



G O D A N A C T I O N C U R R I C U L U M

E-learning course curriculum:

Open Data Management in Agriculture and Nutrition

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Preface

GODAN Action is a three-year project funded by the UK's Department for International Development. The project aims to enable data users, producers and intermediaries to engage effectively with open data and maximise its potential for impact in the agriculture and nutrition sectors. In particular we work to strengthen capacity, to promote common standards and best practice and to improve how we measure impact.

This e-learning course is being developed as part of the capacity development activities of the project, which aims to contribute to increased farmers' yields, improved nutrition for consumers and better evidence-based policy making. Achieving such impacts requires that individuals, organisations, and communities feel confident in engaging with open data.

The development of the course was informed by a consultative workshop on the Open Data and Research Data Management Online Course that took place in Wageningen from 7 to 8 March 2017. The workshop was organised by the Food and Agriculture Organisation of the United Nations (FAO), hosted by the Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA) and funded by the United Kingdom Department for International Development (DFID).

This e-learning course is the result of a collaboration between GODAN Action partners, including Wageningen Environmental Research (WUR), Agroknow, AidData, the Food and Agriculture Organisation of the United Nations (FAO), the Global Forum on Agricultural Research (GFAR), and the Institute of Development Studies (IDS), the Land Portal, the Open Data Institute (ODI) and the Technical Centre for Agriculture and Rural Cooperation (CTA).

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1 Introduction

The e-learning course Open Data Management in Agriculture and Nutrition has been developed to strengthen the capacity of data producers and data consumers to manage and use open data in agriculture and nutrition. The main objective of the course is:

“to be used in the context of different institutions in agricultural and nutrition knowledge networks and raise awareness on the different types of data formats and uses, and on the importance of reliability, accessibility and transparency”

It is aimed at three audience groups:

1. infomediaries, which includes ICT workers, technologist - journalists, communication officers, librarians and extensionists
2. policy makers, administrators and project managers,
3. researchers and scientists.

More specifically, by the end of the course learners will be able to:

- understand the principles and benefits of open data
- understand ethics and responsible use of data
- identify the steps to advocate for open data policies
- understand how and where to find open data
- apply techniques to data analysis and visualisation
- recognise the necessary steps to set up an open data repository
- define the FAIR data principles
- understand the basics of copyright and database rights
- apply open licenses to data

2 E-learning course design

The design of the course was discussed at a consultative workshop entitled “Open Data for Agriculture and Nutrition” held at the Technical Centre for Agricultural and Rural Cooperation (CTA) held in Wageningen on the 7th-8th of March 2017. The workshop brought together 20 experts and representatives of the target audience, including 5 representatives from national organisations and networks in developing countries to define the curriculum outline as a first step in the development of an e-learning module entitled “Open Data and Research Data Management in Agriculture and Nutrition”.

The workshop was a critical step in the design of a series of capacity development modules as it brought a wide range of experts and institutional representatives together to contribute to the definition of the content to be covered.

The consultative workshop had the following objective: Based on the target audience groups characteristics, role, responsibilities and job tasks, jointly decide the knowledge, skills and competences that need to be taken into consideration to design the Open Data curriculum.

The modules are part of an online course. A set of associated resources, learning materials to support face-to-face training will be also delivered as part of the project.

The course content is learner-centered, engaging and rich in interactive elements, examples and case-based scenarios. The content includes key knowledge and concepts required by the target audience groups, as well as providing task-based and vocational training to support professionals in their daily activities.

3 Target audiences

This section includes a series of uses cases based on the functions and activities related to open data of each target audience. Below you will find the main activities related to each function and target audience. In Table 1, you will find the table relating each use case to the units and lessons. The learning paths are linked to specific use cases identified during the consultative workshop¹ in March, as follows:

Infomediaries²:

Note that infomediaries is a broad term that has been used to encapsulate a number of roles within GODAN including:

- ICT workers
- Technologist-journalists
- Communication officers
- Librarians
- Extensionists.

The activity that joins all of these roles is that of taking input and creating outputs for others. What joins them is that they all want to take either data, information or knowledge and help their users climb to the next level of the triangle.

- Use Case A. Informing audiences using open data
- Use Case B. Managing an open data repository

Researchers:

Note that researchers, including private and public sector, communicate their research, collaborate with others - where appropriate - and transfer and exploit knowledge for the benefit of their employer, the economy and society as a whole. Researchers produce research as well preparing, writing and submitting research proposals; reviewing gathered research and analysing various sets of data; interpreting data; verifying that information on databases remains secure.

- Use Case C: Producing and curating datasets that underlie research publications
- Use Case D: Identify datasets suitable for reuse in research
- Use Case E: Communication of societal benefits of research results

Policy and decision makers:

Note that policy makers include both administrators and project managers. Policy makers identify needs and priorities in country/region, collaboration across ministries and sectors, draft or revise policies coherent with national and global development agendas in-line with meeting commitments and goals. In particular for climate and weather data, policy makers publish conditions for availability and openness of weather data and conduct policies on national weather services.

¹ <https://docs.google.com/document/d/1yH5Ld4QXtEiE8SwfRMJfQQoth4MUUyjWK4IG1X54UfE/edit?usp=sharing>

² The functions 3 and 4 identified for infomediaries have been included in other use cases, as they are very specific and also part of other functions.

- Use Case F. Formulating policies and reports using open data
- Use Case G. Developing strategy for sustainable open data plan

Table 1 provides detailed information about the learning paths based on compulsory (X) or recommendable (blank) lessons.

Table 1. Overview of the learning paths by target audience and use case

Target audience	Use case	Unit 1		Unit 2					Unit 3					Unit 4					Unit 5		
		1.1	1.2	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.4.1	3.5	4.1	4.2	4.3	4.4	4.4.1	5.1	5.2
Infomediaries	A	x	x	x	x	x	x	x												x	x
	B	x	x						x	x	x	x	x	x	x	x	x	x	x	x	x
Researchers	C	x	x						x	x	x	x	x	x	x	x	x	x	x	x	x
	D	x	x	x	x	x	x	x						x						x	x
	E	x	x	x	x	x	x	x				x	x	x						x	x
Policy makers	F	x	x	x	x	x	x	x				x	x	x						x	x
	G	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x

Unit 1 Open data principles

This unit provides a definition of open data, its principles and a general overview on its benefits and impact, particularly in agriculture and nutrition in addition to ethical considerations in opening and reusing data.

At the end of this unit, the learner will be able to:

- understand the definition of open data, and its principles
- recognise the value of open data in agriculture and nutrition
- understand the benefits of using and publishing open data
- define ethical challenges with reusing open data
- identify ethics questions in open data lifecycle

Lesson 1.1 What is open data?

Learning objectives

- introduce open data and its principles
- identify the benefits and challenges of open data for the agricultural sector
- provide an overview of key actors involved in the open data publication
- present use cases in agriculture that relate to the benefits of open data

Learning outcomes

- acquire knowledge of definition of open data, its principles.
- recognise the value of open data in agriculture
- define the challenges of moving to a open data landscape
- understand the benefits of publishing and using open data

Lesson 1.2 Ethics in open data lifecycle**Learning Objectives**

- list the stages of the open data lifecycle
- define responsible use of data
- provide an overview on the principles of responsible data
- define responsible data concepts
- provide an overview of responsible data challenges in agriculture
- list ethical questions to ask at different stages of the open data lifecycle

Learning outcomes

- understand the stages of the open data lifecycle
- define challenges within data use
- understand responsible data principles
- become aware of responsible data challenges in agriculture
- identify ethical questions to ask at different stages of the open data lifecycle

Unit 2 Using open data

This unit provides a foundation in how to discover and use open data, assess data quality, information on how to analyse, visualise and reference data.

At the end of this unit, the learner will be able to:

- identify services providing access to open data
- discover downloadable and hidden data
- evaluate data sources and identify the provenance of data
- apply a number of techniques to analyse data
- choose appropriate methods to visualise data
- identify different stages of the policy cycle
- understand the value of identifiers in data citation

Lesson 2.1 Discovering open data

Learning objectives

The lesson aims to provide a foundation in how to discover and access data that is available on the web. From data downloads and data service providers, to publishers of linked open data, this lesson will cover the complete toolkit to quickly obtain the right data from the web.

Learning outcomes

- list different types of services that provide access to open data
- list different methods of accessing data using these services
- explain the difference between these types of services
- use the different types of services to access open data
- discover downloadable data
- discover hidden data
- identify whether a data source is open, using these types of services
- describe the advantages and disadvantages of these types of services

Lesson 2.2 Quality and provenance

Learning objectives

Open data becomes usable when a human can understand it, and a machine can manipulate it. Users of open data need permission from its publisher, granted by an open licence. But an open licence alone is not enough to guarantee the quality and usability of the data. It is unlikely that people will be able to engage with data to derive insights and demonstrate benefits unless it is usable.

Learning outcomes

- list, describe, and apply the factors that affect usability of open data
- use tools that help evaluate usability of open data
- cross check data against other sources
- identify the provenance of an open dataset (for machine-readable/human-readable use)
- describe what makes data usable for different types of users

Lesson 2.3 Data analysis and visualisation

Learning objectives

This lesson aims to provide a foundation in how to prepare, analyse and present findings from data.

Learning outcomes

- explain why data needs to be analysed
- prepare data for analysis
- apply a number of techniques to analyse data

- examine the risks associated with analysing different types of data
- explain the purpose of data visualisation
- choose appropriate data visualisations
- evaluate the effectiveness of different data visualisations

Lesson 2.4 Open data in policy cycles

Learning objectives

This lesson aims to enable students to use open data to inform, and drive policy and to evaluate its effectiveness.

Learning outcomes

- list the steps in the policy cycle
- apply open data to the steps in the policy cycle
- evaluate the effectiveness of using open data to inform and drive policy

Lesson 2.5 Referencing data

Learning objectives

The sharing of scientific research is a long established process dating back to the 1660s with the creation of the Royal Society in England. The publication of journal papers allowed scientists to lay claim to their discoveries while sharing findings with others. Centuries later, our ability to share outputs now reaches far beyond just publication, into the data collected as part of the research process. This lesson looks at how similar principles are now applied to both the discovery and citation of scientific data.

Learning outcomes

- explain the importance of citation
- list and explain the key features provided by citation
- understand the value of adding persistent identifiers in the data exchange workflow
- identify existing good practices for the use of persistent identifiers

Unit 3 Making data open

This unit provides a foundation in how to manage datasets, creating and managing open data repositories, advocacy for capacity development, and developing strategies for sustainable open data.

At the end of this unit, the learner will be able to:

- understand good data management practices
- acquire knowledge of how to create data management plan
- identify the steps for establishing an open repository
- understand requirements for managing an open data repository

- deliver capacity development activities
- implement open data plans

Lesson 3.1 Managing datasets

Learning objectives

- explain the basic principles behind data management
- introduce the process of preparing a data management plan
- explain concepts of data storage, versioning and documentation practices.

Learning outcomes

- identify the steps that ensure good scientific data management practices are followed
- prepare a data management plan
- understand the potential of using data storage, and versioning good practices

Lesson 3.2 Managing dynamic datasets

Learning objectives

- provide an outline of automated processes for publishing data and manual input/aggregation, and provide examples
- introduce simple ways to ensure data consistency

Learning outcomes

- understand the processes that play a role in maintaining and exposing dynamic datasets
- be aware of existing examples of dynamic datasets
- be aware of methods of checking for data consistency in dynamic datasets

Lesson 3.3 Creating and managing open data repositories

Learning objectives

- provide an overview of how to create an open data repository, and explain the requirements for managing a repository
- describe the importance of data curation and its different components

Learning outcomes

- identify the steps to follow when creating an open data repository
- select the appropriate software tool for setting up a repository, based on repository requirements
- understand the requirements to efficiently manage an open data repository
- understand the different components of data curation

Lesson 3.4 Advocating for capacity development on open data

Learning objectives

This lesson aims to describe how to promote the open data repositories by engaging reusers. It also discusses the importance of capacity development for open data, and the skills that need to be developed. Finally, the lesson will include best practices for capturing lessons from open data initiatives, for the continual improvement of open data initiatives.

Learning outcomes

- understand the importance of promoting your own repository
- package, deliver and disseminate the information for advocacy purposes
- understand capacity development needs for open data
- communicate value and impact of open data with their audience
- prepare and collect lessons learned, in addition to good practices

Lesson 3.4.1 Annex - Use Case on open weather data

Learning objectives

The lessons aims to provide successful narratives of the use of weather data, including perspectives to advocate for open data. Two use cases are presented, from NOAA (United States National Oceanic and Atmospheric Administration) and farm management advice to smallholders in Bangladesh.

Lesson 3.5 Developing strategies for implementing open data plans

Learning objectives

This lesson aims to provide an insight on how to develop and implement clear, sustainable strategies for an open data policy.

Learning outcomes

- acquire knowledge on how to develop and formulate a policy for open data
- describe methods and considerations to implement open data policies
- engage stakeholders in policy implementation
- identify sustainability issues in open data policies, and be aware of how to overcome these issues

Unit 4 Exchanging open data

Learning objectives

This unit provides a foundation in sharing principles and data interoperability including frameworks, data structures, architectural interoperability and semantics for agronomic data.

At the end of this unit, the learners will be able to:

- understand and apply the principles of conceptual frameworks for sharing open data

- make informed decisions on how to make the data findable, accessible, interoperable and reusable
- adopt relevant technologies and data standards

Lesson 4.1 Guiding frameworks for data sharing

Learning objectives

- introduce the most endorsed guiding frameworks for data sharing (FAIR, TBL's 5 stars, Linked Open Data, W3C Best Practices)
- match the principles and indications from such frameworks to practical guidelines on how to implement them

Learning outcomes

- understand the principles of the most important guiding frameworks for sharing open data
- understand the major practical implications of these frameworks
- evaluate different ways of publishing data, including tools, against these frameworks.
- identify sustainability issues in open data policies, and be aware of how to overcome these issues

Lesson 4.2 Introduction to data interoperability

Learning objectives

This lesson aims to explain the basics of data interoperability.

Learning outcomes

- understand the basics of data interoperability
- identify the different types and layers of interoperability of data

Lesson 4.3 Structural and architectural interoperability

Learning objectives

- explain the basics of structural interoperability: data formats and data structures
- explain the basics of architectural interoperability: protocols and technical frameworks
- provide guidance on the advantages and disadvantages of specific solutions

Learning outcomes

- understand the basics of structural interoperability and current best practices
- assess formats and protocols that meet requirements
- (guide developers to) adopt the most interoperable solutions

Lesson 4.4 Semantic interoperability

Learning objectives

- explain the basics of semantic interoperability
- introduce what 'vocabularies' are

- provide guidance on how to choose the most suitable vocabularies
- provide guidance on how to use vocabularies in (meta)data

Learning outcomes

- understand the basics of semantic interoperability
- choose the vocabularies that meet requirements
- (guide developers to) use vocabularies in (meta)data

Lesson 4.4.1 Using published semantics for agronomic data

Learning objectives

This lesson aims to provide guidance and examples on how to encode (meta)data using published semantics, with specific examples for agronomic data.

Learning outcomes

- Understand how to identify suitable data standards to share agronomic data
- understand how semantics are embedded in (meta)data
- (guide developers to, or choose tools that) adopt the most suitable vocabularies for data of a specific type

Unit 5 Intellectual property and copyright

Learning objectives

This unit provides an insight on intellectual property rights in relation to copyright, database rights and open licences used for open data.

At the end of this unit, the learners will be able to;

- understand the basics of property rights in the open data landscape
- understand the basics of ownership of data
- acquire knowledge of standard open licences
- apply open licenses to datasets

Lesson 5.1 Intellectual property rights

Learning objectives

- define intellectual property rights (IPRs) and list different types of IPRs
- explain copyright and database rights in relation to IPRs
- explain rights which apply to data that is produced or reused

- lists considerations of IPRs in databases
- provide an overview on data ownership

Learning outcomes

- understand different types of intellectual property rights and how they relate to data
- be aware of differences between different jurisdictions
- make informed assumptions regarding copyright and database laws, considering the data at hand
- understand potential complications in ownership rights in data

Lesson 5.2 Licensing open data

Learning objectives

- provide an overview on licensing and related permissions
- define an open licence
- introduce standard open licences in relation to open data
- explain how to apply open licences

Learning outcomes

- understand the reasons why open data should be accompanied by an open licence
- understand the implications of the different open licences, bearing in mind the data you (intend to) use
- have an overview of the different open licences that can be used
- apply open licences to data that you have produced



[GODAN Action](#) brings together agriculture and nutrition specialists and open data experts to support individuals, organisations and communities to engage with open data.

The project is supported by the UK Department for International Development (DFID), led by Wageningen Environmental Research with international partners Agroknow, AidData, CTA, FAO, GFAR, IDS, Land Portal, and the ODI.

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