Appendix 1: Global tools to leverage open data for agricultural transformation

Open Up Guide for Agriculture

https://openupguideforag.info/

The Open Up Guide for Agriculture provides a roadmap for governments to engage with open data and develop open data strategies to support agriculture and was used substantially in the development of this Policy Discussion Document. It suggests six policy areas where open data can support the agricultural sector, including: empowering farmers; optimizing agricultural practice; stimulating rural finance; facilitating the value chain; enforcing policies; improving transparency and efficiency. These were adapted and used in the formulation of the policy objectives contained in this Policy Discussion Document. Based on a participatory process with politicians, agricultural experts and the open data community, 14 key data categories were identified in the Open Up guide. 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. Extensive use of this framework was made in identifying the data opportunities and priorities in Ghana. 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 Open Up Guide also highlights 11 open data case studies demonstrating how governments are harnessing data to address sustainable agriculture and food security around the world.

As a useful resource for any country or region that seeks to develop open data policies, the Open Up Guide also provide links on how to develop a national or regional open data policy supporting agricultural transformation. It refers two relevant guidance documents: FAO's e-Agricultural Strategy Guide[1] and the Open Data Institute's "How to write a good open data policy"[2]. It also provides good practices on overcoming open data challenges, building an open data community, responsible data publication and linking to the international open data ecosystem. Its material mainly emphasises the publication of data rather that the use of data and how to catalyse an open data ecosystem from a demand perspective.

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[1] http://www.fao.org/3/a-i5564e.pdf

[2] https://theodi.org/article/how-to-write-a-good-open-data-policy/

FAO e-Agriculture strategy guide

http://www.fao.org/3/a-i5564e.pdf

The E-agriculture Strategy Guide was used to inform the development of this Policy Discussion Document. It is a framework that assists countries to develop their national e-agriculture strategy and master plan. It was developed by the Food and Agriculture Organization (FAO) and the International Telecommunication Union (ITU) together with support from partners. The framework provides guidance towards the building of an ICT-enabled agricultural system by developing a vision for agriculture, establishing an action plan and building a monitoring and evaluation framework. It includes steps on how to run a process for developing e-Agriculture in a country's strategy, which requires engaging with diverse stakeholders from across many sectors.

Open Data Institute guide for writing a good open data policy

https://theodi.org/article/how-to-write-a-good-open-data-policy/

The Open Data Institute's 'How to write a good open data policy' was also used to inform the development of this Policy Discussion Document. It lists key elements to consider when writing or reviewing the content of existing policies, which include: providing a clear definition of open data and a declaration of general principles; describing data types considers; outlining relevant legislation; policies; and other guidance. A checklist of additional elements that should be considered is also provided, and includes issues around the policy context, data licensing and reuse rights, identifying and prioritising data for release, privacy considerations, data publishing standards, engaging with re-users, approach to consuming data, concrete commitments and policy transparency.

International Open Data Charter

https://opendatacharter.net/principles/

The Open Data Charter is an independent voluntary programme sponsored by Fund for the City of New York. The Charter's goal is to embed a culture and practice of openness in governments in ways that are resilient to change through opening up data. So far, it has been adopted by 54 national and local governments worldwide, but Ghana is not among these. Nevertheless, the charter provides useful principles related to the release and publication of open data, which can serve as best practice guidelines when considering open data:

1. Open by default
2. Timely and comprehensive
3. Accessible and usable
4. Comparable and interoperable
5. For improved governance & Citizen engagement
6. For inclusive development and innovation

The Charter also provides a roadmap for adopting an implementing these principles.

Open Data Impact Map

http://www.opendataimpactmap.org/

Open Data Impact Map is a project of the Open Data for Development Network, supported by funding from the International Development Research Centre and the World Bank. It is a public database that maps the organisations that use open government data worldwide. It comprises research on previous studies, online surveys and examples from an international network of Regional Supporters. It does not assess the quality of the data but aims at being a resource for further analysis of the impact of open data at a global scale. The Open Data Impact Map shows the findings, organisations involved and sectors using open data per region and/or per sector. Use cases are presented detailing the type of open data used, impact and country.

For Ghana, the Open Data Impact Map shows seven organisations using open data to support good governance and agriculture, mainly Civil Society Organisations (CSOs) and Small and Medium-sized Enterprises (SMEs)[3] (Table 1).

Table 1: An overview of the organisations and their use of open data and sector, as drawn from the open data impact map[3], 31 July 2019.

Organization Name	Country Income Level	Organization Type	Sectors	Description
AgricInMedia	Lower middle income		Agriculture	AgricInMedia provides a variety of geospatial services.
Code for Ghana	Lower middle income	Nonprofit	IT and geospatial	Code for Ghana is part of the Code for Africa initiative which aims to use open data and technology to promote responsive, innovative and effective governance.
Farmerline	Lower middle income	For-profit	Agriculture	Farmerline is a technology product company that builds supply chain and value chain solutions to integrate agricultural outputs of rural farmers in Africa/emerging markets.
Mobile Content Ltd	Lower middle income	For-profit	Media and communications	MC.C is a mobile content provider in Ghana
Mobile Web Ghana	Lower middle income	Nonprofit	IT and geospatial	Acommunity of Ghanaian mobile entrepreneurs that provides training in mobile technology and business, to help local talent build applications for local communities.

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[3] https://www.opendataimpactmap.org/map

Odekro	Lower middle income	Developer group	Governance	Odekro promotes transparency, accountability and democratic governance through citizen action and engagement with relevant government agencies.
Wuni Zaligu Development Association	Lower middle income	Nonprofit	Governance	Wuni Zaligu Development Association build skills of deprived persons.

The Open Data Impact Map further analyses use case studies by region. In the Sub-Saharan Africa, and Ghana more specifically, we can find the following open data case study examples[4] and their impact:

1. Code for Ghana: *Developer group focused on using open data to promote responsive, innovative and effective governance.* As their main impact they state: *Empower civil society with access and skills to make use of public data* (http://www.codeforghana.org)

2. Mobile Content.Com Ltd.: A mobile content provider that informs the organization's market and pricing strategy in Ghana (http://mobilecontent.com.gh).

3. Mobile Web Ghana: It is an *organization that supports people become mobile-technology entrepreneurs through business and mobile technology education* (http://mobilewebghana.org/)

4. Odekro: *A website that provides makes public information from the Parliament of Ghana more easily accessible* (http://www.odekro.org/)

5. Syecomp Business Services Ltd: *A social impact geospatial company that focuses on research and knowledge management, and enhancing agriculture through ICT and advanced geospatial solutions*. As their main impact: *Enhancing Ghana's agricultural sector through data-driven research and geospatial services* (http://syecomp.com/wp/)

Global Open Data Index (GODI)

https://index.okfn.org/

GODI, not to be confused with Ghana's own initiative named Ghana Open Data Initiative (Section **Error! Reference source not found.**), provides an independent assessment on the release of open data by the governments at a national level. It is run by Open Knowledge International and powered by Open Data Census. It analyses the readiness of governments to publish open data and suggests where improvements and data publication updates are required. GODI measures the openness of governments through clearly defined data categories. Index scores for each data category serve as a proxy for the availability of open government data, and are based on the level of openness, content and disaggregation, and temporal updates. Ghana is scored as rank 76 against 94 other countries in the Index, with a 16% of ranking score based on weighted questions according to the methodology used in the Global Open Data Index[5]. The breakdown of this result in Figure 1 shows that only 'green'

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[4] https://www.opendataimpactmap.org/usecases

[5] https://index.okfn.org/place/gh/

scoring data sets (i.e. those that are either publicly available, available free of charge, openly licensed) are: government budget, national statistics, procurement, national laws and draft legislation. All other datasets (air quality, national maps, weather forecasts, election results, government spending, land ownership) are still considered by GODI methodology to be closed. This Index score pertains to all national level data, and is not specifically focussed on agricultural data (although these are also included).

Figure 1: Global Open Data Index for Ghana[5]

Open Data Readiness Assessments (ODRA)

http://opendatatoolkit.worldbank.org/en/odra.html

ODRA is a tool developed by the World Bank's Open Government Data Working Group as part of the 'Open Data Toolkit'. It assesses the readiness of governments or individual agencies to coordinate, design and implement an open data initiative. This tool can be freely downloaded. The ODRA is a generic assessment methodology, with no specific focus on agriculture, or on African countries or developing countries. It does however provide important references to aspects that are relevant for the success of open data initiatives, with a strong emphasis on political economy and the demand side of open data. Several assessments are available the ODRA website, most of them carried out at a national level. These include assessments in West Africa for Burkina Faso and Sierra Leone.

Open Data Certificate

https://certificates.theodi.org/en/

The Open Data Certificate is a freely online tool developed by the Open Data Institute that recognizes well-published data. It verifies the legal, practical, technical and social aspects of published data, its quality, sustainability and reliability via a questionnaire assessment. It further guides the guides publisher through publishing best practices. Companies like Syngenta, UK Data Services and Office for National Statistics are using Open Data Certificates. Ghana has seven certificates that were issued three years ago, although the original datasets are older. Most of them are related to forestry and meteorology. They are also ranked with an award level, for example, the certificate: Geospatial Toolkit

for Ghana from NREL achieved Bronze level on 23 October 2015, which indicates that this data makes a good start at the basics of publishing open data[6].

Periodic Table of Open Data Impact Factors

http://odimpact.org/periodic-table.html

This tool was developed by GovLab and is based on literature review and case studies. It contains the elements deemed important in determining the impact of open data initiatives. These elements are categorized in five groups: Problem and Demand Definition, Capacity and Culture, Partnerships, Risks, Governance. One of the case studies used focuses on Ghana's smallholder farmers (Ghana's Esoko: Levelling the information field for smallholder farmers[7]). Esoko is a company that helps Ghanaian farmers in their struggle to maximize the value of their crops, which is hampered because the lack of information. Esoko acts as an information provider (also in other developing countries) with the aim of helping them in securing their prices.

Global Open Data for Agriculture and Nutrition (GODAN)

https://www.godan.info/

GODAN is an initiative launched in 2013 that seeks to support global efforts of opening up relevant agricultural and nutrition data and to build high-level policy and public and private institutional support for open data. GODAN currently coordinate and African Intergovernmental Network on Open Data for Agriculture and Nutrition to support the Nairobi Declaration (Section **Error! Reference source not found.**), and provide a platform for governments to share experiences, develop strategies, and collaborate with other governments who are facing similar challenges around open data in agriculture and nutrition.

Its three-year GODAN Action project[8] has examined ways to effectively engage with open data in agriculture and nutrition in developing countries. The project worked along three work streams: improving standards and interoperability, assessing open data impact pathways and their evaluation, and capacity building. The work on evaluation is particularly relevant for the development of open data strategies and policies. It provides insight in how open data can lead to impact, and provides a means of assessing impact mechanisms and guidelines on the design and evaluation of open data initiatives to optimize their impact. The project also showcases case studies on weather, land and nutrition data and establishes a knowledge base of methods, tools and cases on (impact) evaluation.

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[6] https://certificates.theodi.org/en/datasets/75601/certificate

[7] http://odimpact.org/case-ghanas-esoko.html

[8] https://drive.google.com/open?id=1DWjsEF0SItXr79aIW5DYbIc6DN8vMsb2

The Open Data Barometer

https://opendatabarometer.org/?_year=2016&indicator=ODB

The Open Data Barometer assesses how governments are publishing and using open data for accountability, innovation and social impact. Country rankings are based on the prevalence of open data initiatives and their trends throughout the five previous Open Data Barometer editions. Countries are also ranked according to their score on Implementation (how accessible and timely open data is published) and Emerging Impact (evidence that open data release by the government has had positive impacts in the country).

The most recent Open Data Barometer (4th edition) measures commitment by governments that have adopted the International Open Data Charter Principles and those that have committed to the G20 Anti-Corruption Open Data Principles. These assessments make use of peer reviewed expert surveys (on open data contexts, policy, implementation, and issues of data availability, format, licensing, timeliness, and discoverability) and secondary complementary data[9]. More detailed information can be found per country on 15 key areas (land ownership data, census data, etc.) and comparisons can be established among countries of choice by selecting other countries and years.

While the Open Data Barometer provides useful information on (trends in) the adoption of open data, there are some issues that make it less applicable for regional policy development. First, the last full edition was from 2016, as the latest edition only considers 30 governments. This results in many gaps in country comparisons, especially in Africa and Asia. Second, the Open Data Barometer does not specifically assess the state of open data related to agriculture, although some of its areas are linked to agriculture (e.g. land ownership and environmental data) or might contain some agricultural data (e.g. census data, map data, international trade data).

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[9] https://opendatabarometer.org/?_year=2016&indicator=ODB