agriculture and nutrition

The goal of the Open Data Initiative is to make core government developmental, demographic, statistical and expenditure data available in a useful digital format for researchers, policy-makers, ICT developers and the public. The website opendata.go.ke actively supplies the public with c urrently 942 datasets, like the complete latest census, national and county public expenditure data, information on health care and school facilities, which all have been bundled in themes, like agriculture, energy, water, infrastructure, health, governance among others. Beyond this online portal, the Open Data Initiative is supporting the digitalisation of government records and processes that will supply the portal in the future.

Informed decisions
Making data easily accessible is important for three key reasons. First, easy access to data will increase innovation and will generate economic and social value: from savings and efficiencies within government,

service delivery improvements and citizen feedback systems to new wealth and jobs generated in the private sector. It also enables data-driven evidence-based decision-making by parliamentarians, policy-makers, civil society organisations and individuals that can see progress and make accurate, informed decisions on issues that affect people's lives. The final reason is the foundation for improving transparency and accountability of the public sector.

Kenya is starting to see the beginning of a boom in applications that make use of open data. For example, DataScience is a software engineering company using data to develop big data analytics and research tools for business development. Open data catalyses the emergence of not only apps, but also open data labs and collaboratives such as the Health Data Collaborative, iLabAfrica and the Agriculture Data Community under the country's national partnership on sustainable development data.

Interdisciplinary analysis
For the future development of sectors such as agriculture, livestock and fisheries, open data will be vital. Open access to accurate data will generate information based on evidence, which will help promote, accelerate, and contribute to economic development and food security. Open data will contribute to Kenya's efforts to find answers to complex questions on climate change, and sustainable and productive agricultural development. Although in some instances agriculture is a contributor to global environmental challenges, we must find ways in which it is part of the solution. Making use of big and open data is one way to make interdisciplinary analysis possible in our quest to deliver comprehensive policies to address these emerging issues.

Such developments are not only important for Kenya, but for the whole continent. 70% of the African population relies on agriculture. The only serious way to improve the economies in Africa is by including

agriculture in economic development policies and making the data available for monitoring and review. That is why the Kenyan government is a focal point for a movement to stimulate open data in Africa especially within the context of the continent's agricultural transformation agenda. That agenda is implemented through the Comprehensive Africa Agriculture Development Program which is based on the African Union Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Livelihoods.

Pledges of African governments
As a result, African governments are exploring options for investing in and achieving sustainable and inclusive agricultural development. During the Africa Green Revolution Forum that took place in Kenya in September 2016, governments made commitments to increase access to credit for farmers, for example, or to stimulate technological exchange in terms of resilient varieties to make agriculture more productive. Further improvements and cooperation can benefit from the use of open data. Agencies and governments made pledges at the Forum totalling to many millions

Open data developments in agriculture are important for the whole continent. 70% of the African population relies on agriculture.

of dollars and have established new initiatives on building capacity and systems to increase data collection and sharing. With adequate data, we will open doors for local African-made solutions to address our aspirations for resilience, productivity and further development of priority commodity value chains.

The new drive since 2015 has not been unnoticed. In July 2015, the portal was voted as a finalist in publishing open data in a global competition held by Bloomberg and the Open Data Institute

in the United Kingdom. Still, there are some important questions to be answered. How do we increase capacity so data is collected in a proper and adequate way? How are we able to give every smallholder farmer access to data so he or she can use it in a relevant manner? How do we sensitise the population and increase collaboration to collect data and make use of it? How do we protect citizens from open data abuse, especially the very real concerns many have about privacy and security?

There is no time to waste, time is running out. Action and leadership are needed now. Investments are necessary for the technology, implementation and roll-out of a proper mechanism that not only secures open data, but also protects us from misuse. The Kenya government wants to become a greater champion for open data and, therefore, has become one of the advocates of the open data movement, especially in agriculture because Kenya depends on its future on agriculture. ◄

About the author
Muchiri Nyaggah is executive director of the Local Development Research Institute in Nairobi, Kenya.

Related Links
➔ www.opendata.go.ke

What has been done so far?
The implementation of the open data portal was the first step. The initial expectations were high and the initiative received praise from all over the world. After two years in operation some critical of the initiative began to appear questioning the real impact of the open data initiative, especially due to lack of an increase in available datasets, data quality, and lack of efforts to sensitise the public on the opportunities of open data. Some datasets were also structured in ways that made it difficult for developers to extract and use the data in their applications.

However, the newly designed Kenya Open Data Portal, which was launched in 2015, improved the number of datasets available significantly, addressed the quality aspects, implemented better visualisation of the information, and featured timely and interactive feedback to data consumers. As the portal looks towards its growth, several strategies have been instituted to greatly increase usability. For example, the data lens is a new tool to interact, explore and discover insights from data easily. It makes it easy for citizens and others to get answers to their questions in a visual, intuitive way.

In addition, eight fellows were embedded in three government ministries and a county government to help with data acquisition, information systems design and setting up of data desks. Already, 25 government agencies are sharing their data through the portal. The initiative is expanding partnerships with data producers and users with the aim of increasing utilisation of the data through outreach initiatives. The focus on county data makes specific data from and about counties easier to find and adds to the relevance of the open data portal within the context of a devolved system of government.

The impact of open data on smallholder farmers

Getting open data benefits to farmers will be crucial if the move towards open access is to have any real impact. There is a lot potential, but lack of reliable and contextualised data is currently working against smallholder farmers.

Infographic of CTA on how datasets can be used by farmers.
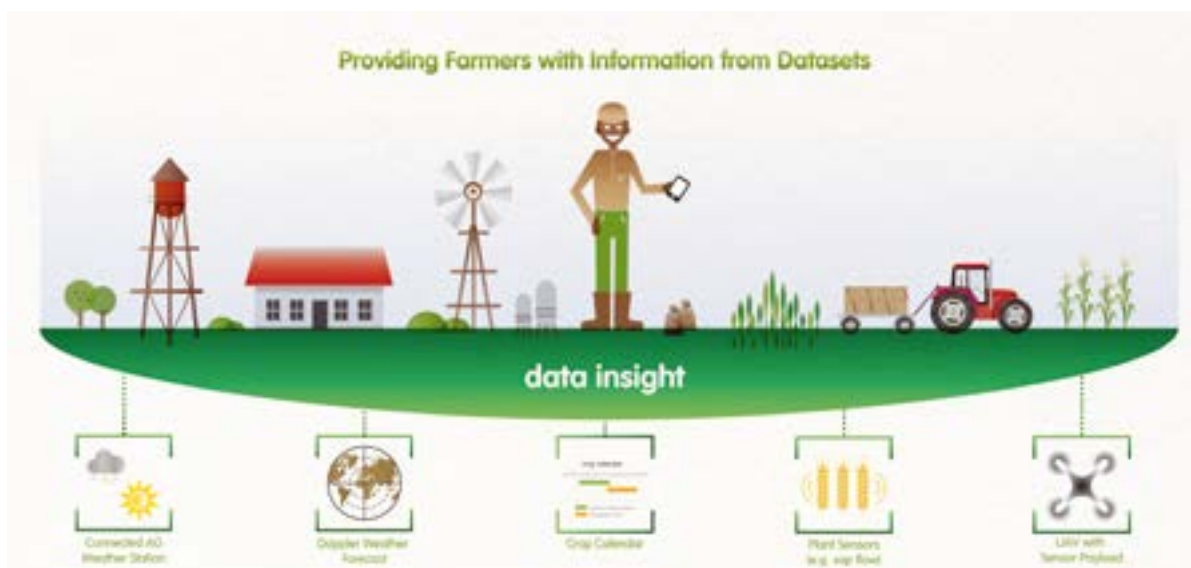
Open data benefits for agriculture and nutrition

Open data could offer significant benefits for smallholder rural communities in developing countries. Advisories combining agricultural knowledge with data from remote sensing and mapping provide farmers with early warnings of adverse conditions. Such advice and warnings can be crucial for protecting crops from pests and extreme weather, for increasing yields, for monitoring water supplies and for anticipating changes brought on by climate change.

Data that is shared or reused can have a far greater value than if it were simply used for its original purpose, was one of the conclusions of CTA working paper Open Data and Smallholder Food and Nutrition Security. Potential benefits for smallholder farmers were identified in the paper as increased participation and self-empowerment, improved or new products such as logistical, extension, financial, input and trade services, more efficient value chains with better access to markets, higher

and less perishable yields, greater availability of inputs and better pest control.

Hence, giving smallholder farmers access to reliable data can translate into higher productivity, greater access to markets and better nutrition. How to deliver on this opportunity for smallholder farmers? In general, the impact of open agricultural data in developing countries is still low, the working paper also revealed. Often, this is because the data needed to have local impact does not exist, or is not openly available. Smallholder farmers are far more practically interested in data. For example, they ask very practical questions. What crops I should grow? How do I grow these crops? Which inputs do I use and where can I get them? Where do I store my harvest? Where do I sell my crops and at what price?

Theo de Jager, president of the Pan African Farmers' Organisation (PAFO): 'On a farm, whether it is one thousand hectares or only one hectare, I need

Potential benefits for smallholder farmers are increasing participation, and self-empowerment.

real-time information. What does the market want now? What's the cost of my inputs now? What's my soil like now? What's the weather like now?' Having better market information would help farmers to decide what to plant and where best to sell it. 'That's why open data is so extremely important. It must enable me as a farmer to make a decision here and now. It's a tool to assist me to make the right decision, on the right day, in the right place,' he says.

Satellite data
Meteorological data is one area where open data is starting to make a real contribution to smallholders. Better satellite data is available and more

services are being created to send the most accurate information to farmers for a lower price. Where satellite imagery is still obstructed by resolution or clouds for the use for small-scale agricultural plots, drone technology is now the emerging solution to improve data.

For example, the Market-led, User-owned ICT4Ag-enabled Information Service (MUIIS) is a multi-stakeholder initiative that looks to provide smallholder farmers in Uganda with satellite-based crop advice. Satellite data will be acquired from a number of sources and data analytics will provide intelligent agronomic tips on amount of inputs to use, daily weather on timing and length of season, preventive practices or early warnings, responses to pest and disease attacks, financial and index-based insurance services, and market intelligence on where and when to sell.

Studies in India have shown that such satellite data-enabled extension and advisory services can lead to about 40% increase in farmers' productivity. Examples of satellite-based crop monitoring services include Cropio, FarmSat, FieldLook and ClimatePro. For many years, precision agriculture was considered irrelevant to small-scale

Open data will provide greater assurances to lenders, if information is readily available on crop performance and inputs.

farmers in developing countries because of the coarse resolution and high cost of the images. This has changed. There is now a growing body of research to

support the idea that small-scale farmers can benefit from precision agriculture. GPS-equipped sensors on tractors, for example, enable farmers to measure and respond to soil variability across vast tracts of land, and dispense the right amounts of fertiliser and water exactly where it's needed.

Multilateral agencies, such as the World Bank and Asian Development Bank, have taken up a more focused approach towards use of spatial technologies and information for ensuring food security. The UN organisations are promoting Global Geospatial Information Management. The Famine Early Warning Systems Network, created in 1985 by the US Agency for International Development (USAID), is a leading provider of early warning and analysis on acute food insecurity. The Dutch government, through the Netherlands Space Office, has started a programme called Geospatial for Agriculture and Water. This initiative uses satellite data to improve food security and has projects in Bangladesh, Ethiopia, Indonesia, Kenya, Mali, as well as Uganda. The Copernicus Land Monitoring Service also makes use of satellite and in situ data to provide regular geospatial information on the state of global vegetation and water cycle for spatial planning, forest management, water management, agriculture and food security.

ICT tools

Success depends on the number of mobile platforms that have been to market with users willing to pay for agricultural and financial information services. The mobile and ICT service operators are developing and hosting agricultural advice services on mobile platforms, providing information as

text messages, structured menus, voice messages. Farmers provide information about themselves and their environment through these services. Opening up these data streams will provide the opportunity to better understand smallholders and therefore the world at large, enabling better progress in terms of development and governance.

For example, Cropster, is an app that helps farmers customise and collect the data they want to help them make more informed decisions. The data can be exchanged between producer groups, NGOs and commercial partners, promoting the sharing of real-time information and decentralising monitoring to support sustainable agriculture.

Open data that is accessible to producers should make it easier for smallholder farmers in developing countries to overcome one of their biggest problems – access to financing, since it will provide greater assurances to banks and other lenders, if information is readily available on crop performance, inputs and other critical points. The first steps have now been set to create the enabling environment on which initiatives can flourish with the aim to impact smallholder farmers by providing them with targeted information based on reliable open data. ◄

This article is compiled from resources of CTA, GODAN and PAFO.

Related links
More information on MUIIS
➡ https://goo.gl/HHVwOJ
CTA working paper Open Data and Smallholder Food and Nutrition Security
➡ https://goo.gl/qu43LS

Boosting data innovations and entrepreneurship

Innovators, programmers, and application developers are at the forefront of a movement that combines big data, open data, and the internet of things to create new marketable products and services for the agricultural sector. Events, like hackathons, pitching and networking gatherings, are important for these young innovators to improve and exchange ideas, get technological advice, connect to investors and marketers.

The three finalists at the GODAN Hackathon even during the conference in September 2016 in New York (GODAN 2016)

Open data benefits for agriculture and nutrition

During the Durban AgriHack Talent Challenge, which took place from 28 November to 2 December 2015 in South Africa, the winner in the category Climate Change made use of open data to develop and present a prototype technology. The three students from the Centre for Geoinformation Science (CGIS) worked on a platform that exists of a website and a mobile application to serve as a decision-making tool for farmers in selecting crop types in their area under future climatic conditions. For their prototype, called "Temo e Boso", they used open data from different sources, notably those of the CGIAR Research Programme on Climate Change, Agriculture and Food Security (CCAFS). The Durban AgriHack Talent Challenge shows how important open data is for new technologies. Hackathons give innovators a platform to deliver a prototype technology with opportunities for further development. The Durban AgriHack is part of a larger hackathon talent programme initiated by CTA to support youth ICT innovations and entrepreneurship in agriculture. Hackathons have been organised by CTA in West Africa, East Africa, Southern Africa, and the Caribbean.

The GODAN rewarded another winner during the Durban AgriHack event for their innovative use of open data. The MobiElectro team from Pretoria in South Africa made

aprototype that harnesses cloud computing and the internet of things to improve water management on farms. It is a 2-tiered platform composed of an electronic circuit of sensors that monitor water levels, temperature, and UV light.
The sensors send the information to an application through the cloud. The monitoring system tells the farmer when to water plants, or even does it for them if set in automatic mode.

Locally monitored data through sensors is combined with other variables that determine when a plant should be watered, like plant specific water needs and weather predictions. This data comes from open data sources like the climate change data from CCAFS and FAO Land and Water data. The team is looking now to add more data on nutrition to the system. With the prize money the team can further improve the team can further improve the prototype, which gives them the opportunity to pitch the system in a later phase to investors and other interested stakeholders.

Hackathons are at the forefront of using open data for new technologies and are part of a new wave of initiatives related to start-up companies all over the world. In hackathons prototypes of technologies are made, innovators

can be linked to partners in all kind of network events, and in pitching events technologies are presented to investors, incubators, and accelerators. In September 2016, the GODAN conference hosted an Open Data Maker's Hackathon, which gave young entrepreneurs and innovators the unique opportunity to exchange ideas, expand skills, whilst potentially winning a spot to participate in the next phase of the GODAN Open Data Challenge. Three finalists were selected. One of them is Farm Trade, an online marketplace for biofortified crops. The idea is to collect data from farmers to share with the marketplace about what biofortified crops are grown when, where, and of what quality. Making this data available is key to build this marketplace.

It is places like the regional hackathons or coding championships, followed by entrepreneurship support in ICT and agriculture, and the promotion of the products developed by the best young talents in for example incubator programmes, that transforms ideas and prototypes into real ICT products. Open data therefore not only stimulates new technology and solutions to boost agriculture and better nutrition, it also increases the business and employment opportunities for the young people involved and improves the image of agriculture. ◄

About the author
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Related links
Blog of AgriHack Talent Initiative
➔ http://hackathon.ict4ag.org/
GODAN Open Data Challenge
➔ www.godan.info/pages/odc/
godan-open-data-challenge

Translating complex data into accessible articles

It sounds simple, open data is there for anyone to access. However, not all journalists are aware of the open data available to them or how to use it when writing about food security or the critical challenges facing agriculture.

Good journalism is not based on opinions, it relies on evidence-based information. Access to reliable data is important, but journalist must also understand how to interpret data. Paida Kadzakumanja writes for The Nation, in Malawi.
She is investigating challenges facing the country's Farm Input Subsidy Programme, basing her stories on a range of data sources, and illustrating how access to data allows journalists to illustrate progress on government programmes rather than simply relaying opinions.

She was part of a group of journalists that attended the Open Data Training Course for Journalists from 25 until 28 July 2016. CTA co-organised this training with the New Partnership for Africa's Development Agency (NEPAD). The training on tips and tricks of open data was provided for the members of the Journalists Network of the Comprehensive Africa Agriculture Development Programme (CAADP), the continental framework for improving food security and nutrition, and increasing incomes in Africa's largely farming-based economies.

Intermediators

Journalists are key partners in communicating and facilitating dialogue in agriculture, explains Augustin Wambo Yamdjeu, Head of CAADP at the NEPAD Agency. 'The CAADP Results Framework and the indicators therein prove critical for the media to interrogate in evidence-based reporting,' he said during the course. The Journalist Network of CAADP was launched in 2013 and aims to equip African journalists with an understanding of the broader issues and debates related to agricultural development on the continent.

Journalist are pivotal as intermediaries to translate open data into context specific and accessible information for specific audiences of end users. 'Enhancing the capacity of journalists to research and work with open data could lead, as a ultimate goal, to a demand for data from civil society groups and farmers' organisations to monitor progress in reaching the agreed targets of investment and production both at national and continental levels,' says Isaura Lopes Ramos, project coordinator on open data at CTA.

The training course introduced participants to open data concepts, showed them where to find open data and demonstrated ways to use it. Journalists learned how to transform data into compelling stories, charts, maps and infographics. Like Natasha Mhango, who is senior agricultural information officer-publications at the Ministry of Agriculture and Livestock of Zambia. She could improve her skills at the training course and with mentoring from the Local Development Research Institute (LDRI) she has been building on open data to write about the biggest issues in agriculture and nutrition in Zambia. She made use of open data for stories about stabilising agricultural productivity in Zambia, and stunting in children due to malnutrition. 'The sources of data I used for my articles were all online – the FAO STAT website and Zambia's Central Statistical Office website - on which I found Zambia's agricultural crop forecast reports,' says Mhango. The training course helped her learn to better and critically navigate and interpret open data sources, which is important as her articles will be used by smallholder farmers to improve farming practices. 'I often come across very bulky data, so to say. And so the workshop's practical session on how to filter data was most useful to me, as it has now made interpretation and subsequently presentation of the data easier.'

On completion of the training, the participants were encouraged to produce one piece of data- or research-driven content every month for six months, with LDRI's mentorship. The content is being published by their own organisations online and offline, as well as on the website Transform Agriculture, The Network for Agricultural Transformation in Africa.

The workshop was part of GODAN Action project on open data. CTA has helped establish a GODAN Working Group on Capacity Development for individuals and institutions interested in collaborative efforts in agricultural and nutritional open data initiatives. The working group aims to promote open data knowledge and increase awareness of ongoing open data initiatives, and good practices. ◄

Journalists at the Open Data Training Course for Journalist.

About the author
Chris Addison is Senior Programme Coordinator on Data4Ag at CTA.

Related links
Video about the workshop on
➜ https://goo.gl/MyJg4t
Webstie Transform Agriculture
➜ http://transformagriculture.org/

Research facilitating open data

Open data research can significantly help to stimulate changes in practices and organisation of the public and private sector actors in agriculture and food supply chains, but it cannot force those changes. Crucial are the researchers themselves, who need to interact to ensure their knowledge and expertise is used and useful.

Climbing bean trials in Darién, Colombia. (Neil Palmer / CIAT)

NEIL PALMER / CIAT

Open data benefits for agriculture and nutrition

With research is meant the whole system that produces knowledge and science, including universities, research centres, scientific publications and of course data. Research has its influence on the adoption and use of open data in three important ways: a knowledge reservoir, experimental playground, and objective watch-dog. As a knowledge reservoir research provides objective and independent facts and figures, that can assist others in their decision making. While this is the function of research most commonly alluded to and most people will be aware of, the knowledge reservoir on open data in agriculture and nutrition is quite small as it is a new emerging topic.

Some aspects of it have been studied more extensively than others. For example, research on standards and meta data for making data available, and data assimilation in simulation techniques are well known. Other aspects are new and require a lot more attention, like impact evaluations on the benefits of open data, organisational changes caused by open data, and innovative business models for value creation with open data. Impact studies are important to provide public, private and civic sector actors some steer on vital developments in applications – like opening up weather data for farm management and open data on genetic resources for plant breeding.

Impact studies explain what the benefits are and how these benefits come about. They can also demonstrate that the benefits are enjoyed in another part of society than where the costs are. For example, small companies can make farm management applications based on open weather data, but weather agencies need to open up this data. This type of information enables stakeholders to jointly discuss models for benefit sharing. An important research priority on which knowledge is lacking is farmer, small business and consumer participation in the data value in a democratic way, such that each actor keeps control and experiences the benefits of his or her data ownership.

Experimental playground

Research can also offer an experimental playground for testing out developments, before to deploy them on large scale. Just having data available as open, will not lead to changes by itself, as data needs to be combined, cleaned out and aggregated till wisdom is achieved (see in figure the Data-Information-Knowledge-Wisdom Pyramid of the Wageningen UR). As often such data combinations and aggregations are new and agriculture and food systems are geographical and temporally specific, research can offer facilities to discover what makes sense (and potentially more importantly what doesn't).

This can be organised in research projects in which more in depth innovative work is done, like the Yield Gap project or the Food Secure project. Another way is through innovative collaborative sessions like hackathons, Bring Your Own Data workshops, and development sprints (i.e. data and ICT teams working closely together in development of products). Here researchers both with an agriculture and food background and those with an IT, statistics or data background, can provide expert knowledge to facilitate the process of data value creation during such innovative collaborative sessions. This requires from researchers that they are able to act as brokers in the learning and discovery process of others, while these are using their knowledge and expertise.

An example in which this experimental playground function of research could be instrumental for change is the application of data from remote sensing (also called earth observation). Many detailed satellite images are coming available as open data (for example through the Copernicus program of the European Union). Such data could potentially be used in applications in agriculture such as yield forecasting, irrigation prediction, precision farming. However, it needs experimentation across crops, livestock systems, and
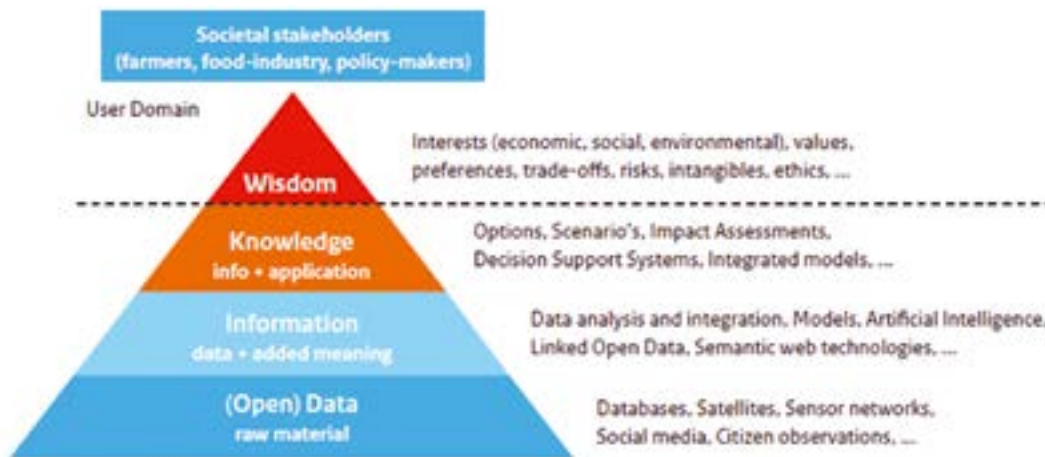
Figure 1. *Data or open data does not create impact. Data can be used to create meaningful information and ultimately knowledge about a system, for example crop growth and water use. The ultimate goal is to support the user with knowledge so he can benefit by using the knowledge to create impact (individual wisdom) such as interpretation of a DSS tool for operational farm management to save water costs and optimize farm performance.*

farming systems. Observations in highly heterogeneous conditions with small farmer fields, intercropping and agro-forestry the application will require a lot tuning and validation, what is the case in for example the CommonSense project (lead by Wageningen UR), which is one of the projects off the GeoData for Agriculture and Water programme (financed by the Netherlands Ministry of Foreign Affairs).

Objective watch dog

Finally, research has a role to play as an objective watch dog to provide wanted and unwanted feedback and common goods around developments of open data in agriculture and nutrition. The watch dog role for open data gives researchers the opportunity to highlight cases of application of open data that are relevant to society at large, while it might not be in the immediate interest of actors to release the data they have, and to highlight issues of privacy, digital divide and gender inclusiveness that could be studied more in detail in the future.

For example, in the Netherlands there is now a discussion whether the agency admitting pesticides for use in agriculture should release its data on which the admission is based as open, such that it is open for public scrutiny and transparency. With respect to common goods, research can supply data sharing, IT and organisational infrastructure to ensure that all parties can have some level of access. This is also recognized in GODAN, where a Data Ecosystem Working Group is

starting to explore infrastructural elements that should be available to all. For agriculture and nutrition there is an important opportunity here in the sense that such platforms should not become monopolised by any single organisation.

The changing role of researchers

For research to be effective in its various roles, it also needs to change itself. First, it needs to open its own data where possible, so that this is available as a common good. There are movements in this direction with an Open Data Journal for Agricultural Research, many institutional data repositories and developments driven by funders such as the European Open Science Cloud.

Furthermore, research not only needs to lecture and send knowledge, but also listen to the needs to other actors for their needs in research. This makes the evaluation of (potential) impacts of open data across cases in agriculture and nutrition especially important, as this can drive the agenda of research and provide clear indications of obstacles related to a lack of knowledge and understanding. Therefore, in the GODAN Action programme cases on food safety, genetic resources, land data, weather data, nutrition data and food safety were studied with respect to their likely impacts.

In the next years the GODAN Action project will explore several of these cases in more detail, and for each case will work on standards and

interoperability for data sharing, specific impact studies on benefits on opening certain types of data, and capacity building on open data of important actors for data-based value creation. The project will thus lead to guidelines on use of standards, factsheets and documented cases of impact and many trained individuals, which can also train others. Finally, the programme will produce reproducible methodologies and guidelines for working with open data in new cases. In this way, research will keep channels of communication open during its research process to ensure maximum usefulness of its findings. ◄

About the author
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Related Links
Big Data technologies in agro-environmental science:
➜ http://bigdatatimeline.wageningenur.nl/en/
Open Data Journal for Agricultural Research
➜ www.odjar.org
GODAN Action
➜ https://goo.gl/wVkIGE

Responsible data revolution

There is much potential for open data to positively affect the future of agriculture.
But without a proactive, responsible approach, there is a very real risk of these changes
benefiting only the most powerful actors within the sector.

Decoding the cassava
genome. (Neil Palmer /
CIAT)
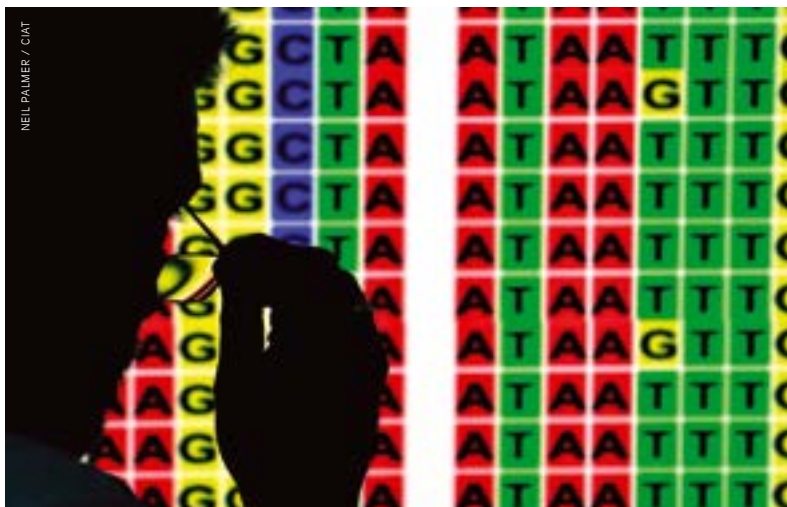
**Open data
benefits for
agriculture
and nutrition**

The agriculture sector is creating increasing amounts of data, from many different sources. From tractors equipped with GPS tracking, to open data released by government ministries, data is becoming ever more valuable, as agricultural business development and global food policy decisions are being made based upon data. But the sector is also home to severe resource inequality. The largest agricultural companies make billions of dollars per year, in comparison with subsistence farmers growing just enough to feed themselves, or smallholder farmers who grow enough to sell on a year-by-year basis.

When it comes to data and technology, these differences in resources translate to stark power imbalances in data access and use. The most well-resourced actors are able to delve into new technologies and make the most of those insights, whereas others are unable to take any such risks or divert any of their limited resources. Access to and use of data has radically changed the business models and behaviour of some of those well-resourced actors, but in contrast, those with fewer resources are receiving the same, limited access to information that they always have.

Therefore, it is important also to look to open data trends from a responsible data perspective. One example of a new trend within the sector which brings these issues to the fore is that of precision agriculture, a farm management concept based on observing and measuring crops, environment variables and management operations with sensors and satellites. At the moment, most precision farming applications are employed in highly capital-intensive farming systems and most of the access to technologies and data remains in the hands of a few, large-scale farmers and service providers.

Responsible data challenges

Data breaches are not uncommon and they are growing in number; the loss of control associated with open data can lead to breaches that may have personal consequences for farmers. For example, SMS services used to reach populations with high mobile penetration bring with them a risk of a personal data breach. Especially with shared mobile phones, there is no way to know who is reading any given SMS message. As a result, it is hard to control who has access to information on a farmer's financials, crops or land if they are sent by SMS.

There is also the need to anonymise or restrict access to sensitive data on human subjects. Sensitive data is more than simply personally identifiable information, and what is deemed sensitive is often contextually specific. For example, great care should be taken with data on community held land, resources and agriculture, especially when it comes to data on water resources and forest rights. Communities can be pushed from their lands or water resources in case official data is inaccurate to identify who depends on lands and other natural resources.

Accessibility and reliability is another challenge that needs to be addressed as more agricultural data is opened up. Large agricultural enterprises have skills and resources in-house to analyse and use data, thus it is very feasible for them to benefit from agricultural open data. However, small-holder farmers often do not have access to the Internet or the skills to use this data. Some might not even know that there is data that they could be using. In order to maximise use by the least powerful actors, open data needs to be communicated in a way that is useful for all actors. This means targeting offline and online communication channels to disseminate information building capacity for analysis and sharing insights rather than raw information.

Data ownership

With increasing amounts of data being created about farming and by farmers, one key issue is around ownership of data. When it comes to ownership of data created by farmers once it is aggregated with other farmers' data - in many cases, this is then considered to be in the ownership of the company responsible. In the current set up, it seems clear that actors with access to more resources are more able to gather data and to understand the legal environment surrounding that data. Farmers are not legally equipped to ensure that they are benefitting from

With increasing amounts of data being created about farming and by farmers, one key issue is around ownership of data.

the data and legal mechanisms in place to ensure rights are weak.

This fear of sharing information sits in almost direct contrast to the push for more open data on the sector: in the case of indigenous peoples, knowledge that could then be used against them by malicious actors looking to profit from that knowledge is particularly sensitive information. Traditional seeds and recipes held by indigenous populations need ownership mechanisms to prevent knowledge from falling into commercial hands that may license them and require traditional communities to pay royalties. However, this type of ownership stands in contrast to open data, in which all data should be reusable by anyone for any purpose.

To avoid data to fall in the wrong hands, as part of CGIAR's Open Data and Open Access Initiative, the Systems Office team supports Centers in helping them identify whether the data they are working with falls into exception categories (sensitive information, or information that can identify individuals when combined with other datasets) in

order to put data management structures in place at the project planning stage. The Systems Office also works with Centers to ensure that informed consent is an important part of their project framework.

Shared decision-making

Given the huge power disparities present within actors in the agricultural sector, it comes as no surprise that this can increase tensions when it comes to the use, creation and analysis of data. In order to find solutions for challenges and reduce future tensions, decisions on data should be made in a responsible way. Sharing the decision-making responsibility with people from the communities themselves seems to be the best way of ensuring no harm or negative unintended consequences. Co-design methods and collaboration early on in the data sharing process is also recommended as a way of getting solid buy-in from relevant communities.

Furthermore, there is the need to build capacity among smallholder farmers and less well resourced actors in the sector on how to deal with the growing amounts of data that are becoming available. Simply making data available is not enough to address these differences, and more needs to be done, potentially through providing low-cost advisory services on data use, or more accessible capacity building options. The responsibility for addressing this

does not lie solely with the smaller players in the sector, though. Practising responsible data approaches should be a key concern and policy of the larger actors, from Ministries of Agriculture to companies gathering and dealing with large amounts of data on the sector. Developing policies to proactively identify and address these issues will be an important step to making sure data-driven insights can benefit everyone in the sector. ◄

This article is a short version of the GODAN research publication "Responsible Data in Agriculture" (September 2016). You can download the full publication by using this url https://goo.gl/2KVeb6 or via the GODAN website (www.godan.info).

About the authors
Zara Rahman works for the Engine Room and is a researcher, writer and linguist who has worked in the field of information accessibility and data use among civil society. Lindsay Ferris is an open data researcher and post-graduate student at Oxford University.

Gender and open data: is there an app for that?

Wouldn't it be handy if you could just switch on that app and see the agricultural (or any other) sector through a gender lens? And what if everyone else also working in the agricultural sector just magically started to use it? Would it make us do things differently, collect different data, push for the release and visualisation of other types of datasets, or would we make sure the data were more equally accessed and used?

The adaptive process in gendered civic spaces

Graph: C. Ørnemark, 2017
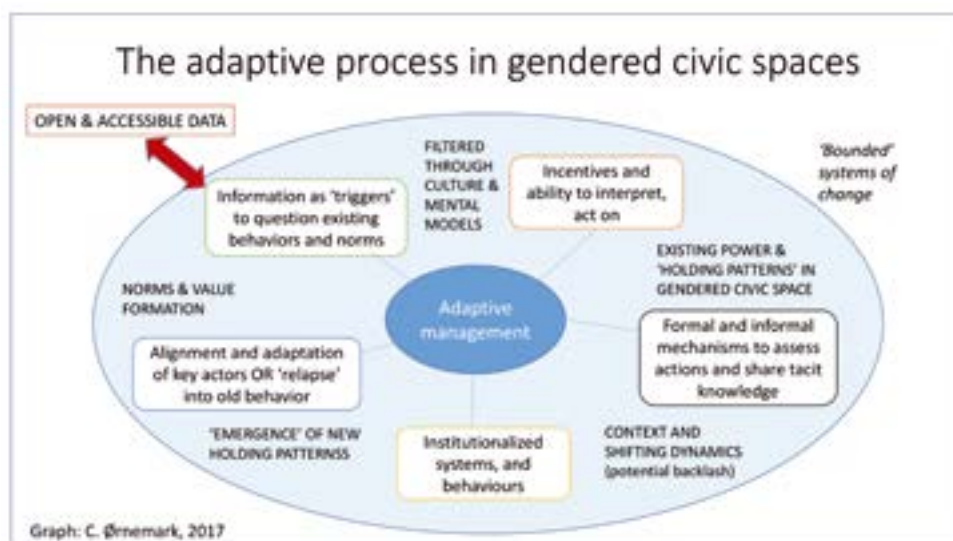
Open data benefits for agriculture and nutrition

For some, this is not a hypothetical question. Even if such an app may not (at present) be an option, Ana Brandusescu, Research Officer at the World Wide Web Foundation where she drives and coordinates Open Data Barometer research, open contracting (transparency in public procurement), anticorruption projects and who was earlier involved in establishing GODAN, brought the issue of 'gender and open data' to the attention of participants at the Open Government Partnership (OGP) Summit in Paris in late 2016, where she along with others called on OGP to 'walk the talk' on gender equality. 'The open data space is still a rather techy and predominantly a male space, even if things are gradually changing,' she explained.

A reason given could be that it is easy to assume that any data, and open data – which in itself is neutral – should steer clear from normative interpretations around gender and instead focus on just maximising its availability to citizens overall. The field has traditionally shied away from the normative side on data ownership and usage, yet this is becoming increasingly important going forward.

Another possible reason why gender has not featured strongly until very recently lies in the fact that those who come up with tech solutions around open data rarely are the same, or are even able to closely relate to, the universe of the end users. Rapid proto-typing allowing for frequent interaction and adaptation between designer and user has taken off in other commercial domains, and even informed the 'agile movement' of working adaptively as a management approach. Yet, there are many challenges in replicating this approach to finding innovative open data solutions for rural agricultural workers, many of whom are women.

'All evidence points to the fact that you need to closely interact with the end user in coming up with digital solutions to real world problems,' says Brandusescu. Beyond securing equal data access, a gendered approach to open data involves systematically gathering relevant data for different sub-sets of users. For women in the agricultural sector, it could for instance be making data available about women, gathered by women and for women. It means shifting both the priority setting and primary data gathering closer to these women's realities, involving the women themselves.

Clearly, such an approach goes beyond gender disaggregated data to look at what data is being collected, by whom, who owns it and who interprets it for action? As was also raised at a GODAN 2016 Summit break-out panel, it means empowering women's groups to identify more clearly their

A farmer sorts tomatoes in Ethiopia. Video still from "Catching Hope: Safety Nets Change Lives in Brazil and Ethiopia".

information needs and to help them get access to this information in a way that is actionable for them.

Open and accessible data can serve as necessary and powerful triggers for learning in the adaptive process. Yet, in civic and political spaces – which by definition are gendered in nature – such data inputs will still have to go through many stages and filters in order to lead to lasting, institutionalised change that can challenge existing power patterns, often encountering backlash along the way (see figure). Making women the main actors of such learning and adaptation, rather than being 'recipients' or 'channels' of data and information is key.

'Data doesn't change the world; people change the world. It's about inclusion. If women or other marginalized groups are categorically less able to access, feed into, interpret or interact with open data, the problem- solving and learning that goes along with that process and which leads into policy will by-pass them,' Brandusescu stressed. 'It goes back to the fundamental notion that we are not in this business of caring about open data for the sake it just being open. Unless it is both useful, and used, we have not done our job right.'

The World Wide Web Foundation has demonstrated through its own research the need to put a gender lens onto the open data field – across sectors. A 2015 report revealed for instance that in poor urban areas in the global South (drawing on 10 cities across Africa, Asia and Latin America), women were 50% less likely to be online than men. Moreover, once online they were 30-50% less likely to use the web to access their rights or speak out online.

Initiatives to address this divide include TechMousso (TechWoman) in Côte d'Ivoire, where the World Wide Web Foundation together with Data2x and the Millennium Challenge Corporation collaborated to address gendered data gaps and data use by women themselves. 'In every local meeting, we are being invited,' commented a woman from a participating village. 'But being invited is not the same as having the right to speak in public. This right is reserved only for men.' Finding new and alternative ways of interpreting data and feeding their views into local decision-making has been a first step of using data as means for empowerment.

On the other side of the spectrum of local to global, the Gates Foundation No Ceilings project explore gender inequality data at a meta level, in order to give more nuanced picture of progress and setbacks worldwide, using available global data on women and girls over the last 20 years. While this in itself is a powerful tool for visualising data on gender, the challenge will be to put it to work for gender transformation in more sector specific work.

So what does gender have to do with it? It is clear that a gendered approach to open data and its use need to go beyond the first and vital step of ensuring that open data is gender disaggregated, that the term 'citizen' is broken down into gendered sub-categories when it comes to voice and participation, and that efforts to address information asymmetries go hand in hand with efforts to address 'empowerment asymmetries'. With women making up 60-80 percent of farmers in non-industrial countries (according to FAO estimates) and with up to 70 percent of agricultural labour in some countries coming from women, the role of open data will never transform the global response to hunger if women are by-passed in our global efforts to open data.

And no. There is no app for that. Not yet. ◄

About the author
Charlotte Ørnemark works as a consultant on issues related to data democratisation and how evidence-based learning and adaptation can be used as a force for social change.

Related Links
Read as well in ICT Update about the gender citizen-generated data project of Datashift in Kenya on page 18 of this issue.

Gender data for gender equality

Demand is growing for gender data and targeted solutions for challenges unique to women, men, girls or boys. In Kenya, a community gathers and discusses gender citizen-generated data, which are uploaded to mobile phones and distributed to women leaders.

Group discussions within the Lanet Umoja community in Kenya. (Davis Adieno / CIVICUS)

DAVIS ADIENO / CIVICUS

Open data benefits for agriculture and nutrition

DataShift has partnered with the Open Institute and Chief Francis Kariuki, also known as the "Tweeting Chief", to collect and discuss gender data collected on the community level in Lanet Umoja Location, Nakuru County in Kenya. DataShift is an initiative of CIVICUS World Alliance that builds the capacity and confidence of civil society organisations to produce and use citizen-generated data to monitor sustainable development progress, demand accountability and campaign for transformative change. Through the project citizen-generated data gives better insights in gender-related development and governance priorities.

Data collection came first, but it is now used more frequently to empower the community to undertake advocacy campaigns targeting local government decision-making and budget processes. Ultimately the goal is to develop, test, and share widely a model for citizen engagement in domestication and tracking progress at the community level. Over time such initiatives could measure whether progress is being made or not on the Sustainable Development Goal on gender (SDG 5).

Datashift started by convening a women's-only (young and old) community gender thematic forum with over 100 women groups, training them on SDG 5 targets and indicators. The women's-only forum created a safe space for them to candidly discuss their challenges, opportunities and priorities. A follow-up joint thematic forum was then organised to bring the men in the community and local leaders on board, raising awareness among them on SDG 5 and including them in the Lanet Umoja gender committee.

Subsequent meetings focused on data literacy, clarifying contentious issues: such as unpaid care and domestic work, and demonstrating the importance of SDG 5 indicators in measuring progress. Datashift further involved the community in developing the gender citizen-generated data collection methodology and tools. In October 2016, the gender citizen-generated data collection tools were uploaded to mobile phones and distributed to women leaders. The women were trained to use the mobile phones to collect the data - this data collection is currently underway. The data will be available on an online dashboard, visualising it as information the community can use to power campaigns and advocacy.

Challenges

Many lessons can be learned from the community engagements and gender citizen-generated data in Lanet Umoja. Some targets were more relevant than others depending on the magnitude of the problem within the community. Some targets had to be domesticated or further expanded to address emerging issues and to ensure the data captures the reality on the ground. And the community was also more interested in indicators they could do something about. Furthermore, gender equality is still largely perceived as a women's-only issue.

Another challenge is access to classified official data to complement data generated by communities. This makes it difficult to understand wider trends and what the government is doing on this agenda and therefore hold it to account.

From the perspective of DataShift, mainstreaming gender in sub-national government policy, practice, and service delivery will be critical for targeted interventions, which meet the specific needs of women and girls at the lowest levels of the community. It's now widely acknowledged that gender equality and the empowerment of women and girls is a precondition for the achievement of the SDGs, however this requires good quality, timely, and accurate gender data, in addition to partnerships and relentless efforts on all fronts.

DataShift's work on using community-generated data on gender for delivering the SDG 5 continues to explore opportunities and challenges through applied research, collaboration and partnership development and policy engagement, outreach and advocacy primarily in Kenya and Tanzania, and in other DataShift pilot countries – Nepal and Argentina. ◄

This article was first published on 7 December 2016 on the Open Data Institute website under the title "Global gender goals: achieving local impact". The original article can be uploaded from: https://theodi.org/blog/global-gender-goals-achieving-local-impact

About the author
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Related Links
About DataShift
➜ http://civicus.org/thedatashift/

Healthy choices

Increasing the open access to nutrition and food data for ICT developers has resulted in a surge in applications for a healthier food intake and better fitness.

JAIME SANTOYO / FLICKR

Nowadays, technology has made it easier to manage our personal nutritional intake with the help of applications on computers and mobile devices, like phones or watches. Search, for example, in Google for food products, like carrots, chocolate cake or milk, and you get all the nutritional information directly on your search result page. You can use apps to scan your grocery to look up how many calories there are in your cart. And there are many fitness apps and devices, like Fitbit, that give extra information about nutrition and healthy food intake.

The data that makes these apps and devices running with adequate information comes from open data sources. One of the most influential comes from the United States. For example, the US Department of Agriculture (USDA) operates the Agriculture Research Service that is gathering information from food manufacturers. When you Google certain nutrients, what Google actually does, is that it goes to the Agriculture

Research Service databases to get their information. The USDA improves and extents its databases of nutritional information for food items regularly. The research agency is currently improving its Branded Food Products Database, which is an expansion of the USDA National Nutrient Database, which offers information on 8,800 branded foods and serves as a data source for government agencies, researchers, and the food industry.

Quality control measures

Most of the data comes from the manufacturers that submit their food products to the service. Then the information undergoes quality control measures at the Agriculture Research Service to ensure it lines up correctly and no mistakes were made. All data is in the public domain, there is no copyright and no permission is needed for its use by ICT developers.

USDA's API provides Representational State Transfer (REST) access to the food composition databases. It is intended primarily to assist application developers wishing to incorporate nutrient data into their applications or websites. The API provides two kinds of reports: food reports which list nutrient values for specified food, and nutrient reports which provide lists of foods and their nutrient values for a specified set of nutrients. USDA currently limit the number of API requests to a default rate of 1,000 request per hour per API Key and it feels that this is adequate for most applications.

The goal USDA has for the National Nutrient Database is to expand to 1 million items, including store brands, international food items, and food from chain restaurants may follow. Because of this expansion of the database, the agency is looking into cloud services to increase its storage capacity. USDA also announced an update to the Global Agricultural Concept Scheme (GACS), a thesaurus containing 350,000 common agricultural data terms in 28 languages. USDA, the United

Nations Food and Agriculture Organization (FAO), and the Centre for Agriculture and Bioscience International (CABI) collaborated to create the GACS data set. This collaboration is an example of how governments, non-profit organisations, businesses and researchers are capable of fostering scientific innovation by making data open and available to the public.

Screenshot of the LoseIt app (www.loseit.com) (Jaime Santoyo / Flickr)

YuScale System

ODINE is the Open Data Incubator programme of the European Union. One of the start-ups that are included in the incubator programme is YuScale System that makes an app for nutritional values of food by making it easier for those with dietary requirements to keep track. The German start-up received 100,000 euros of ODINE.
25% of 415 million diabetics have to know the contained carbohydrates of each meal and most of the others have to lose weight. For both this is a lifetime challenge. The YuScale System is able to determine the nutritional values of ready-to-eat meals with a precision of 80%, by providing a fast but safe process. The app replaces human weakness of guessing and supports diabetics in everyday life and overweight and obese people to change their behaviour. ◀
Source: https://opendataincubator. eu/category/yuscale/

About the author
Evert-jan Quak is a freelance research editor and knowledge broker. He works as editor for ICT Update magazine.

Related Links
Agriculture Research Service website
➜ https://www.ars.usda.gov/

Storytelling through data visualisations

There is a stupefying amount of data out there and the aim of any researcher, analyst or manager should be to make it accessible and useful. By what means can data be digested and translated into knowledge? One way is via data visualisation.

Figure 1: Sparkline example

Source: http://www.excel-easy.com/examples/sparklines.html

Open data benefits for agriculture and nutrition

The public and decision-makers do not want data. What they want are insights and explanations, which are - rest assured - derived from data and internalised into knowledge. There are three main reasons why data visualisation is popular. It is a tool to communicate complex ideas and relationships more effectively to peers, but also to decision-makers, and the broader public. Second, it is a way to represent and explore a data set. It is also a powerful tool to explain data and tell stories.

Visualisations are more efficient than reading for instance a table with data. "A picture is worth a thousand words", as the saying goes. Processing charts and graphics appears to be ideal for most people given the author knows what they are doing. It is visually instinctive and creates an almost immediate reaction. You can see below how much easier the trend or anomalies in numbers appear compared to the table in a simple example with a visualisation called *sparklines*, a tiny word-like chart (see figure 1).

Separating useful from useless information

Secondly, visualisations can be used to explore a dataset. The story, insights or irregularities of a dataset are often not immediately available. Therefore, charts and graphics are created to understand and learn about what the data is telling us. It can also be used to engage the reader. An example of using this method is the Open Data Barometer (http://opendatabarometer.org), a leading ranking of open data use across the world (see figure 2). Next to a report and an executive summary you can visually explore the dataset yourself, for example by looking at the indicator "land ownership". The site also publishes a detailed methodology, which is crucial to establish trust, transparency and inspiration for people to use the work as a stick in policy discussions - "look how badly we're doing in the ranking" - to improve data releases.

Thirdly, visualisations allow us to tell a story and, thus, explain or support an argument. This is the most difficult, because it requires skills from several disciplines. The best way to tackle it, is to create a team with a mix of skills, for example, a strong collaboration between a statistician, a developer and a communication expert. Gro Intelligence, a software start-up based in New York City and Nairobi, demonstrate this approach with data related to agriculture and food production. For example, the map shown in figure 2 in conjunction with a time series feature can be a simple yet powerful visualisation to show changes over time. In this case, this visualisation shows the impact of Tanzania's corn production after the drought in 2016.

Similarly, dashboards like Gro Intelligence's that made one of the US corn market are useful in obtaining an overview of the most important data in several visualisations what normally could be a complex set of indicators. A thought-through dashboard, therefore, allows a user to understand information and use it to make decisions or explain the insights to others. The key in both examples is separating useful from useless information and being astutely aware of what needs to be explained in more detail. An exemplar dashboard, graphic or narrative visualisation picks up at the right point and guides the reader.

Visualisations are more efficient than reading a table with data.

Becoming an expert in data visualisations

A good way to start is learning from experts: look at examples in newspapers, leading blogs such as http://flowingdata.com/ and read seminal books such as the series by Edward Tufte. He will teach you about the data-ink ratio, a reminder to be minimalist and use ink mainly for data and not for lines or boxes around the chart. The rest is about practice, with a liberal mind and peer exchange of ideas. For instance, it is always a good idea to peer test a graph or a data chart to make sure that those whom it is intended for can interpret it correctly, and that

Figure 2: Tanzania's corn production after the 2016 drought
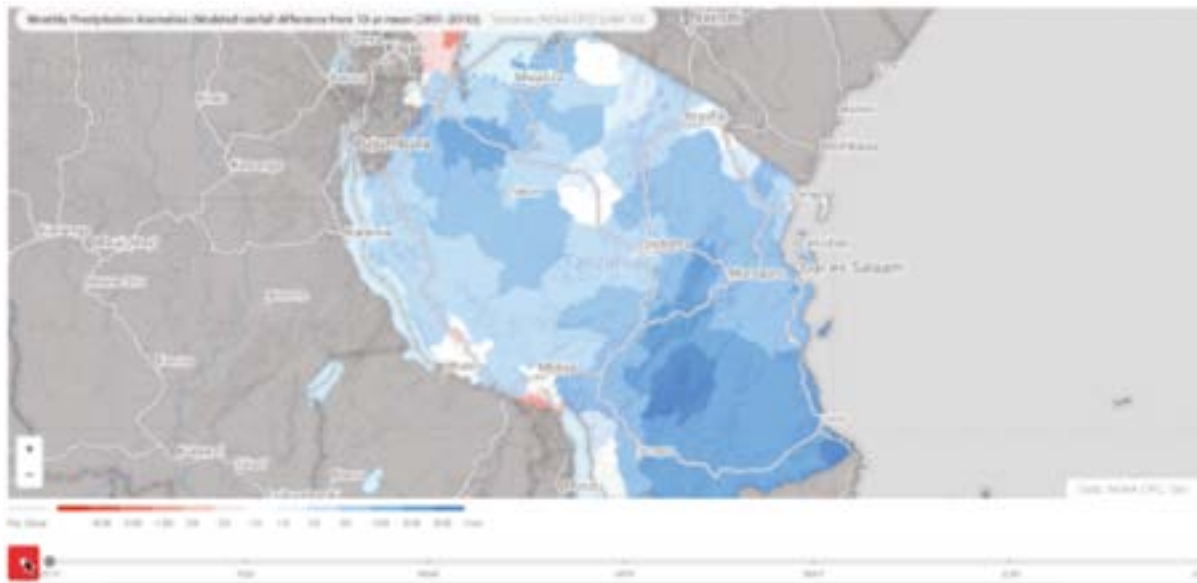
Source: Gro Intelligence, slide from the GODAN Summit 2016

shapes and colours are not distracting or culturally hard to read.

For many the solution is a spreadsheet, such as Microsoft Excel. That does not mean you are stuck with the default graphics; you can find some nice templates for popular charts on this website http://labs.juiceanalytics.com/chartchooser. For some tasks a simple spreadsheet is ideal – but it carries the disadvantages that it is error-prone and hard to reproduce.

Commercial software such as Tableau is user-friendly and often offers various ways to customise it for your uses. However, it comes at a sometimes hefty price and there is a risk that you are stuck in a "gilded cage", a system full of features but without the freedom to leave.

Open source software, e.g. the statistical language R (https://www.r-project.org), or programming languages such as D3 (https://d3js.org), offer flexibility, powerful capabilities and an outstanding support from an enthusiastic community. However, they have a steep learning curve and can be frustrating because at the beginning simple tasks can take a long time.

If you have a blog or create content for a website, give Datawrapper a try. It is a state-of-the-art tool that produces simple graphics with a touch of interactivity and yield results that are leading practice. Often simple charts are more than enough (see figure 3). As an added bonus the software is open source, which allows for more unrestricted usage

In summary, data visualisations have come a long way, are used from sport statistics to pension reports, and are driven by rapid progress in available and accessible software. Edward Tufte may say "above all else show the data" and I supplement this by saying "and be clear why". Few people are great composers, but most people enjoy music. The same goes for data visualisations. Using graphics and charts is a first step in democratising information from data. Big challenges as hunger can only be eradicated when we avoid bias, empower people and translate the insights into action. ◀

Figure 3: Open source visualisation software from Datawrapper
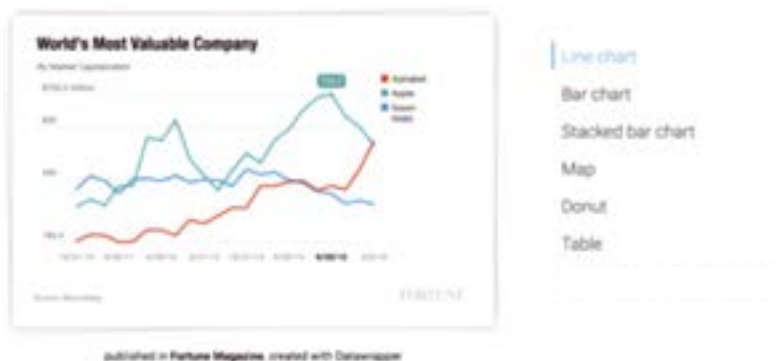
Source: http://datawrapper.de/

About the author

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Resources

GODAN website
On the website www.godan.info several publications, videos, and news items on open data for agriculture can be downloaded from the "Research" section, "Success Stories" section, and "Summit 2016" section. An example of a research publication is "A Global Data Ecosystem for agriculture and food"
➜ https://goo.gl/kcCTzD

AgPack
The Agriculture Open Data Package (AgPack) provides a roadmap for governments. The AgPack suggests six policy areas where open data can support the agricultural sector. Based on a participatory process with politicians, agricultural experts and the open data community, 14 key data categories are identified. For each data category, the potential use of the data by the agricultural sector and the estimated effort to publish this data from government sources are discussed and examples of implementation and initiatives that support the interoperability of each data category are provided. The categories include data on: pest and disease management, production advice, soil, hydrology, elevation, meteorology, markets, infrastructure, value chain, land use and productivity, rural projects, government finance, official records and regulations. The AgPack also highlights 10 examples of open data in action demonstrating how governments are harnessing data to address sustainable agriculture and food security around the world.
➜ http://agpack.info/

Interest Group on Agricultural Data
Within the Research Data Alliance (RDA), the Interest Group on Agricultural Data (IGAD) has grown in community strength to over 100 members, becoming one of the RDA's most prominent thematic groups. IGAD is a forum for sharing experience and providing visibility to research and work in agricultural

Open data benefits for agriculture and nutrition

data. It represents stakeholders in managing data for agricultural research and innovation and promotes good practices in research with regard data sharing policies, data management plans, and data interoperability.
➜ https://goo.gl/IzUytL

On Twitter
#OpenAgData is the information exchange place on Twitter about open data development in agriculture.
➜ https://twitter.com/hashtag/OpenAgData

Open Data at CTA
Information about Open Data in agriculture can be found on the website of CTA. It shows in chronological order news items, information from events and training sessions, infographics, best practices, and research reports on open data.
➜ http://www.cta.int/en/tag/open-data.html

Open Access and Open Data Support Pack
CGIAR has developed a support pack to share information and material to assist practitioners on open data for agriculture in various aspects of open access and open data implementation. It is a living resource that will grow over time. Material can be found about open access and open data, policies and plans, staffing information (including ToRs), information and links to repositories, and a calendar.
➜ https://goo.gl/I70zc3

Responsible Data
The Responsible Data Forum is a collaborative effort to develop useful tools and strategies for dealing with the ethical, security and privacy challenges facing data-driven

advocacy. The project is built on the premise that using data in advocacy carries with it a responsibility to avoid contributing to the harm of people reflected in that data or who might be affected by its use, and that responsible data practices will also inevitably lead to stronger, more efficient and impactful advocacy.
➜ https://responsibledata.io

FAOSTAT
The FAO's Statistics Division provides free access to food and agriculture data for over 245 countries and territories and covers all FAO regional groupings from 1961 to the most recent year available on its new website FAOSTAT. Everyone can for free download the data, look at country indicators and rankings.
➜ http://www.fao.org/faostat/en/

Open Data Portals
DataPortals.org offers a comprehensive list of open data portals from all over the world. It is curated by a group of leading international open data experts – including representatives from local, regional and national governments, international organisations such as the World Bank, and numerous NGOs.
➜ http://dataportals.org/

Open Data Institute
On the website of the Open Data Institute there is a section reserved for agriculture and nutrition. It publishes some updates and about reports and events on the topic on which the Open Data Institute has been working with partners.
➜ http://theodi.org/agriculture-nutrition-open-data

Open Agriculture
the MIT Media Lab Open Agriculture ("OpenAg") Initiative we are on a mission to bring out the farmer in everyone by creating healthier, more engaging, and more inventive food systems. OpenAg is building

collaborative tools and platforms to develop an open-source ecosystem of food technologies that enables and promotes transparency, networked experimentation, education, and local production. By making the science behind modern agriculture more accessible, we hope to break down the barrier of entry and put the power of food production back in the hands of the people.
➜ http://openag.media.mit.edu/

Open Data Resource Centre
An overview of good practice, impact of open data, and publications from all around the world on open data trends have been collected and presented on the Open Data Charter website. Its Resource Centre is a portal with many links to open data research and other knowledge products and publications.
➜ http://opendatacharter.net/resource-centre/

Roadmap for open data support
The Global Partnership for Sustainable Development Data supports country-led efforts to advance whole-of-government and multi-stakeholder Data Roadmaps for Sustainable Development. One way it does so is through the Data4SDGs Toolbox, a set of tools, methods and resources developed by Data Champions from around the world, adapted and compiled by the Global Partnership. The Data4SDGs Toolbox could help countries to create and implement their own holistic data roadmaps for sustainable development — roadmaps that are responsive to and drive positive change on the ground. The Toolbox will address institutional, policy, technical, resources and capacity issues, among other things. It will help countries to address challenges and seize new opportunities in the collection and use of real-time, dynamic, disaggregated data to achieve and monitor the SDGs and their own sustainable development priorities.
➜ http://www.data4sdgs.org/toolbox

Open Data Day
Every year there is Open Data Day. On Saturday 4 March 2017, Open Data Day 2017 has been organised, a gathering of citizens in cities around the world to write applications, liberate data, and create visualisations in an Open Data Hackathon. It also publishes analyses using open public data to show support for and encourage the adoption of open data policies by the world's local, regional and national governments.
➜ http://opendataday.org/

Open Data Science Conference
This is a global forum for anyone who wants to connect to the data science community and contribute to the open source applications they use every day. The goal is to bring together the global data science community to help foster the exchange of innovative ideas and encourage the growth of open source software.
➜ https://www.odsc.com/

WHAT IS OPEN DATA DAY?

Open Data Day is an annual celebration of open data all over the world. For the fifth time in history, groups from around the world will create local events on the day where they will use open data in their communities. It is an opportunity to show the benefits of open data and encourage the adoption of open data policies in government, business and civil society.

All outputs are open for everyone to use and re-use.

OPEN DATA DAY 2017

For Open Data Day 2017, we want to take things up a notch. The focus this year will be on four key areas that we believe open data can solve.

Open **research** data

Tracking public **money** flows

Open data for **environment**

Open data for **human rights**

WHO IS THIS FOR? EVERYONE!

If you have an idea for using open data, want to find an interesting project to contribute towards, learn about how to visualise or analyse data or simply want to see what's happening, then definitely come participate! Participation is a core value of Open Data Day, everyone is free to voice their opinions in a constructive manner. No matter your skill-set or interests, we are encouraging organisers to foster opportunities for you to learn and help the global open data community grow.