

# Open Data Training Course for Researchers and Academics

*A Collaborative Open Data Training Initiative of:*



**Kiringai Kamau**  
Executive Director  
Center for Agricultural Networking  
and Information Sharing (CANIS)  
University of Nairobi

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## ACKNOWLEDGEMENTS

The Center for Agricultural Networking and Information Sharing (CANIS) is a nascent organization. Its mandate is to identify gaps in the agricultural sector, bring the actors in the agricultural space to discuss what can be done to address the gaps and without defining where the resourcefulness to meet the challenges is going to come from, make it happen. We therefore rely on the partnerships that we are able to moot from existing organizations that find value in our efforts. We are particularly thankful to Prof. Kiama Gitahi for this unfailing support to the CANIS dream.

Beginning a new approach to Open Data capacity building through experiential models presented by CANIS would not have been possible without the kind encouragement and support by GODAN Action's Coordinator, Ms. Chipso Msengezi. We are grateful to her for the desire to create a new approach and thinking in implementing this contextualized approach. The implementation dovetails the encouragement we received when we first conceptualized the capacity building for Africa, following GODAN Conference in June 2017, by CTA's Chris Addison who challenged us to think of solutions to capacity development within the perspective of the triple bottom line of *people, planet, and prosperity*. The encouragement and support both Chris and Chipso and the opportunity to develop a broad perspective to address the contextualized bottom up implementation that the CANIS model takes is to us a milestone that we hope will advise CTA's GODAN Action programme implementation.

The foregoing however had a foundation that was supported by the University of Nairobi's leadership in buying the dream that brings sectoral actors together in a feasible organizational framework that is CANIS. This supported the Kenya government's focus on transforming agriculture through the nexus of ICTs and Agriculture which supported the linkage with GODAN. We are therefore forever grateful to GODAN and GoK for introducing the Open Data thinking that has helped us trail our focus on what has become an opportunity creator for the youth in the value chain functional layers of the agricultural sector. We would like to single out Willy Bett, CS Agriculture, and the team he appointed to steer the GODAN work in Kenya and Andre Laperriere, Martin Parr and their team in GODAN Secretariat.

Most importantly, this effort would not have succeeded without the network of service providers that that we first reached out to in the organizations that have contributed the Faculty in this open data training. We are therefore indebted beyond measure to LDRI for making it possible to deploy the resourcefulness of Muchiri Nyaggah to our programme as we do to KALRO for making Boniface Akuku join us. We are also very exultant that Trimpact released its Lead Researcher Dr. Niek van Duivenbooden to join the Nairobi Programme at a great cost to them and to RCMRD for releasing their lead capacity development and geospatial lead Dr. Kenneth Mubea.

The support of the first group of trainees from programmes within KALRO and to have their lead researchers join us is highly appreciated. Similarly, we are grateful to ICRAFT, Rongo University, Pwani University, and Upper Tana Natural Resources Project.

Our profound gratitude goes to the Government of Kenya's National Bureau of Statistics Director General Zachary Mwangi for supporting the vision of Open Data leaning agricultural research and its linkage to academia and to the Ministry of Devolution for their support. Lastly, to FAO for releasing their Open Data lead to join us and to agree to champion the open data agenda with CANIS is well acknowledged.

## BACKGROUND

The Global Open Data for Agriculture and Nutrition (GODAN) is a global effort that supports data driven efforts to end hunger, achieve food and improved nutrition security; as it also promotes sustainable agriculture and agricultural practices. GODAN is tasked by the UN with the unenviable mandate of ensuring that countries evolve evidence based models to promote harnessing, and use, of data in agriculture and nutrition. In many developing countries, the data may not exist making GODAN take the responsibility to build capacity in institutions, and individuals running the data focus in those institutions so that data is created to be a sharable resource among as many actors, which is the reason behind Open Data. GODAN Action on the other hand is a programme of GODAN Secretariat; with its partners, that seeks to promote capacity development, research and operational standards for use of Open Data in agriculture and nutrition. GODAN is a network of partner organizations that help to promote a value chain focus in promoting consumption and production patterns that support the realization of SDGs.

The Center for Agricultural Networking and Information Sharing (CANIS) of the University of Nairobi is one of GODAN's partners. CANIS has been a member of GODAN for over two years now and identifies gaps in the implementation of data value chains. It has taken the challenge to promote the practice of Open Data among research, academia and their linkage with farmers and farmer organizations. It therefore promotes collaboration among actors in the agricultural space through capacity development and partnerships to realize the networking mandate in agriculture. For this reason CANIS, like GODAN, works with partners in promote confluence in focus among like-minded agricultural value chain actors now expanded to include private sector, development institutions, and government (or the public sector actors) so that they can promote harmony in knowledge sharing and promote sustainable development using data science and value chain aligned design thinking. A key focus of CANIS is to promote communication of research outcomes, in whatever value chains, to facilitate transfer and exploitation of knowledge for the benefit of producers, employers, the economy, and the wider society at large. As researchers produce their outcomes, as they prepare, write and submit research proposals; as they review and gather research by analysing various sets of data sets; interpreting them, as well as verifying that they create information that is stored in accessible form from databases, CANIS works with partners to ensure that the knowledge behind the data science can be learnt in an accessible manner.

### Why Open Data Training?

The Kenya government noted through the Director General (DG) of the Kenya National Bureau of Statistics (KNBS) in the opening statement that, with agriculture being the mainstay of the economy and contributing significantly as it does to the Gross Domestic Product (GDP), it is necessary to identify sources of quality agriculture and nutrition statistics. This the government avers is central to the wellbeing of the people as well as for evidence based decision making, policy formulation, monitoring and evaluation of development projects. Accurate data the DG noted to is needed to measure foreign exchange earnings, employment and livelihoods level particularly among the rural population. It is also needed for monitoring and evaluation of the country's long term development blue print, the Vision 2030, as it is in realizing the Sustainable Development Goals (SDGs), and the UN 2030 Agenda on agriculture, and collaborative engagement through SDG 2 and SDG 17.

Indeed, much of the agricultural data used in research and academia can help the government realize its own goals, but the data has been and remains unavailable to policy formulation. This training therefore comes at a time when researchers and academics are seeking avenues for impact from their research work.

The course therefore comes to help researchers and academics to commoditize their research data by making it become what Todd J Vision (2010, 330) calls “a public good”. We aver that data when shared does not diminish in value but rather, when considered from a value chain thinking, shared becomes the ‘raw-material’ for knowledge based innovation.

In the view of CANIS and its partners, this training illuminates a pathway and a shortcut for researchers to identify usable datasets in a less complex paradigm where data can be found outside the normal path of reading published literature, attending workshops as they talk with (network) professional peers, or search mining from trusted data repositories. This training aligns with the key focus of the Open Data movement which is to make research data freely and publicly available. This shall be made possible if researchers and academics can open up datasets for reuse.

Major funding agencies have indeed begun to require the projects they fund to demonstrate data management plans, with some of them even insisting on their funded programmes and projects to formulate Open Data policies. Research and academic organizations, with the right strategic open-data focus, help their researchers to reproduce and validate their research in ways that promote new discoveries or innovations. Researchers and academics will therefore be expected to evolve internal strategies for data reuse by evolving avenues for effective data documentation, formatting of with the appropriate file formats for data re use by new and existing software so that it can be made sharable with established repositories that operate with open licenses.

In the agricultural space particularly at the lower level of the food chain where research and foundational knowledge are involved, the key focus is to ensure that value chain participants from producers, input suppliers, processors, distributors, retailers, regulators and consumers gain access to the data with permission for use and reuse at every point of the food chain from pre-production to selling a ready food product.

### **WHY PARTNER WITH CTA’S GODAN ACTION?**

GODAN Action is a programme of GODAN Secretariat, similarly formulated as a network oriented programme to demonstrate how the SDGs Triple Bottom Line (TBL) of the three Ps of People, Prosperity, and Planet can be realized using knowledge as the key resource to drive the TBL focus. The programme notes that achieving this TBL calls for collection, aggregation and curation of data, which when processed creates information, from which knowledge is derived from information synthesis. Knowledge when integrated is the oil so much needed to provide evidence for effective decision making, on which the realization of the UN’s SDGs hinges.

This course was therefore formulated with a view to helping research organizations, academia, government and development actors to understand what CTA GODAN Action’s focus in Open Data is, and for each to identify role they each can play in promoting the use of evidence based decision making. In the individual organizations represented and through collaboration with others the training is expected to spur collaborative innovation so much necessary to end poverty by creating global networks of knowledge workers. CANIS an SDG 17 initiative will work with its partners to create a replicable model of capacity building for innovation through Open Data thinking. It is for this reason that the workshop addressed the following:

1. Understanding Open Data
2. The process of sourcing and acquiring data in a devolved agricultural setup
3. Promoting innovation through Open Data in Agriculture and Nutrition
4. Demonstration of a ‘use case’ on planning and data management activities Open Data Exchange and Publishing



5. The legal aspects of data use: Where to publish: Open Data Journals, Types of Publications to produce
6. Partnerships with Data Sources and Beneficiaries of Research Outcomes: farmer organizations, nutrition practitioners etc.
7. What Open Datasets are needed for Reuse
8. Check Provenance and Relevance of Datasets for Reuse.

## THE FACULTY

CANIS sought to deliver a programme that is not theoretical rather it identified the faculty to deliver this training on the basis of practical experience in handling Open Data from a grassroots perspective, empowering value chain actors along the chain from pre-production to markets and including policy engagement. We selected individuals who have worked with research and academia and who appreciate the gaps that existing in delivering knowledge from research and academia to the farmers. Effort was taken to ensure that the delivery was based on the experiences of the organizations sponsoring the individuals as well as the experience of the individual facilitator.

1. **Kiringai Kamau** is currently the Executive Director of the Center for Agricultural Networking and Information Sharing (CANIS), and a visiting lecturer in Agricultural Policy, at the University of Nairobi. He is also engaged in championing the role of Open Data in promoting data centered, student led, agricultural sector transformation to create farmer based, farmer-owned agribusinesses that will provide the future for county rooted economic transformation. He is also the leader of the Capacity Building Sub-Committee of the Global Open Data on Agriculture and Nutrition, Ministry of Agriculture, Livestock and Fisheries. He uses a new platform, the Programme for Agriculture Capacity Development in Africa (PACADEA) that he has mooted with like-minded professionals from Kenya and Netherlands, in the data value chain subsector to create ecosystems for evidence based decision making in Africa. Kiringai is proud of his role as an agricultural economist who practices farming with a focus on Value Chain driven agriculture, ICT4D/ICT4Ag and has been the Global Telecentre Network Agribusiness Expert. He has many years as a practicing mentor in small business development, and a collaborative researcher on the impacts of farmer owned agribusinesses to wealth creation. He combines both macro and micro integration of development in sustainable agricultural thinking through food systems driven ICT4D and ICT4Ag.
2. **Muchiri Nyaggah** serves as the Executive Director at the Local Development Research Institute (LDRI), an African action-oriented think tank supporting efforts of African Union member states to end extreme poverty, end hunger and reduce inequalities. LDRI's work is focused on the role of agricultural transformation especially the capability of states to have available to them, and share openly, data and statistics for decision-making. Muchiri has worked in technology and innovation consulting and capacity building for seventeen years, six of which have been spent working on Open Data and open government in Africa as a driver for improving development outcomes. His work explores the implementation of Africa's development agenda, its impact and how developmental states can deliver better outcomes for Africa's people.
3. **Boniface Akuku** is the Director of Information and Communication Technology (ICT) at the Kenya Agricultural and Livestock Research Organization (KALRO). Previously he worked as Chief of Information Technology (IT) at US Army Medical Research Unit (USAMRU). He has more than 15 years of experience in ICT field. He has experience in the management of research data, information and knowledge and undertaken several scientific research assignment as a Principal Investigator (PI) and

- co-Principal Investigator (co-PI). His research interest includes research informatics, knowledge management, open data, open science and Big Data. He was the climate information prize winner in 2016 for developing a platform that tackles climate change impacts on farmers in Kenya. KALRO was established to promote, streamline, co-ordinate and regulate research in crops, livestock, genetic resources and biotechnology in Kenya. In addition, expedite equitable access to research information, resources and technology and promote the application of research findings and technology in the field of agriculture.
4. **Chipo Msengezi** is the GODAN Action Programme Coordinator. She is a specialist in combining innovative technology, and non-technology, based approaches to promote the use of data driven paradigms to help tackle organisational challenges. She focuses in data driven capacity building paradigms that help organizations realize their missions through enhanced and efficient organisational process. Her work in GODAN Action is to create a network of Open Data savvy service providers who can strategically support project delivery by developing development a globalised Open Data network of knowledge providers using contextualized information technology resources to inspire the development sector.
  5. **Dr. Kenneth Mubea** is the Capacity Development Lead at the Regional Centre for Mapping of Resources for Development (RCMRD). RCMRD is an inter-governmental organization established in 1975 and currently has 20 Contracting Member States in the Eastern and Southern Africa Regions. Furthermore, Kenneth promotes the use of earth observation in addressing resilience to climate change in Eastern and Southern Africa under SERVIR project (USAID and NASA initiative). Kenneth considers partnerships as the foundation for achieving the social development goals (SDG's), sustainability and achieving lasting IMPACT. His other tasks include: education outreach and awareness; stakeholder engagement and mapping; capacity building; needs assessment exercises; knowledge sharing events; and resource mobilisation using open data
  6. **Dr. Niek van Duivenbooden** is Director of the social enterprise Trimpact. He combines his skills of being a researcher, entrepreneur, facilitator and business coach. He has over 15 years of experience in research and rural development in North and West Africa. Since 2013 he has been working in East Africa, mainly in Burundi, Kenya, Uganda, and DRC with the mission of increasing the impact of development, research and humanitarian aid projects to efficiently realize the SDGs. Through Trimpact, he has invented the multidisciplinary and multi-scale online development ecosystem platform named DevSAT (Development Synergy and Alignment Tool), whose value in guiding open-data thinking he demonstrated in the training at CANIS/CTA Workshop.

## THE TRAINING PROGRAMME

### Programme Chair: Prof Gachene

#### DAY 1

- 08:30 Guest arrival and registration
- 09:00 **Introductions (Muchiri Nyaggah)**
  - Welcome by the host (Prof. Kiama, Principal CAVS)
  - Keynote Speech (Zachary Mwangi, Director General KNBS)
  - Why GODAN Action? (Chipo Msengezi, Programme Manager, CTA)
  - Workshop objective (Kiringai Kamau, Executive Director, CANIS)

- 10:00 TEA BREAK
- 10:30 Use Case: **Student Led Agricultural Extension Demonstrating (Kiringai Kamau)**
  - The Foundation of Open Data
  - Sourcing and Acquiring Data in a Devolved Agricultural Setup
- 11:30 Breakout Session: How can research make collaborative data collection feedback-feedforward cycle
- 12:15 Group Presentations
- 1:00 LUNCH BREAK
- 2:00 Use Case: KALRO Farmer Information Platform (Boniface Akuku)
  - Innovation through Open Data in Agriculture and Nutrition
  - KALRO's Geospatial data solution platform
- 3:00 Breakout Session: What question would KALRO like to see guiding its break out session?
- 3:45 Group Presentations
- 4:30 Plenary feedback
- 5:00 **Plenary Discussion:** Legal aspects of data use: Where to publish: Open Data Journals, Types of Publications to produce (Kiringai)
- 5:30 COFFEE BREAK and Closure of Day 1

## DAY 2

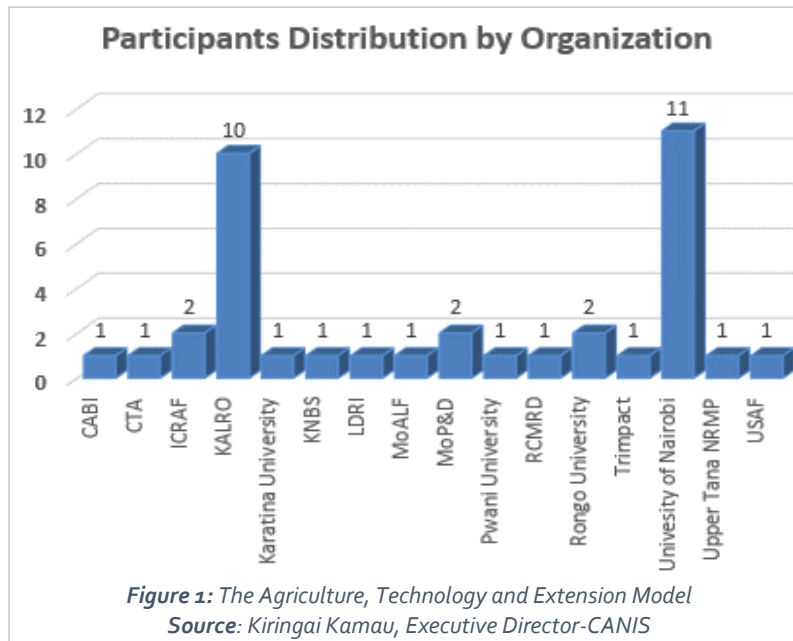
- 08:30 Review of Day 1 (Kiringai)
- 09:00 Use Case: **DevSAT and Ins4Outs (Niek van Duivenbooden)**
  - Planning and data management activities
  - Open Data Exchange and Publishing
- 10:00 TEA BREAK
- 10:30 Breakout Session: How can research make Open Data planning and publishing a feasible engagement?
- 11:15 Group Presentations
- 12:00 Use Case: **Open Data in the African Landscape (Muchiri Nyaggah)**
  - What Open Datasets are needed for Reuse
  - Check Provenance and Relevance of Datasets for Reuse
- 1:00 LUNCH BREAK
- 2:00 Breakout Session: How can create a culture of Open Data in research?
- 2:45 Group Presentations
- 3:15 Use Case: **RCMRD Collaborative Framework for the ESA Region (Kenneth Mubea/Byron Anangwe)**
  - Partnerships with Data Sources and Beneficiaries of Research Outcomes: farmer organizations, nutrition practitioners
- 4:15 COFFEE BREAK
- 4:30 **Inter-University Open Data Partnership, Way Forward (Kiringai Kamau)**
- 5:00 Closure of Day 2



## Pictorial - Training Programme in Session



## 1. Distribution of Participants by Sponsoring Organization



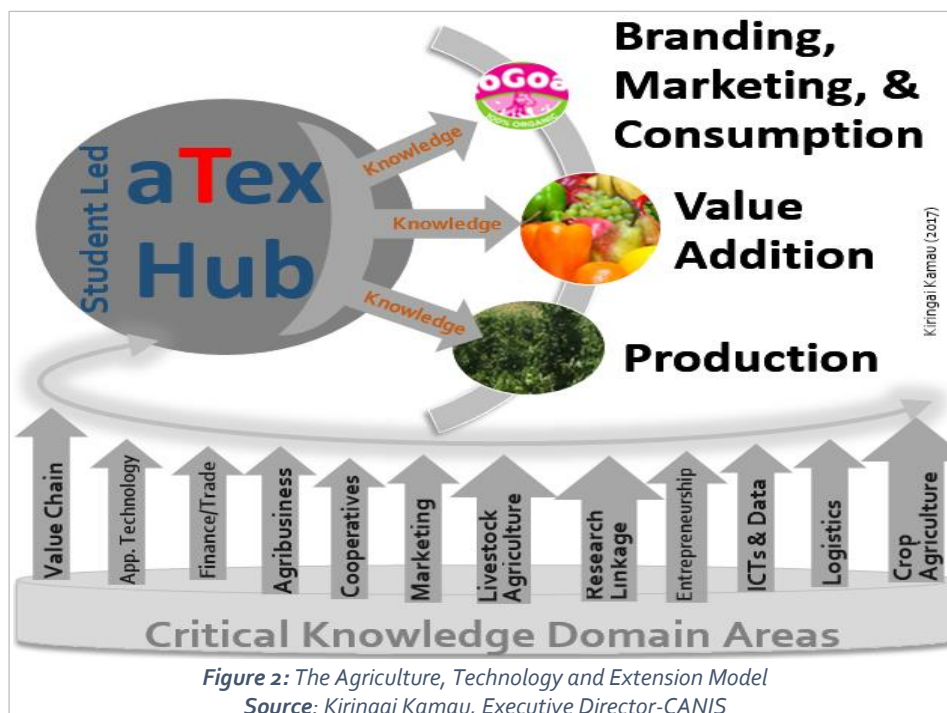
Participants for this training were drawn from across National Research Organizations (12), International Research (4), Academia (15), Project Implementation (1) and Government (5).

Research took the lion's share while Academia came 2<sup>nd</sup>. Government will be engaged in a future government and policy focused training where we envisage the capacity development of stakeholders will be emphasized through

county government training as they will host the farmer organizations offering the aTex Hubs to the student led agricultural extension paradigm discussed next.

## 2. Student Led Agricultural Extension Demonstrating

This session sought to present the practical example that CANIS has formulated to guide the data



collection and aggregation paradigm that employs students as the vehicle for extension to support agricultural producers gain knowledge delivered from researchers and the faculty from their learning organizations.

This use case seeks to deploy students as the interface between the producer farmers so that the aging farmer can unpack the research/knowledge message from research or university/college. The students are clustered from various knowledge domain areas that include, but not necessarily limited to: value chains; appropriate technologies needed by farmers in the particular location; financial management, record keeping or trade, agribusiness management, cooperative management and development, marketing; livestock agriculture; linkage with research or action research; ICTs both software and hardware/telecommunication for data collection and aggregation and local processing for managing the cooperative; logistics management and crops based agriculture. These skills are concentrated in a single location as the farmer association may desire or as the agricultural needs in the farmer organization may be. To make sure that the students do not become a burden for the farmer organization to manage, they are expected to be from the locality of the farmers so that they are drawn from the community. If students come from a far locations, they should make arrangement with the local community for their accommodation. All the activities of the students as they learn are supposed to be for learning purposes and hence bear no cost to the farmers.

The service centre where the students are aggregated is called the Agriculture, **T**echnology and Extension (a**T**ex) Hub. A key requirement is that use of ICTs (or digital technology) is the critical driver, which is the reason it is highlighted. Knowledge in the production of commodities that are suitable for the geographical area where the a**T**ex Hub is based is another critical requirement. If the agro-ecology and geography permit a crop that is not grown by the farmers, then feedback to research and academia becomes necessary as a new income generation area which should be discussed with the policy institutions. It is the potential to identify new potential and use of technology to guide on wealth creation by increasing production and productivity that makes the learning beneficial to students and the farmers. Use of mobile phones or other digital devices to collect data that is tied to each farmer and ensuring that the produce is sold through documented and weighed records is critical for promoting transparency.

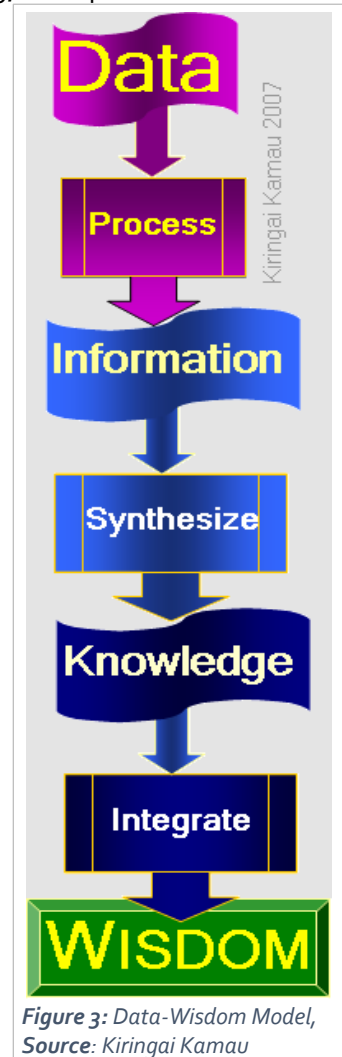
Realizing the a**T**ex Hub model calls for the use of knowledge to address the challenges presented by the various agricultural sector shocks and is needed to fortress economies against existing imbalances. It is therefore necessary to moot collaborations between research, academia, government, development actors, private sector, and producers or the owners of the a**T**ex Hub. This can be achieved when human centered design thinking is infused through knowledge and backed by investments by the communities or earnings from the market.



## 1.1 The Foundation of Open Data

Data on its own is useless. It only makes sense when it is transformed to other forms shown in the diagram in Figure 1. The critical steps to make it depends on how the data is *processed* to create information, how the information is *synthesized* into knowledge packages for decision making, to help the decision makers gain insights or wisdom by *integrating* various knowledge sets in their organization. It is therefore appropriate to ensure that data is captured not for a single use alone, but to influence inference once it is processed or curated into information. Data is indeed the raw material for diverse value added (or data processing) interests from devices that are programmed by systems/app developers, livelihoods analysts, scientific researchers, policy analysts, etc.. Each of these analysts use their own 'data use' lenses to realize what they seek from the data.

It is imperative therefore that since the chain from data to wisdom is so critical efforts must be made to ensure that the wisdom sought, and the decision making that this inspires, is derived from the right data sources. It is necessary to ensure that data is sourced accurate, and once sourced, it should be retained at the same form and accessible to all those others that may seek to use it so that future inferences yield similar results if assessed from the same lens. Data that possesses the characteristics of accessibility, usability, and share-ability is said to be **Open**. In other words Open Data has to be Availability or Accessible, Usable or Reusable, and Redistributable or Intermixable. The accessibility of data is a challenge that must be addressed if it must be used to advise innovation for it is not always open and exists on a spectrum that ranges from closed, to shared, to open. Because the choice for access, use and share-ability is a product of knowledge, knowledge in Data Science is critical and therefore courts many actors. In the agricultural 'data ecosystem', there are many actors ranging from individual or organizational data generators or producers, public sector actors, Researchers and Agribusinesses and Farmers.

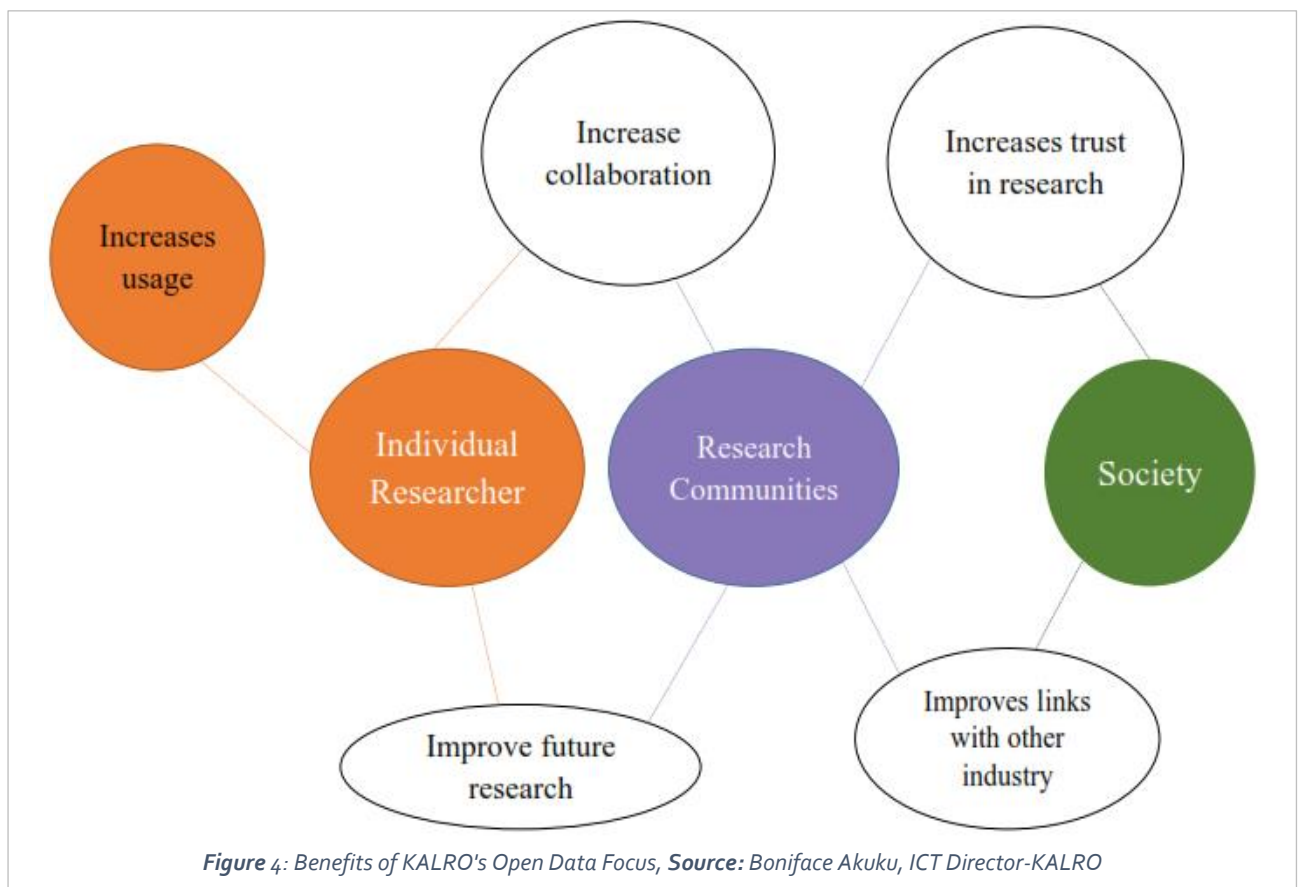


To ensure accuracy in the data sourcing, there is need to identify avenues for tapping from the growing mobility bulge which the African youth provides. This helps drive data driven innovation and with it wealth and employment generation for people currently removed from the income generation streams of workers. Promoting data driven agricultural engagement for any country that has invest in the communication infrastructure as Kenya has done presents an 'opportunity edge' over the 'continental others' and helps such a country surge ahead in the digital space. This can only be achieved if feasible value chain frameworks are integrated to drive mobile innovations to illuminate new ways for economic growth for development. The value chain frameworks need to themselves ride on organizational frameworks that can host food-systems leaning value chain pathways for opportunities to engage youth agripreneurs.

## Use Case: KALRO Farmer Information Platform

This session was conducted to help researchers academics and other agricultural value chain actors to appreciate how a data leaning focus can impact a traditional research organization to become the driver or innovation by just adopting approaches that make use of the resource they always take for granted – their data repositories that are never aggregated.

Indeed, with agriculture being the sector on which people depend for their prosperity, it is heavily impacted by the actions of the people through their relationship with the natural resources that development thinkers have called planet welfare. It is agriculture that guides on the processes of food crops nurturing and animal resources management to provide food and nutrition to the people. No doubt agriculture is a heavily loaded knowledge domain that comprises crop production, animal



husbandry, agro-forestry, fisheries and aquaculture, agribusiness and related enterprises. With animal and human health interaction providing an avenue for value chain engagement, the potential to create opportunities for employment in providing services to manage the animals as a source of human nutrition cannot be gainsaid.

As the productive sector on which other subsectors depend, agriculture can become the source of data to guide engagement on how to engage with the sustainable nurturing and management of natural sources such as water and soils that define agricultural productivity. Furthermore, due to its impact on the socio-cultural existence of people, it is necessary to understand the bio-diverse landscapes that define food and nutrition sub-systems and ecologies that determine which food and nutrition can be grown in a given ecological zone. From this learning, agricultural researchers need to therefore appreciate that an understanding of agriculture as a key driver of opportunities beyond research is



necessary which makes data availability to guide the linkage with the other opportunity generation paradigms can present to the other subsectors critical in guiding investment for development.

The most critical entry points to creating agricultural leaning opportunities is academia and research, which normally absorb the best brains in terms of knowledge, but whose pathways to influencing sustainable development has been lacking. Data driven engagement provides the necessary guidance on how to manage agriculture to enhance people's engagement with the sector for wealth creation and nurturing of the environment to support the economic activities that generate wealth or prosperity. It is for this reason that training of researchers in data aligned opportunity identification is critical.

KALRO is the lead national agricultural research organization and guides the government of Kenya's engagement with agriculture. Both local and international research organizations rely on KALRO to provide the human resource base and indeed physical infrastructure in terms of productive land for agriculture.

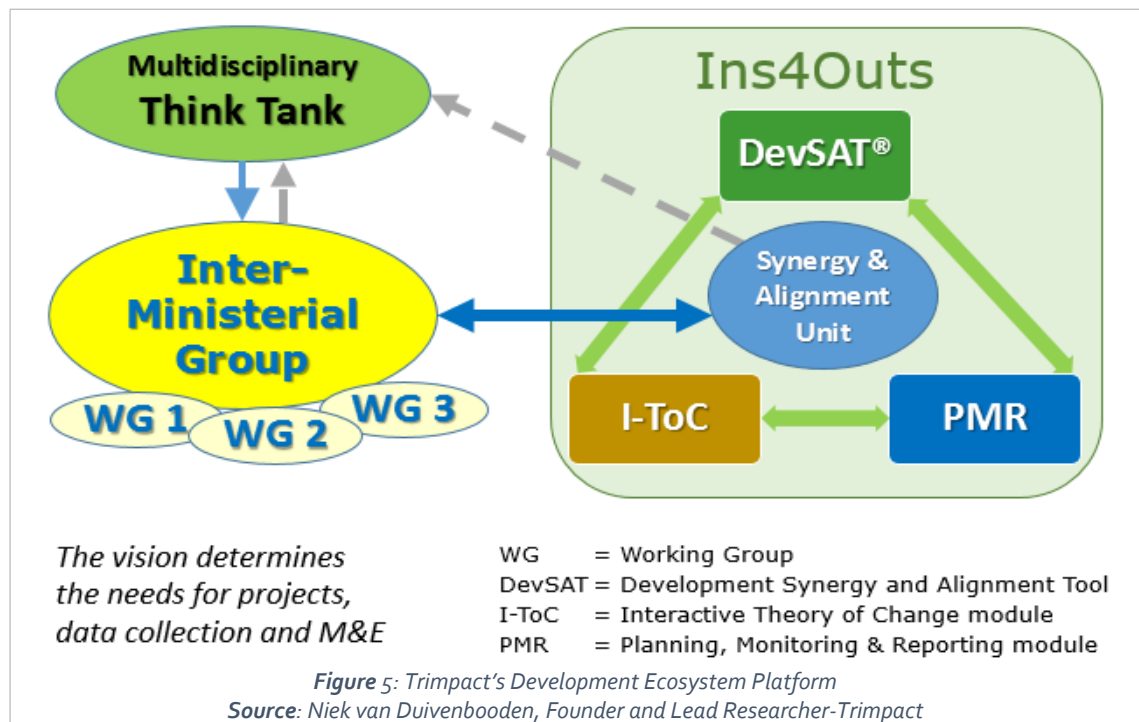
This use case sought to demonstrate to the participants how KALRO has used Open Data to transform the way the organization has seen the role of data to be in its path towards the evolution from a traditional research organization to one that is guided by data thinking. The organization has isolated key gains in opening up its datasets internally for use across the organization and which makes it feasible as a framework for adoption in other research related work. It has identified the following key benefits:

1. Increased collaboration between researchers and research communities, both internal and external
2. Increased data use by the individual researchers within KALRO
3. Shared usage of research data resulting to increased trust among researchers within KALRO
4. Collaborative engagement with industry and industrial value chain actors and government
5. Easier linkage with the producer community

KALRO has evolved a geospatial platform to provide contextualized geographical, sociological and cultural focus to guide researchers who may be based in KALRO Research Institute labs working to provide solutions to producers in an area of interest to its research. Natural resource endowments of the regions where research is taking place are easily discernible by researchers using the geospatial tool that KALRO has developed. The organization has evolved a collaborative framework to work with CANIS to support its research work through a mechanism that rides on the student research intermediaries who work with producers and hence provide the missing extension service that has so since the devolution of the agricultural services took effect. Other than working with the students, the organization also works with a number of other extension providers and research programmes who capture the data in prescribed format by KARLO researchers and its ICT Department.

## Use Case: Systems orientation to project implementation - DevSAT and Ins4Outs

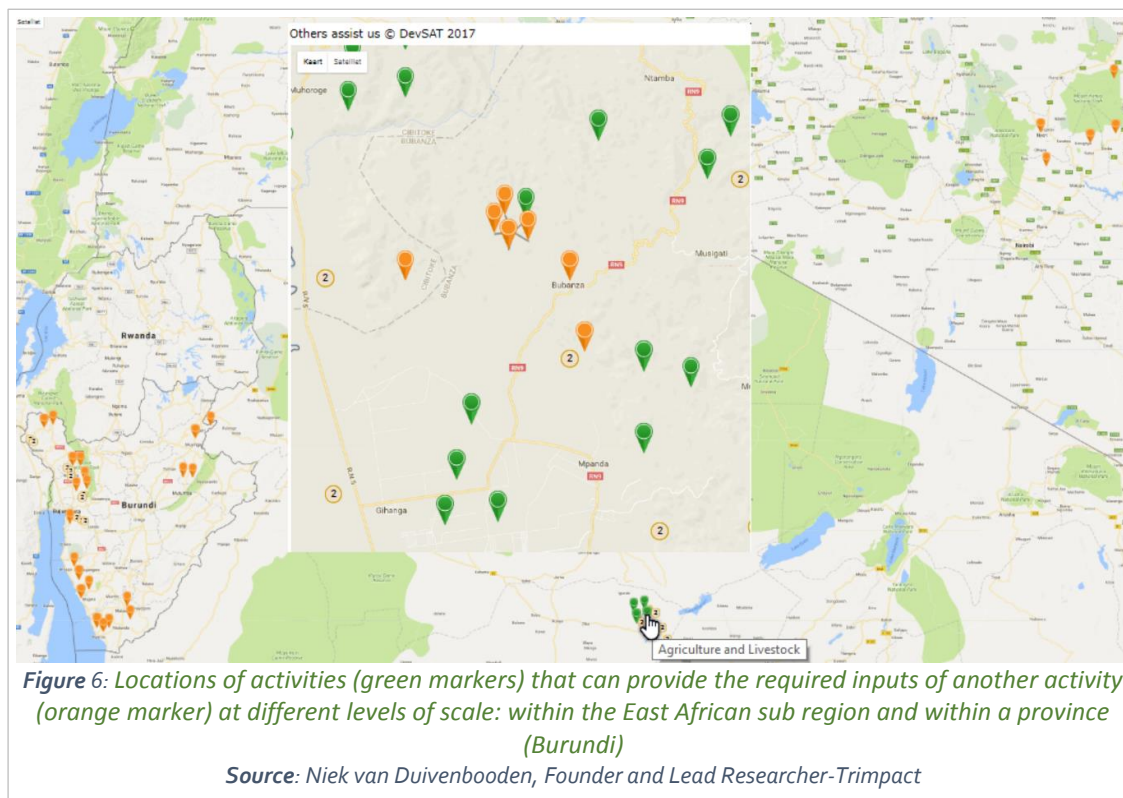
This session was included in the training to help researchers identify the pitfalls of sub optimization or create a systems focus in their engagement as data value chain actors. Sub optimization is a term used to describe a common policy mistake that emerges when one component of a total (system) emphasizes on its own efficiency perfecting its own space alone but ignoring its impact or effects on the other components. In systems theory components or units are integrated to work as individual units but when their outputs are aggregated they achieve more than what each one of them can achieve individually. When a component operates alone, sub-optimization is said to set in. The questions becomes then how to increase the possible interaction between actors to increase the efficiency of data collection.



Trimpact's development ecosystem platform (see Figure 4) provides a tool (DevSAT, Development Synergy and Alignment Tool), which helps organizations and programmes to interactively work towards achieving a desired strategic goal. It is a policy implementation platform that can be used by governments at national, subnational or within projects and is steered by data driven support to decision makers at the highest level in an organizational setup. In a university setup, it can be used to guide inter-departmental, -faculty, -college/school and indeed university collaboration in getting 'the puzzle complete' so that the overall impact of aligned implementation of learning is achieved. It is the same case in research where more often than not, so much resources are used in data collection commonly done in a 'silo perspective' depleting resources that could otherwise be used to achieve more if there was synergy in planning and implementation of the research actions.

This session sought also to demonstrate how Trimpact has deployed the DevSAT in Burundi to support improvement of planning, execution and monitoring of integrated multi-disciplinary activities based on synergy and alignment at various levels of scale, and increased efficiency that results in increased impact that may be the goal of a project or programme. Various visualisations were presented showing how one project can support another (Figure 5, prepared for this report), and how results of one can easily be

transferred to another. It was underscored that data and information can be used by a much larger public than only the owner of the project.



Agricultural research, academia, governments and development programmes can deploy DevSAT to realize the expectations within their own programmes to address the SDGs (or the national plans for that matter) and make clear what data and information they can share. Harnessing grassroots data collection using the paradigm of agricultural extension through aTex Hubs promoted by CANIS will address this challenge. Realizing this however calls for collaborative engagement with all stakeholders in the data value chain.

## Use Case: Open Data in the African Landscape

This session sought to bring the participants to a level of understanding of the continental role their work in open data will play in supporting the cause of African Union's Agenda 2063. For at their 23<sup>rd</sup> Ordinary Session of the African Union held in Malabo, Equatorial Guinea in June 2014, African Heads of State tasked ECA, AUC, AfDB and UNDP to organize a High Level Conference to discuss the data revolution in Africa and its implications for African Union's Agenda 2063 and the post-2015 development agenda. The High Level Conference on Data Revolution was held in Addis Ababa, Ethiopia from 27 to 29 March 2015, culminating in an Africa Data Consensus.

As an outcome of this consensus, the need to create an Africa Open Data Network (AODN), which is hosted at the [Local Development Research Institute](#) as a community of Africans, and friends of Africa, who believe in the continent's development agenda and how Open Data can help make it a reality has come to being. AODN's mandate is to:

1. Mobilize for advocacy on a common agenda informed by Africa's [Agenda 2063](#) and other normative continental frameworks

2. Provide a platform for shared learning and peer networking
3. Share information on resources, events and news on Open Data in Africa
4. Catalyze research on what works, what doesn't and what's next in Open Data in Africa.
5. Facilitate technical assistance to governments for successful Open Data initiatives in Africa.

As part of this mandate, AODN has partnered with CANIS and its open data initiatives to support the organization's effort to promote efforts at ending poverty, ending hunger, reducing inequality and delivering inclusive prosperity for all through knowledge driven initiatives.

With CANIS's commitment to work with AODN and its wider global network of the Open Data for Development (OD4D) Network, the focus of this training is to help researchers and academics to align their open data efforts with global partnerships that advance the creation of locally driven and sustainable Open Data ecosystems within their organizations and research/learning programmes. Through this collaboration, researchers working within the CANIS framework will create knowledge to inform policies, standards, innovation and research within their organizational efforts.

During this session participants were taken through an understanding of how their role will support the efforts that make open data a resource that is made available for onwards value addition by others. The facilitator presented an understanding of what technical and legal characteristics are necessary for data to be freely used, reused, and redistributed by anyone, anytime, anywhere. With the value given to data ownership by academics and researchers, the facilitator delved on the issue of provenance in Open Datasets as others use it to generate innovations.

The application of open data to agriculture and more so to nutrition were addressed more so on how to address the challenges of the availability of vital agricultural inputs sub nationally, availability and access to quality-assured extension services, cost of food (last mile) disaggregated by category and type, market price trends and forecasts for produce, as well as the prevailing status and trend for coverage of digital platforms.

### **Legal aspects of data use - Where to publish: Open Data Journals, Types of Publications**

This session was delivered to help participants appreciate that data is a resource which inspires influence as it also creates power to the holder. Such power which can be redistributed, amplified or disrupted based on how the wielder of the power resource uses it. To those who have the data it's their duty and privilege to realize the benefit it portends to them. The facilitator amplified the critical tenet of responsible use of data and why it is necessary to ensure that the rights of a people to consent, to privacy, to security of its use, and ownership around the information processes of collection, analysis, storage, presentation and reuse of data, while respecting the values of transparency and openness are addressed at all times.

The participants were reminded of the critical considerations that would need to address when using data. These include:

- i. Legal implications
- ii. Ethics and integrity
- iii. Rights and dignity of others
- iv. Reputation in relationship with development and research partners, students and customers

Key highlights of this presentation the participants were cautioned that there is potential for data breaches which may be difficult to accurately assess on the consequences of data breaches from companies or actors who deal with a lot of data within the sector. This makes the challenge of defending oneself from anyone claiming recourse against another for such data breaches. Given the sensitivity of data when dealing with vulnerable communities and related contexts, it is necessary to ensure precautions on whether to collect and share this data or if the necessary safeguards are assured before the data is shared.

Anyone evolving data ownership perspectives will need to appreciate that issues associated with ownership of data generated through new areas of agriculture technology remain relatively unexplored and therefore calls for one to forestall any challenges by raising data collection agreements through Non-Disclosure Agreements within which the right to use and reuse are included so that as much openness is integrated into the agreement as possible. For vulnerable communities such as indigenous populations, migrant farmers and displaced smallholder farmers who are lacking in basic land rights need to be taken care of keenly so that the data collector is not accused of exploiting community vulnerabilities. Issues to do with women and children are generally taken very seriously meaning that the researcher would need to include clauses that demonstrate their understanding when dealing with such communities and the document that there is understanding that the benefit of using data on such communities bestows to them benefits rather than negativity that may be inferred by others that may seek to foment trouble for open data researchers or academics.

### **Use Case: RCMRD Collaborative Framework for the ESA Region**

This session sought to help participants to identify how they can use digital technology to support them through a tool that is increasingly becoming a critical integrated knowledgebase that is now part of every aspect of the lives of research and academia. Indeed, using geospatial technology is critical for data alignment with appropriate and transparent research and implementation of development initiatives that seek to realize the UN 2030 agenda for sustainable development.

The training sought to enable researchers, academia, policymakers, geospatial professionals, and development actors participating in the training to find out why they need to integrate Geospatial 'Open' Data orientation to their work particularly in their consideration for planning and implementation of projects and programmes. At the global level Geospatial Open Data promotes the transparent and accountable scaling-up of public-private cooperation to support the contribution of a wide range of data, including Earth observation and geospatial information, which RCMRD makes available to regional and local research organizations and academia. Geospatial knowledge and use promotes the assurance of stakeholders that ownership, support and tracking of development progress is in their hands.

The Regional Centre for Mapping of Resources for Development (RCMRD), is itself a 1975 u United Nations Economic Commission for Africa (UNECA) and the African Union (AU) establishment. RCMRD seeks to promote sustainable development through generation, application and dissemination of Geo-Information and allied Information Communication Technology (ICT) services and products in the Member States in the Eastern and Southern Africa Regions and beyond. It seeks to do this through programmes that are oriented towards sustainable applications in natural resource management, infrastructure and environmental management utilizing Geo-Information Technologies. The organization supports both research and academia to create partnerships and collaboration through the provision of supportive services in the following areas:



1. Advisory services
2. Capacity Building and Training
3. Servicing and Calibration of Mapping Equipment
4. Project implementation
5. Data and information Dissemination
6. Research and Development

The organization's regional mandate enables it to work through partnerships and collaboration as has happened in its ongoing work with:

1. Kenya Meteorological Department, NDMA, Kenya Water Towers, Northern Rangelands Trust (NRT)
2. GODAN, CANIS, CTA
3. Acre Africa, Akorion, TAHMO, 4H Africa, among others

In its current strategic focus, RCMRD seeks to partner with the academia and research organizations to enhance their geospatial capacity as per its mandate. RCMRD wishes to explore partnerships on how research and academia can gain from the exceptional resource endowment of the organization as they seek to capture, aggregate and curate data from the various efforts that they are engaged with. Partnerships with these organizations will help RCMRD gain as it also provides Data Sources to partners to have a backend solution for identifying farmer organizations, nutrition practitioners

### **Inter-University Open Data Partnership, Way Forward**

Much of the way forward for many of the participating organizational partners who sponsored their participants had been discussed before the training on the role Open Data will play and what collaboration is needed with CANIS. Plenary discussion in this session which would have been necessary for ownership was however badly affected by time since some people had to take flights to their destinations.

CANIS has however undertaken to follow up with all participants and explore viable areas of collaboration with a view to promoting Data Openness and the adoption of student led agricultural extension using farmer owned aTex Hubs. Further sessions that have a way forward will have to integrate the way forward in group thinking/working as happened in the programme.

Much of the thinking of the participants was captured in the group works and will guide the engagement with the participants.

## Participant's Evaluation of the Programme

### What did you like about the Open Data Course?

- It was conducted in a very friendly way for adult leaning. There was a good balance between theory and practical sessions.
- The course was participatory and interactive
- The trainers were well equipped and informed on the subject
- The techniques used were clear and audible
- All the presentations were very informative.
- The use cases presented, group sessions and the institutional representation provided a good mix.

### What do you think could be improved?

- Move the venue closer to town if you are not providing accommodation near the training place or provide transport from town Centre
- Offer accommodation and reimburse fares for those travelling from out of Nairobi
- More time is needed for presentations and discussions especially after the exercises
- Provide the report soon after the training and training materials immediately

### Outline 3 things that you take with you/learnt in the programme

- Got a deeper understanding of why we need to have "open data".
- Open data has lots of benefits to include giving opportunities for people working in the same fields to understand what has been and the opportunity to make use of the data to achieve different outputs far beyond the initial intended outputs.
- Gives opportunity to avoid duplication of efforts and resources.
- New innovation by KALRO scientist
- New networks for funding/collaboration
- Progress made open data initiative this far
- What is open data in science, its existence and sources
- Importance of Open data in research, policy and academic world
- Availability of many important online programmes in KARLO website
- Implementing open data projects and importance of networking
- What data sets are required and data management practices at institutional level
- Considerations for open data

### Do you have any suggestions for new sessions? (If so, please give details and if you would like to be contacted about this idea please include your email address)

- Gender mainstreaming is of essence especially during data collection and interpretation
- Gender perspectives of data should be included in future training to enhance the type of data collected.
- How to build and open data strategy- practical based.
- Data Quality

### Would you like to be contacted about becoming a trainer or about new upcoming sessions?

All participants unanimously indicated interest to participate in becoming trainers to contribute use-cases in their areas of specialization. Those not in academics have institutional constraints and are not able to propose their participation in hosting the training. CANIS will lead on thinking the institutional dimension through all open data capacity building and implementation partners.

# Annexes

## Keynote Speech by the Director General, KNBS

KEYNOTE SPEECH BY THE DIRECTOR GENERAL, KENYA NATIONAL BUREAU OF STATISTICS, MR. ZACHARY MWANGI, DURING THE TRAINING WORKSHOP ON OPEN DATA FOR AGRICULTURE AND NUTRITION, 4<sup>TH</sup> OCTOBER, 2017 AT KABETE CAMPUS, NAIROBI

Principal College of Agriculture and Veterinary Sciences, Prof. Kiama  
Programme Manager, CTA, Chipso Msengezi  
Executive Director, CANIS, Prof. Kiringai Kamau  
Programme Chair, Prof Gachene  
Invited Guests  
Ladies and Gentlemen

Good Morning

It is my pleasure to join you today as we begin this important training workshop on Open Data for agriculture and nutrition in Kenya.

Ladies and Gentlemen

As you may be aware, agriculture is the mainstay of most of our economy and contributes significantly to the Gross Domestic Product (GDP). It is a major foreign exchange earner, a source of employment and livelihood to the rural population. Quality agriculture and nutrition statistics are therefore central to the wellbeing of the people as well as the basis for evidence based decision making, policy formulation, monitoring and evaluation of development projects. Agriculture statistics are also critical in monitoring and evaluation of the Vision 2030, which is the country's long term development blue print as well as the Sustainable Development Goals (SDGs), among others. The 2030 Agenda places a premium on agriculture, specifically Goal 2: which aims to end hunger and all forms of malnutrition by 2030. It also commits to universal access to safe, nutritious and sufficient food at all times of the year.

Goal 17 further notes that achieving the ambitious targets of the 2030 Agenda requires a revitalized and enhanced global partnership that brings together Governments, civil society, the private sector, the United Nations system and other actors and mobilizes all available resources. Further, the 2030 Agenda recognizes the need to use data for decision making underscoring the importance of "quality, accessible, timely and reliable disaggregated data to help with the measurement of progress and to ensure no one is left behind."

It is therefore important to appreciate the fact that the Global Open Data for Agriculture and Nutrition (GODAN) is one of those partnerships that truly reflects this multi-stakeholder ecosystem in support of developing countries.

Ladies and Gentlemen

According to the Open Data Institute, Open Data is data that anyone can access, use or share. This brings to focus the use of technology as a means of achieving the desired objectives. Indeed, it is now widely acknowledged that effective use of technology brings down the cost of producing statistics as well as easing data collection, capture, processing, analysis and dissemination. The KNBS has adopted the use of the latest technology in order to improve on the timeliness of releasing and sharing the statistics available with the users. Currently, most statistical surveys and censuses undertakings are based on computer assisted personal interviews, commonly referred to as CAPI where tablets and smart phones are utilised in data collection. The results of these statistical operations are currently available online for all to use. These have been made possible by use of various data sharing and dissemination platforms easily

visible from the KNBS website. It is also important to note that most of our statistical publications, dating many years ago, are now freely available online for anyone to refer.

Ladies and Gentlemen

As a result of the decline in the quantity and quality of agricultural statistics in many countries across the world, the Global Strategy (GS) for improving Agricultural and Rural Statistics was adopted in 2010 at the meeting of the United Nations Statistical Commission in New York. The GS is a framework for improving agricultural statistics to enable countries to meet emerging data needs for policy making, food security and research, among others.

The adoption of the Action Plan for Africa on the Global Strategy has encouraged many developing countries to come up with Strategic Plan for Agriculture and Rural Statistics (SPARS) which is to be integrated into the respective National Strategy for the Development of Statistics (NSDS). SPARS is aimed at enhancing coordination of statistical activities within the agricultural and rural statistics sectors. In Kenya we have developed a SPARS-KEN which is expected to become a mechanism for consultation between the Governments and Development Partners on improvement and funding support of agricultural and nutrition statistics.

Finally, ladies and gentlemen, food and nutrition security remains a key determinant of a healthy workforce. As such, statistics in this sector need a consistent and dedicated approach by the various actors. If we join hands we will have the statistics to build the future we desire.

THANK YOU



## The Proposed Programme Delivery

The following course Content will be covered:

Topical Learning Area	Approach to training delivery
1. Understanding Open Data	<ul style="list-style-type: none"> <li>• Trainers will be encouraged to demonstrate the concepts through a use case that they have been working on in their organization</li> <li>• Topics that a trainer is assigned to cover will be grouped together for ease of delivery</li> <li>• Participants break into groups to share from their understanding from a task that the trainer will identify for them</li> <li>• Groups will make their presentations as a group</li> </ul>
2. Sourcing and acquiring data in a devolved agricultural setup	
3. Innovation through Open Data in Agriculture and Nutrition	
4. Use case on planning and data management activities Open Data Exchange and Publishing	
5. Legal aspects of data use: Where to publish: Open Data Journals, Types of Publications to produce	
6. Partnerships with Data Sources and Beneficiaries of Research Outcomes: farmer organizations, nutrition practitioners etc.	
7. What Open Datasets are needed for Reuse	
8. Check Provenance and Relevance of Datasets for Reuse.	

## The Programme Outcomes

At the end of the training, we expect to have exposed the participants to be exposed to:

1. Become champion trainers of others in Open Data in their organizations and to become resource persons when programmes are hosted in their own organizations or departments
2. Understand Open Data and why research data needs to be open
3. Engage in discussions on the use of data in devolution using student led agricultural extension
4. Appreciation of project implementation through Open Data paradigms

As an inaugural Programme for African Agriculture, and keen to undertake projects of a similar nature in other countries, we need to create a formidable resource pool of people who can be coopted in CANIS Programmes. Indeed, CAVS will be the programme host and therefore needs a team to fill the positions that have been reserved by CANIS in this programme.

[GODAN Action](#) is a 3.5 year project supported by the UK Department for International Development ([DFID](#)), led by [Wageningen Environmental Research](#) with international partners [AgroKnow](#), [CTA](#), [Land Portal](#), [ODI](#), [FAO](#), [IDS](#) and [AidData](#).



## Group Discussions Outcomes

### 1. In what ways can universities help make the data most needed become more available

- Closing data gaps
- Building on existing research
- Bridge research gaps
- Informed decision making- policy
- Paradigm shift in research
- Reduced cost of data collection and analysis
- Avoidance of duplication
- Review policy at institutional and national level
- Create working groups (Per discipline) to advocate
- Make research institute center of excellence of open data
- create platform for sharing data (roundtables)
- Develop and about an open data
- Set up mechanism to identify demand driven data
- Capacity building on grant winning proposals
- Sensitizing on best disseminate awareness e. e.g. open data
- Create awareness
- Increased trust and ownership
- Willingness for sharing
- Reduced bureaucracy
- Capacity building on open data sharing
- Bridging gaps and increasing content
- Improved accuracy of available data
- Commitment of actors
- Create awareness in the respective organization and others (stakeholders)
- Will reduce duplication of efforts
- Reduce resources used in research
- Enhance multiple use of data
- It will eliminate bureaucracy
- Reliability of data
- Reduce risk of data loss since we have multiple repositories
- Will increase impact on the end users
- Understanding the concept of open data
- Provide open data infrastructure
- Establishing task force
- Categorize data users
- Revitalize link in research with those in need of data
- Create awareness on existence of university awareness
- Policy on data sharing by students on completion of field work
- Georeferenced library
- E- infrastructure facilitate access of data

- Faster flow of information
  - Continuity of extension services
  - Reduce monopoly (Ivory towers)
2. What are the actions needed to be able to start with Open Data next week?
- Working group formation
  - MOU between stakeholders working groups
  - Infrastructure
  - Capacity building
  - Set up secretariat/technical committees
  - Capacity building
  - Data journalism/social media
  - Policy on open data
  - Standardization framework
  - Evaluate policies framework in organizations partnering in open data
  - Profiling of stakeholders involved in open data
  - Sensitization of users within organizations and their partners
  - Establishing task force
  - Categorize data users
  - Revitalize link in research with those in need of data
  - Create awareness on existence of university awareness
  - Policy on data sharing by students on completion of field work
  - Georeferenced library
  - E- infrastructure facilitate access of data
  - More knowledgeable – training should be done (interpolate geo location to facilitate real time data collection)
  - Internship program – practical field
  - Institution/ government would want to collect data ( identify areas where data needs to be collected )
  - Consider relevance to the academic field to ensure correct / relevant data collection
  - Capacity management students can collect data randomly using ICT
3. How can Synergy and Alignment in research and development give a boost to Open Data Availability?
- Increased pool of resources- quality and quantity and efficiency contribution to greater data availability and mapping
  - Help define a common objective (research and development)
  - sensitization on open data to change culture of researchers keeping information (advocacy)
  - Developing collaborative projects on open data
  - Develop and Implement open data policy
  - Conduct awareness creation training for managers, students and lecturers and researcher in the importance of open data

- Create platform on open data
  - Synergy of researchers
  - What kind of data do we want to collect
  - Ensure data is accessible and make sense, can be reused and shared
  - Determine and create the platform to share the data
  - Monitoring and evaluation of the shared data
  - convergence of similar data
  - Increased volumes of data
  - Clarity of roles in research of different players and better collaboration
  - Efficient use of resources
  - Quality research
  - Data sharing- ease access to diverse data
  - Better quality of life from research information
  - Synergy and alignment in research and development give a boost to open data availability
  - Pooled resources translating to more research /data hence availability
  - Knowledge value chain creates/ boosts demand for open data
  - Used correctly with proper recruitment, advertise, use established CBOs, NGOs and networks
  - Enforce ethics and integrity
  - Formulate policies
  - Open data saves resources/cost effective
  - Avoids duplication of data
  - Open data- networking synergy
  - Helps to identify existing problems
  - Promotes development, Other players utilization data
  - Accelerate adoption of technology and innovation
4. How can open data concepts and activities help agricultural organization create 'Information Driven Research?
- Research organizations should develop data management plans
  - Standardized data management plans for all stakeholders (in research) framework
  - Tools to create awareness and increase utilization of open data
  - Define indicators to address SDGs and collect data on the defined indicators. (collect, collate, analyses, preserve and achieve
  - Packaging different target groups/users
    - farmers
    - extension groups
    - cooperatives
    - insurance
  - Change research priorities towards existing problems and predicted/anticipated problems
  - Platforms for communication
    - Radio
    - TV
    - SMS



- Web
  - Apps
  - Seminars
  - Webinars
  - Workshops
  - Participatory research/learning
5. What areas should agricultural research prioritize to enable efficient sharing of research information & knowledge with its stakeholders?
6. Capacity building for researchers
7. Copyrights, patents, data security
8. Standardization of data presentation
- Nutrition – prevalence of malnutrition
  - Soil fertility- rate of fertilizer use
  - Post-harvest losses
  - Climate Change
  - Water Management
  - Agri- business
  - Inventory classification based on the indicators- thematic areas
  - Policy to indicate publications and data with appropriate ethnical consideration
  - Strengthen the IP/ legal framework
  - Sensitization of actors
  - Set-up necessary infrastructure
  - Agriculture
    - Financial data on projects
    - Human Resource
    - Student Data
    - Data on technologies
    - patents
  - Health
  - Food and nutrition
  - Climate change
    - Rainfall pattern
  - Data to address SDGs
  - Formats of the data
  - Fear of losing data to the competitors before publishing
  - Fear of exposure
  - Lack of awareness of open data
  - No policies set up to make open data
  - Personalization of the data
  - How the data is collected and format of collection
  - Protocols in opening data
  - Organizational framework

9. How can open data support strengthening the already weak research-extension-farmer linkages?
  - Improved access to information
  - Through platforms : multi actors, various channels
  - Open data allows for translation to better understand each other
10. In your view, which (sub) topics should be prioritized for opening of data
  - IP issues ownership
  - Quality control
  - Licensing
  - Accessibility infrastructure
  - Awareness of researchers – Holding on to data (because being a PI in a project at no cost)
  - Organizational interests- Donor interest
  - Government bureaucracy – Sensitive data, radioactive material, GMOs
  - Intellectual property rights – innovations (private) breeders
  - Questionable data (integrity) – Ethics
  - Open data policy – on intellectual property
  - Capacity building on open data
  - Sensitization on open data
  - Proper data storage infrastructure
  - Technology standardization
  - Data management
  - Policy development
  - Intellectual property and rights
  - Infrastructure
  - Private public profit partnership
11. Whom do we need to bring on board for our efforts to bear more fruits?
  - Government agencies: policy makers and regulators
  - licensing authorities/boards
  - Stakeholders: Research institutions
    - Universities
    - NGOs
    - CBOs
    - Development projects
  - Students as data generators and consumers
  - Government
  - Donors
  - Industries
  - Students
  - Parents
  - Other universities
  - Raw research data
  - Published duplicated articles and journals

- Examination materials
- Reports
- Universities researchers, farmers organizations, civil society organization, policy makers private sector, all researchers (ILRI, KEMRI) including private sector researchers, county government opinion leaders and youths.
- Meteorological department
- Kenya soil survey
- Animal health department
- National county government
- Private sector (Financial institution insurance)
- Civil society, CBO, NGO and churches
- Donors
- Citizen
  - Crowds
  - Farmers

12. In what ways can universities help make the data most needed become more available

- Innovation tools and technologies
- Information flow utilization
- Fill data gaps
- Build capacity
- Availability of data
- Translates to move information which can be utilized
- Policies to support open data
- Address plagiarism – have software to trace plagiarism duplication
- Flexibility in opening data
- Capacity building should be established
- Establish systems /platforms which can be easily accessible and interoperable
- Resources- financial, human important
- Reward systems for sharing data
- land use- based for agri
- Soil fertility- Advisory
- Gender and other vulnerable gps-food security/nutrition
- Socio-economic- advisory
- Input (Agri) – land ownership
- Marketing – Advisory on market, poverty alleviation
- Data need to be published first
- Security of data (competition)
- Capacity skills
- Infrastructure
- Purpose of data (routine/project/etc.)
- Classify data
- Collaboration /synergy
- Capacity building

- Target Publications- outreach /farmers
  - To be guided/supervised
  - To be adequately
    - Software
    - Data management
  - To have at least tertiary (Diploma)
  - Integration with extension service (when active)
  - Framework for collaboration between actors (e.g. working with farmers, extension office etc.)
  - Guidance from planners what data to collect where!
- 
- Intellectual property right issues (are they lost on open data)
  - How is data going to be used
  - Are all countries willing to share their open data
  - Use of data by private sector for their own benefit
  - Over reliance on open data preventing generation of new data

## Participant's Attendance List

### CTA/CANIS Open Data Training

Venue: 8-4-4 Boardroom

Date: 4-5<sup>th</sup> October 2017

#### Registration Form

No	Name	Organization	Email
1	Lydia Wamulwa	UON	2007.wamulwa@gmail.com
2	Dr. Joyce Njoba	Rongo Univ.	njobj@rongo.ac.ke
3	Teena Mwangi	UON	teena.mwangi@uonbi.ac.ke
4	Viollet Gathara	KALRO	vgathara@gmail.com
5	Henry Muriu	CABI	h.muriu@cabi.org
6	Dr. Wanjiku Muriu	ICMAD	muriu@icmad.org
7	Dr. Nick van Oosterhout	Triumph	nick@triumph.nl
8	JEFF KAMUTI	UON	jeffkamuti@uonbi.ac.ke
9	CHAB MBERE	CTA	mberer@cta.int
10	Charles K.K. Lachane	LARMAT	gachanecharles@gmail.com
11	Anne Karumira	LARMAT	annekarumira@gmail.com
12	MURIEL MURUGA	ICRI	muriel.muruga@icri.ac.ke
13	Joseph Ngũgĩ	UON-PARI	ngugij@gmail.com
14	Dr. Lucy Muriu	UON	lucymuriu@uonbi.ac.ke
15	Abdullah Kibila	KALRO	abdkibila@gmail.com
16	Gideon S. MUNGA	KALRO	Gideon.Munga@kalro.org
17	MILDA KEGUDE	ICRAT	milda.kegude@gmail.com
18	ANDREW SOLT	ICRAF	andrewsolt@gmail.com
19	JESCA MABUKA	KALRO	jescamabuka@kalro.org
20	Devon Muriu	KALRO	devonmuriu@gmail.com
21	Simon Mwangi	UON	simonmwangi@uonbi.ac.ke
22	CHARLES MURUGA	UON	charlesmuruga@gmail.com
23	ROBERT M. MURUGA	UON	robertmuruga@gmail.com
24	Daphny Khambua	ICRAF	khambua@gmail.com
25	Dr. Esther Muriu	UON	esthermuriu@gmail.com
26	Dr. Kipruto Mwangi	KALRO	kipruto.mwangi@kalro.org
27	Dr. Tom Ouma	UON	tomouma@gmail.com
28	Dr. Emma Muriu	UON	emmamuriu@gmail.com
29	Patrick Mwangi	KNBS	patrick.mwangi@knbs.co.ke
30	Albert Gunga	KALRO	albert.gunga@kalro.org
31	OSCAR H. KIBUKU	UON	oscar.kibuku@gmail.com
32	LUMPAKE AKUOKI	KALRO	lumpake.akuoki@gmail.com
33	John Muriu	UON	johnmuriu@gmail.com
34	FREDERICK WANDERA	KALRO	fredmuriu@gmail.com
35	Adams Mwangi	CANIS	adams.mwangi@gmail.com
36	CAROLINE KITALO	LARMAT	carol.kitalo@gmail.com
37	Teena Mwangi	KALRO	teena.mwangi@kalro.org
38	Maria Puri	CABI-GODAN	m.puri@cabi.org
39	Timothy Muriu	ICRI	timothy.muriu@icri.ac.ke
40	Prof. Peter Oloo Kibuka	Rongo Univ.	prof.petero@rongo.ac.ke
41	Nixon Mwangi	UON	nixonmwangi@gmail.com
42	DORAH NJIRIA	ICMAD	dorahnjiria@gmail.com
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