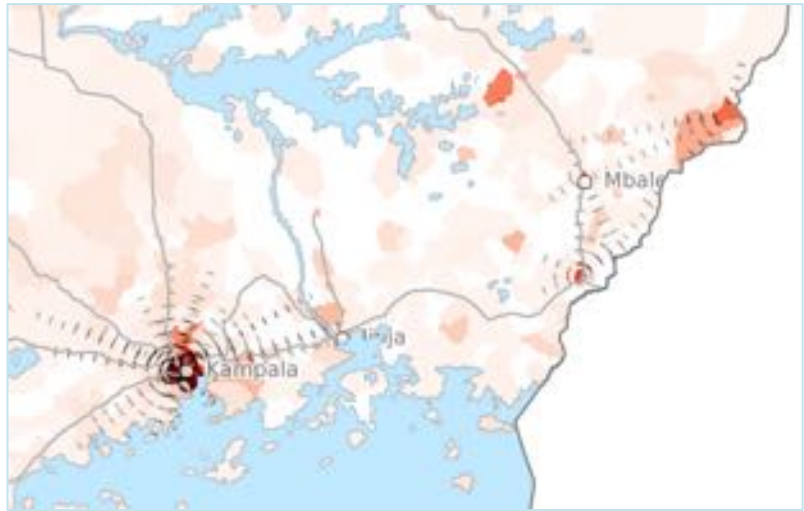*Image by Our Planet*

Subcounty-level typhoid incidence and population mobility from highly infected areas. By Pulse Lab Kampala

PROGRESS REPORT

PULSE LAB KAMPALA

June 2015

A DATA REVOLUTION TO ACHIEVE SDGs

HIGH-LEVEL CONFERENCE "*SUSTAINABLE DEVELOPMENT GOALS IN MIDDLE INCOME AND SMALL ISLAND DEVELOPING STATES: A PERSPECTIVE FROM AFRICA"*

A high-level conference on Sustainable Development Goals in Middle Income and Small Island Developing States: A Perspective from Africa was held on 9-10 June 2015 in Praia, Cape Verde. The Government of Cape Verde and UNDP jointly organized the conference in collaboration with other UN agencies.

Presenters were drawn from government, civil society, and international organizations. The conference engaged high-level leaders and experts around three key topics: 1) promoting national ownership of the SDGs; 2) ensuring sound consultation on the process of SDG integration into national development strategies and plans; and 3) facilitating innovative ways of financing for development, promotion of technology transfer and knowledge exchange through South-South and Triangular Cooperation.Pulse Lab Kampala delivered a presentation on how data innovation projects are making efforts to support achieving the SDGs in Uganda and the region. Further information on the conference can be found here: http://www.panapress.com/Cabo-Verde-acolhe-conferencia-de-alto-nivel-sobre-Objetivos-de-Desenvolvimento-Sustentavel---3-630440141-51-lang4-index.html.
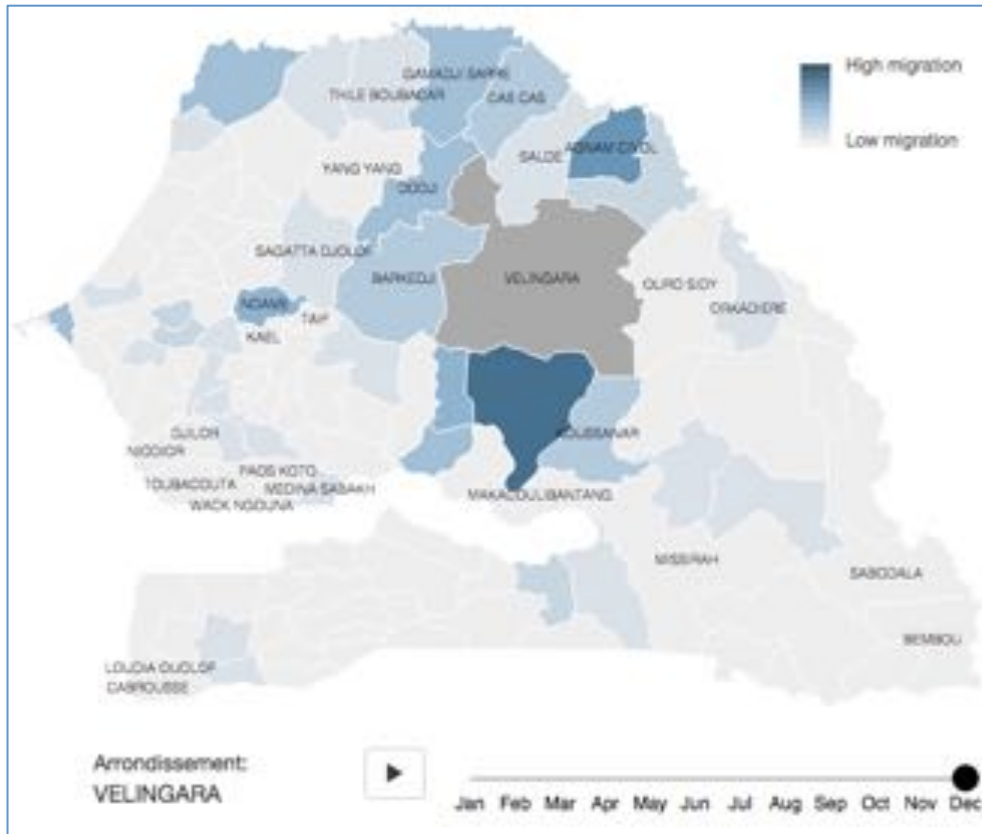
"…The new agenda of the SDGs will have increased demands and opportunities for the use of data. New technologies are leading to an exponential increase in the volume and types of data available, creating unprecedented possibilities to achieve sustainable development. The SDGs agenda calls for investment to build the capacity of national statistical systems in African SIDs to tap into the ongoing data revolution. Capacity building will enhance the capacities of national statistical systems to use the existing deluge of new data sources (Big Data), and the methodologies to harness these data sources, mainly driven by academia and industry..." - recommendation on the data revolution reflected in the Conference - outcome document.

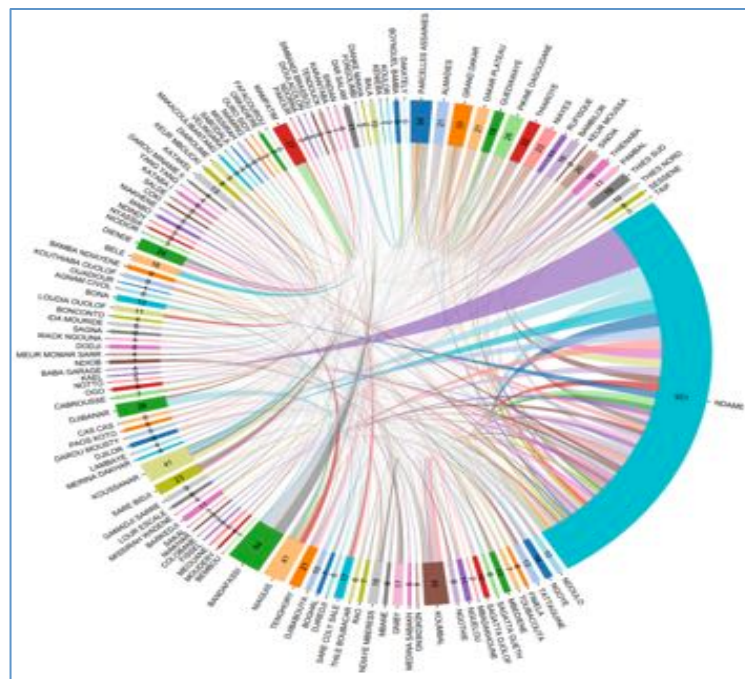## AWARD WINNERS – DATA FOR DEVELOPMENT (D4D) CHALLENGE

In 2012, the global telecommunications company Orange launched its first "Data for Development Challenge" (D4D). The challenge marked the first time a large database of mobile network data was opened to the international scientific community for use in research for sustainable development. This year, Orange and Sonatel, in partnership with UN Global Pulse, the Gates Foundation, GSMA, Paris21, the World Economic Forum, MIT, Catholic University of Louvain, UC Santa Barbara, and Université Cheik Anta Diop de Dakar, have launched a second edition of the D4D challenge, this time with a focus on Senegal (http://www.unglobalpulse.org/D4D-Challenge-Senegal).

Pulse Lab Kampala participated in the challenge in partnership with WFP Senegal and with the Politécnica University of Madrid. The exercise submitted "Mobility profiles and calendars for food security and livelihoods analysis" won the second award under the "Agriculture" category. An overview of the exercise can be found here:
http://pulselabkampala.ug/d4d-senegal/d4d-senegal-poster.pdf

How is the exercise useful for development/humanitarian action? For vulnerable population groups, changes in mobility patterns can indicate a change in livelihoods or coping strategies as a result of shocks. Monitoring changes in mobility patterns can thus be a powerful early warning mechanism. Statistics about the movements of different population groups, and in particular deviations from normal seasonal patterns, can be a new quantitative dimension of analysis for the Seasonal Monitoring reports used for decision making and crisis management.

Mobility map of Senegal (D4D Challenge)

Data generated with Call Detailed Records in Senegal
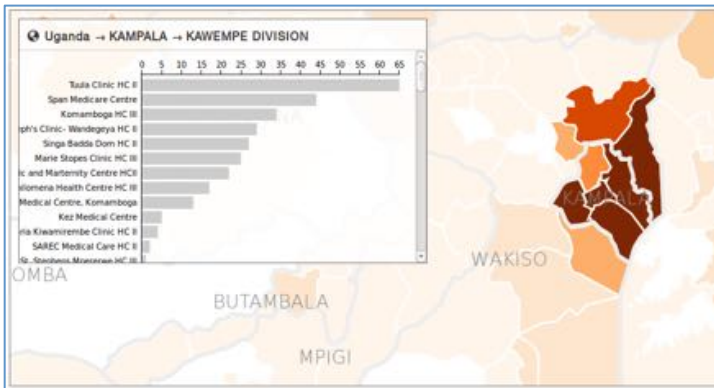
TRACK 1 INNOVATION DRIVER

DATA INNOVATION PROJECTS

In close collaboration with the teams in Pulse Lab New York and Pulse Lab Jakarta, data innovation projects around the SDGs have advanced in the second quarter of the year.
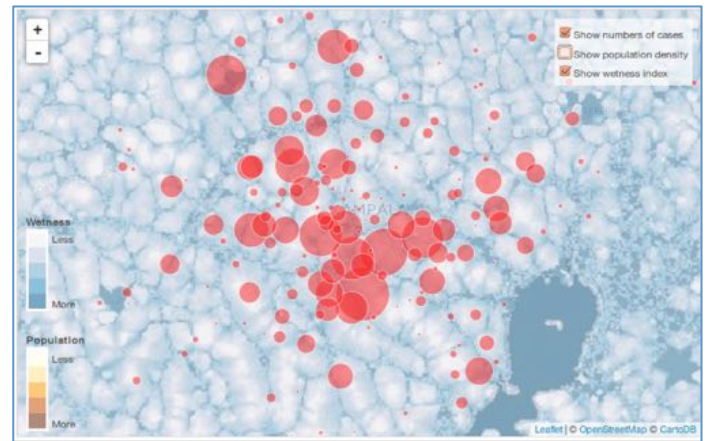
SDG3. Ensure healthy lives…responding to disease outbreaks

The partnership with the Ugandan Ministry of Health and the World Health Organisation (WHO) continues to strengthen. Pulse Lab Kampala became a member of the Typhoid National Task Force that was formed to support the response to the disease outbreak early in 2015. The Lab prepared a series of data visualizations to support better understanding of the disease data and built prediction modeling to enhance the response. An overview of the project is available at: *http://pulselabkampala.ug/diseasemapping/*

> "…. the visualizations produced by Pulse Lab Kampala have been tremendously helpful to the Ministry of Health. The field teams have used the visualization to identify the hotspots of the typhoid outbreak by district, sub-county and even health center. This has enabled the Ministry to prioritize which areas of the country, and which health centers, to allocate resources to – including medicine, medical personnel and training…" – Dr. Monica Musenero Masanza, Assistant Commissioner, Epidemiology and Surveillance, Ministry of Health, Uganda (2015).

Interactive typhoid map allowing exploration of data from health centres

Interactive map of cases by area of home residence, overlaid on topological wetness index

SDG1. End poverty… with better targeting (*at proof of concept phase*)

There are many examples of how satellite imagery can support the achieving SDGs in helping to understand changes on the surface of the earth. Pilot programs have been completed in the region using satellite imagery and machine learning to identify and measure these changes. Pulse Lab Kampala and partners, including UNDP, the University of Edinburgh, UNDP, the Uganda Bureau of Statistics and private companies such as Google (Google Earth and Skybox), are learning from pilot initiatives to scale them up. With the project, data scientists will develop an algorithm to determine the proportion of thatch to metal roofed homes in northern Uganda. A toolkit will be developed to estimate trends in poverty levels with satellite imagery.

Satellite imagery from Gulu District, Northern Uganda. Left: image from 2012, with metal-roofed buildings highlighted in yellow. Right: image from 2014, with new metal-roofed buildings highlighted in red. Source photography: Google Earth. Analysis: Pulse Lab Kampala.

SDG15. Halting biodiversity loss…with spatial data

The NBSAP Forum (www.nbsapforum.net) has established a structured methodology for reviewing draft revised National Biodiversity Strategies and Action Plans (NBSAPs) against baseline global best conservation planning practices. A technical review of 20 drafts of second generation NBSAPs suggests that access to and incorporation of geospatial data for systemic conservation planning analysis is a persisting area of deficit. In partnership with the NBSAP Forum and UNDP Zimbabwe, Pulse Lab Kampala is working on a toolkit to support the incorporation of spatial data in NBSAPs. After validation, the tool will be used to support other countries designing NBSAPs.

Image by Exploring Africa   *Image by Nature's Big 4*

SDG2. Ending hunger… with new insights (*at proof of concept phase*)

The Ugandan National Household survey collects data to estimate and monitor the level of household poverty/wealth in the country. Data for multiple proxy indicators of poverty has been collected on a regular basis since 1989, for households and communities. One of the identified and measured proxy indicators is "*Air time & services fee for owned fixed/ mobile phones".* For the first time in Uganda, data on real expenditure on airtime for approximately 5,000,000 individuals will be available for analysis. Pulse Lab Kampala is partnering with Ugandan Bureau of Statistics (UBOS) and Real Impact Analytics to implement this project.

SDG16. Promote peaceful societies…. with new insights (*at proof of concept phase*)

Pulse Lab Kampala is currently engaged in a project aimed at monitoring the digital print of the evolving context in Uganda towards the 2016 General elections. By using Big Data Analytics, the results will showcase innovative ways to strengthen conflict analysis. This will support the RCO's work to guide the strategic direction of UNCT in relation to conflict prevention programming and strengthening of Uganda's peace and development framework. A tool is under development to mine digital data from social media, online media, blogs and mobile surveys. Partners include UN Agencies in Uganda.

SDG17. Strengthening implementation

…with radio data mining

Pulse Lab Kampala continues to work closely with Stellenbosch, Makerere and Sheffield Universities on this global innovation. Analysis of radio content from Kampala and Gulu regions is ongoing to develop pronunciation dictionaries, language models and acustic models. Signal processing to filter radio content including speech and excluding music or sports has been established. More information on the project is available at: *http://pulselabkampala.ug/radiomining/*

Image by www.danchurchaid.org

Image by Pulse Lab Kampala

… with community reporting

UNICEF's U-report system is now in 11 countries and expanding rapidly to others. An integrated, open-source toolkit that can provide a clear analysis based on the voice of their citizens expressed in U-report has been requested in many of these countries. Pulse Lab Kampala supported UNICEF to use U-Report in its full potential with Big Data Analytics last year. Discussions are ongoing at the HQ and CO levels to define the scope of the pilot project that will be tested in Uganda. More information on this project can be found at: *http://pulselabkampala.ug/post2015/categories/*
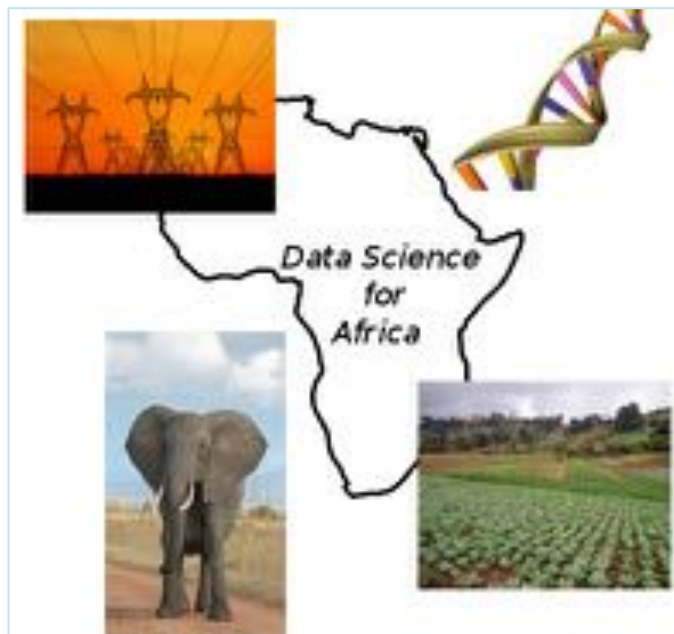
TRACK 2 ECOSYSTEM CATALYST

WORKSHOP "*DATA SCIENCE IN AFRICA, 2015*"

The last few years have witnessed an explosion in the quantity and variety of data available in Africa, produced either as a by-product of digital services from sensors or measuring devices, satellites and many other sources. A number of practical fields have been transformed by the ability to collect large volumes of data: for example, bioinformatics with the development of high throughput sequencing technology capable of measuring gene expression in cells, or agriculture with the widespread availability of high quality remote sensing data. For other data sources – such as mobile phone usage records from telecoms operators, which can be used to measure population movement and economic activity – we are just beginning to understand the practical possibilities.

Data science seeks to exploit advances in machine learning and statistics to make sense of the growing amounts of data available from various sources. In Africa, sustainable development areas such as healthcare, agriculture, disaster response and wildlife conservation would benefit greatly if domain experts were exposed to data science techniques. These skills would allow practitioners to extract useful information from these abundant sources of raw data.

Tweet on the workshop:
wanjohi kibui @wanjohikibui Jun 20
Congrats to the organizers.
This is a start of a journey
we all want to walk.

Pulse Lab Kampala, in partnership with Dedan Kimathi University of Technology (Kenya) and the University of Sheffield (United Kingdom), organized the workshop "Data Science in Africa" in June 2014 gathering over 120 academics, development practitioners and private sector partners.

The workshop aimed to: (1) bring together leading researchers and practitioners working on data science methods or applications relevant to Africa, and (2) to provide training on state of the art data science methods to students and others interesting in developing practical skills.

PARTNERSHIPS, KNOWLEDGE TRANSFER AND CAPACITY BUILDING

Pulse Lab Kampala has taken important steps in promoting *"data philanthropy"*. Different partners from the private sector have provided data sets or have granted access to data streams for data innovation projects. The table below summarizes the status collaborations and current challenges.

Private Sector Partnerships in Development

PARTNER	STATUS
Uganda Telecom Ltd (UTL)	• UTL will make available for data innovation projects the largest dataset that a telecommunications company has ever made available worldwide. • An agreement to formalize the partnership is under review and will be signed with the Executive office of the UN Secretary General. • A server to facilitate the data access is under procurement.
Airtel Uganda Ltd	• Airtel will make available for data innovation projects a data set with mobile money transactions and CDRs. • An agreement to formalize the partnership is under review and will be signed with the Executive Office of the UN Secretary General.
Real-Impact Analytics	• An agreement is under development to formalize the partnership with the company. • Working relations are consolidating with a project at the proof of concept phase.
Uchumi Supermarkets	• Three years of retail data has been shared with Pulse Lab Kampala (including pricing data). • Discussions are under way to continue exploring the use of the data for development.

Exploratory meetings have been conducted with the following companies: Ushahidi, Trademark East Africa, MTN Uganda, Afri-Cell Telecom, ThoughtWorks Technology Consulting, Mining-Atlas, Peripheral Vision International, Masae Analytics, OptiMetriks, Stanbic Bank, Hewlett Packard and Afrosoft IT Solutions.

Data Science Partners

Pulse Lab Kampala continues building relationships with universities that contribute to data innovation projects on a pro-bono basis. Pulse Lab Kampala has been fostering South-South cooperation in particular, through fostering collaborative projects between with Makerere University in Uganda and Stellenbosch University in South Africa.

Collaborations have been consolidated with the Universities of Edinburgh and Sheffield (UK) and new partnerships are under development with the Centre for Innovation at Leiden University (The Hague, Netherlands) and Dedan Kimathi University of Technology (Nyeri, Kenya).

Government Counterparts

- **Ministry of Health:** the Ministry of Health of Uganda continuous leading an ongoing collaboration to use data innovation in response to disease outbreaks. See *annex 3. Appreciation letter to Pulse Lab Kampala from Ministry of Health.*
- **Uganda Bureau of Statistics (UBOS):** the partnership with UBOS has continued with 2 projects identified for further collaboration.
- **National Planning Authority (NPA):** 2 projects are at the design stage to support the implementation and monitoring of the National Development Plan II and the SDGs.
- **Office of the Prime Minister (OPM):** Discussions have continued to define the support to the OPM, with specific focus on the role under the next Peace Development and Development Plan 3 (PRDP).
- **National Water and Sewerage Corporation (NWSC):** The scope for a pilot collaboration project has been drafted.
- **Kampala Capital City Authority (KCCA):** Discussions have started to support prevention/response to floods in Kampala with data innovation.

Global Advocacy and UN System Engagement

Exploratory meetings have been held with the following civil society organizations/innovation initiatives:
- Innovations for Poverty Action (http://www.poverty-action.org)
- Resilient Africa Network (http://www.ranlab.org)
- iHub Kenya (http://www.ihub.co.ke) and iHub Research (http://www.ihub.co.ke/research)
- Flowminder (http://www.flowminder.org)
- International Development Group / RTI International, International Growth Center (http://www.theigc.org)
- Peripheral Vision International (http://www.pvinternational.org)
- Women of Uganda Network (WOUGNET) (http://wougnet.org)
- BRAC NGO (http://www.brac.net)

Discussions have continued with a number of UN Agencies to define data innovation projects: UNDP, FAO, UNICEF, UNCDF and UNAIDS. Additionally, a presentation on the work of Pulse Lab Kampala has been delivered to UNAIDS CO Uganda (brown bag lunch presentation for all staff).

Advocating for innovations in the UN System and sharing knowledge on data innovation have been conducted in the reporting period under different modalities:

MODALITY	
Visitors to the Lab	A team from Innovations for Poverty Action ((http://www.poverty-action.org); A team from Real Impact Analytics (https://realimpactanalytics.com/en), the manager of, Humanitarian Data Exchange (HDX) - the Data Lab Nairobi (https://data.hdx.rwlabs.org/); a team from the International Development Group / RTI International (http://www.theigc.org).
Contribution to innovation events	• The Pulse Lab Manager participated as Jury of the ACIA 2015 awards (http://acia.ug) organized by the Ugandan Telecommunications Commission. • The Lab contributed to the UNFPA Hackathon (Kampala 21-23 July) with guidelines on "*Big Data considerations for mobile apps*"
Presentations at Conferences	• Presentation at the iHub Entrepreneurs Forum (iHub Kenya) "How to leverage Big Data to benefit rural communities" (Nairobi 18 April) • Presentation at the High-Level Conference "*Sustainable Development Goals in middle income and small island developing states: a perspective from Africa*" (Praia

MODALITY	
	9-10 June). • UN Seminar *"Leadership for the SDGs: Delivering Together in a Post 2015 World'"* (NY 11-13 May).

RESOURCE MOBILIZATION

FUNDING PROPOSALS SUBMITTED IN 2015 TO DATE

Title	Funding window	Budget	STATUS
Radio Mining to put voices of the people at the centre of development in Uganda	Sweden Embassy	USD 300,000	Approved
Big Data for Sustainable Development	UNDAF Innovation Fund post	USD 50,000	Approved
Junior Data Scientist	South Korean Embassy	JPO	Under review
Incorporating the voices of Ugandans in sustainable development with radio mining	UNDP RBA Innovation Fund 2015	USD 150,000	Under review
Advancing SDG1 in Uganda with automated roof counting	UNDP RBA Innovation Fund 2015	USD 150,000	Under review
Exploring Mobile Money Transaction Data	Bill & Melinda Gates Foundation	USD 100,000	Under review

Follow up discussions with donors have continued during the reporting period.

Figure: www.gigya.com