Open Data Management in Agriculture and Nutrition

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GODAN Action is a three-year project UK's Department for International Development 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. [www.godan.info]

UNIT 2: USING OPEN DATA

LESSON 2.4: OPEN DATA IN POLICY CYCLES

Aims and learning outcomes

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

After studying this lesson, you should be able to:
- 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.

Contents

List of figures

1.Introduction

The policy cycle is a tool used for designing and delivering policies. Whilst it has its roots in the public sector, it can also be used by private-sector organisations when implementing a company- or department-wide policy.

There are different variations of the policy cycle model which largely depend on the granularity of the breakdown of the stages, as well as the needs of the organisation that is using the cycle.
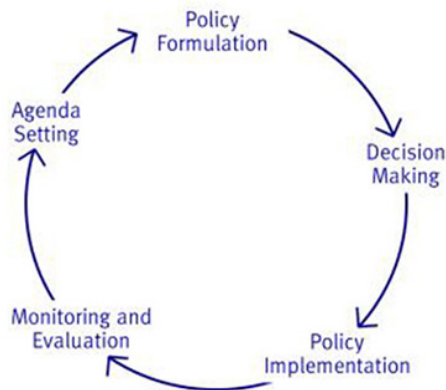
Broadly, however, there are five key steps in a policy cycle as identified by Anderson (1974):

- agenda setting
- policy formulation
- decision making
- policy implementation
- monitoring and evaluation.

Agenda setting is the first step in the policy cycle. This key focus of this stage is the identification of a problem or vision that requires policy intervention. Following the setting of an agenda is **policy formulation**. This can often be the biggest stage of the policy cycle and involve everything from data analysis to in depth studies and consultation with a broad range of stakeholders.

Next in the cycle is **decision making** where all the various options are discussed and external factors considered prior to **policy implementation**.

The step in one complete policy cycle is that of **monitoring and evaluation**. This is a critical last step to help evaluate the success of a policy and set the agenda for improving of changing the policy to suit the new environment the policy has created. Anderson (1974) offers the definition of the stages as set out in Table 1.

Table 1 Stages in the policy cycle as identified by Anderson (1974)

Problem identification	The recognition of certain subject as a problem demanding further government attention.
Policy formulation	Involves exploring a variation of options or alternative courses of action available for addressing the problem. (appraisal, dialogue, formulation, and consolidation)
Decision making	Government decides on an ultimate course of action, whether to perpetuate the policy status quo or alter it. (Decision could be 'positive', 'negative', or 'no-action')

Implementation	The ultimate decision made earlier will be put into practice.
Evaluation	Assesses the effectiveness of a public policy in terms of its perceived intentions and results. Policy actors attempt to determine whether the course of action is a success or failure by examining its impact and outcomes.

It is also worth noting that the UK Institute for Government has written a report (*Policy Making in the Real World*, Hallsworth *et al.*, 2011) detailing how a policy cycle 'reduces policy making to a structured, logical methodical process that does not reflect reality,' as policy making will often not fit neatly into isolated stages. Whilst a policy cycle can be a useful tool when designing a policy and thinking where open data can assist in policy making, if the actions you need to take do not fit into neat stages, that is still OK. Additionally, you may find yourself repeating steps, or completing the cycle more than once with one policy.

2. Applying Open Data to the Policy Cycle

2.1.   Agenda setting

Data can help you **identify the problem**, by giving you a realistic view of what is currently happening and helping you to make decisions that are informed by the current situation. Without data as an input, you are merely making a best guess at what is happening. With open data, anyone is able to access, use and share the data, so more people can make more informed decisions from a wider range of available sources.

Using open data to help you identify the problem is also known as using open data as **an input** such as the example with GroenMonitor in the Netherlands.

Protecting crops from pest outbreaks with vegetation maps: GroenMonitor. Farm productivity is often hit by crop damage caused by pests. Mice and other pests are difficult to detect on large farms through manual inspection alone. The GroenMonitor (GreenMonitor) is a tool that shows a current vegetation map of the Netherlands, based on satellite images and maps made publicly available through the European Space Agency (ESA). This makes pest outbreaks easy to identify and mitigate relatively quickly. In 2014, the GroenMonitor helped to identify 12,000 ha (29,652 acres) of fields affected by mice. The tool is now being exploited for various other applications, including plant phenology, crop identification and yield, identification of agricultural activities (e.g. mowing, ploughing and harvesting), nature and water management.

When using data, whether open or not, to help you make informed decisions, you need to be confident in the quality of that data. Poor data as an input will be reflected in the poor quality of your policy agenda. Having good-quality data, does not just mean data that is accurate or free from errors.

Quality data should also be timely: that might be using the most recent dataset or using data that is still relevant to your decision or policy. For example, US crop prices from 2005 may be irrelevant in today's policy making, unless you are looking for data to measure the impact of Hurricane Katrina on American crop prices, and comparing that to make predictions about the effects of 2017's Hurricane Irma, or future hurricanes in the United States. This could then identify a need for a policy on crop insurance, regulated prices or government subsidies.

You should also be confident in the way the data has been collected, especially when the data relates to people. A non-representative sample can skew the data, as has been seen repeatedly in British election predictions in recent years[1]. In the agricultural sector, open data about farm incomes could be skewed by surveying a non-representative sample of farmers. Most open data sources will provide details on how the data was collected[2].

Using different sources of data will help you to gain a holistic overview of the problem.

2.2. Policy formulation

The next stage of the policy cycle involves **designing the policy**. Having identified the problem, the idea here is to carry out a number of research studies and/or data analysis processes in order to formulate a potential solution to the identified problem. In the case of the GroenMonitor, potential solutions included plant phenology, mowing and even culling.

This stage of a policy cycle can take the longest and be the most challenging due to the nature of statistics and the difficulties in obtaining accurate and controlled scientific data. As discussed in lesson 2.3, the analysis of data does not always mean the correlation equates to causation and sometimes can lead to the wrong (or no) conclusion.

Once such example in the UK is how to control the outbreak of bovine tuberculosis in cattle. The government has decided that one necessary course of action is to cull tens of thousands of badgers[3], which have been linked to outbreaks. However scientific studies of the effects of culling (available from

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[1] http://eprints.ncrm.ac.uk/3789/

[2] https://www.gov.uk/guidance/farm-business-survey-technical-notes-and-guidance

[3] Huge increase in badger culling will see up to 33,500 animals shot - https://www.theguardian.com/environment/2017/sep/11/huge-increase-badger-culling-see-up-to-33500-animals-shot

the government's own website) find that 'badger culling cannot meaningfully contribute to the future control of cattle TB in Britain.'[4]

There are many tools that can help those in agriculture make meaningful decisions to protect their crops and react to changing conditions. Plantwise[5] offers farmers open access to over 10,000 factsheets regarding crop pest prevalence and best practices to help manage and prevent potential crop loss from pests and diseases. Farmers are thus able to make informed decisions about crop protection.

2.3. Decision making

It is at this stage that a decision is made on which course of action to take. While the policy formulation stage may have come up with what appears to be an ideal solution to the particular problem identified, the final decision will need to take into account any adverse effects the policy might have on the sector as a whole.

To help guide the decision-making process it may be necessary to have a set of objectives that the policy has to fulfil overall. A good example of such a process is the European Common Agricultural Policy (CAP) which has five key objectives:

1. to increase productivity, by promoting technical progress and ensuring the optimum use of the factors of production, in particular labour;
2. to ensure a fair standard of living for the agricultural community;
3. to stabilise markets;
4. to secure availability of supplies;
5. to provide consumers with food at reasonable prices.

Balancing the requirements of these 5 objectives can be a challenging task, especially as some countries have access to more advanced technologies which could create unstable monopolies within Europe. Securing fair standards or living, with stable markets and availability of supplies could be challenging as Europe grows to the east, while potentially losing the UK on the west.

Once again open data can play a key role in the decision making process. In relation to the CAP, each of the objectives either is already monitored or can be evaluated using open data on trade, markets and census data. Even multinational companies, such as Syngenta, are now releasing key indicator data they hold regarding productivity, biodiversity and smallholder reach[6].

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[4] Bovine TB: The Scientific Evidence – http://webarchive.nationalarchives.gov.uk/20081108133322/http://www.defra.gov.uk/animalh/tb/isg/pdf/final_report.pdf

[5] https://www.plantwise.org

[6] The Good Growth Plan Progress Data - http://opendata.syngenta.agroknow.com/the-good-growth-plan-progress-data

2.4. Policy Implementation

This stage is about taking or setting an expected course of action, either by changing law, distribution of money or something else. As well as helping inform the policy decision, open data can also play an important role in policy implementation. The publication of open data may be all that is required to help enact the policy. For example, open data plays a key role in tackling obesity and increase the health of a population:

> **Empowering consumers to make smart food choices: US national nutrient database.** Consumers have clearly indicated that they want to be more well informed on the quality and ingredients of the food that they are consuming. Although basic information already exists on food packaging, more detailed information on food nutrients could allow people to make better decisions regarding food selection based on their individual needs (e.g. following the advice of a dietitian).

> **The USDA National Nutrient Database for Standard Reference** (SR25) is the major source of food composition data in the United States, and provides data sources for most public and private sector databases. SR25 contains nutrient data for more than 8500 food items and about 150 food components, such as vitamins, minerals, amino acids, and fatty acids. The use of this data is not limited to commercial applications (e.g. smartphone apps). It provides the basis for new services like ChooseMyPlate.gov, an initiative launched by US First Lady Michelle Obama and USDA Secretary Tom Vilsack to provide 'practical information to individuals, health professionals, nutrition educators, and the food industry to help consumers build healthier diets with resources and tools for dietary assessment, nutrition education, and other user-friendly nutrition information.'

Many countries around the world now mandate that nutritional information be displayed on all their food products. Food standards agencies also publish open rating data and mandate that restaurants and food-processing companies must publicly display their rating data for everyone to access[7]. This open publication is designed to force behaviour change and help improve the overall quality of the food production supply chain, from farm to plate.

Data is not just an input to the policy-making process. It can also be the **output**. It may even be sufficient on its own to help solve the policy problem or to create markets in which others solve the policy problem for you.

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[7] UK food hygiene rating data API - http://ratings.food.gov.uk/open-data/

2.5. Monitoring and Evaluation

Depending on the policy implementation, the monitoring and evaluation can take many forms, from the simple monitoring of continued open data publication (as is the case with food hygiene ratings) to the re-analysis of cereal crop yields and cases of Bovine TB. In nearly all cases, monitoring and evaluation requires the continued collection and analysis of data. This represents a completing of the policy cycle as this data can then be used to set the new agenda.

As with all stages of the policy cycle, wider involvement in the monitoring will also be key to ensuring the success of a policy. This is especially the case where there might be evidence of corruption anywhere in the policy chain:

> **Exposing misspent farm subsidies in Mexico: FUNDAR.** PROCAMPO is the largest federal farm subsidy programme in Mexico supporting the poorest farmers. There have been concerns since 2007 that its subsidies were not received by those meeting the requirements, who were in dire need of support. To better understand the situation FUNDAR Center of Analysis and Research, a Mexican NGO, called for information related to the distribution of subsidies from the Mexican Ministry of Agriculture. After initial requests resulted in incomplete data in non-machine readable formats, the agency in charge finally published the data. Analysis showed that 57% of the benefits were distributed among the wealthiest 10% of recipients, confirming initial fears. An important outcome of the data release was the development of a database (Subsidios al Campo en México) by FUNDAR and other NGOs, which publishes ongoing information about the farm subsidies to ensure more transparency over the process. A series of resignations followed the revelations and the government imposed limits on the eligibility of subsidies.

Open data can play an even more important role when there are many international players involved in the policy process. This is particularly relevant in agriculture in the area of international aid funding. The UK DFID DevTracker allows anyone to find what money is being spent by the UK government on international aid and in which countries[8]. Challenges are faced with monitoring the impact of such funds, especially on a global scale. Community groups such as Follow the Money (Nigeria) are important to ensure that funds reach their designated projects and that policies are effectively implemented.

Being open and transparent throughout the policy cycle is critically important to allow anyone to join in the conversation and assist with the monitoring and evaluation, be that as a member of government, a private organisation, the press, or a community member.

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[8] DFID DevTracker - https://devtracker.dfid.gov.uk

3. The Impact of Open on Policies

An open approach to policy making has many benefits beyond simply being able to use open data as an input to inform the decision making.
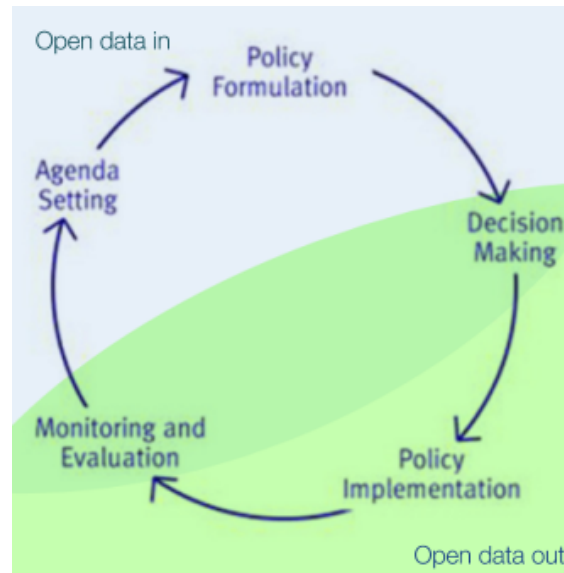

Figure 1 Open data in the policy cycle

The policy cycle relies on the constant use of data to both inform the correct decision as well as monitor the effectiveness of that decision. If the data was open at the point of agenda identification but is closed at the point of monitoring and evaluation, then the policy cycle has been broken and a second cycle is not possible following the same process.

As seen in the implementation section above, open data could also be sufficient to solve a policy problem without further intervention. For example, open transport data can help ease congestion by informing people about public transport options, possibly avoiding the need to spend millions on new roads.

There are many other benefits open data brings to the policy-making process including transparency and inclusion. This is important if the number of stakeholders you are trying to reach is high. In order to obtain 'buy in' it is important to include as many of your stakeholders as possible. Open Data not only allows stakeholders to engage but to also perform their own analysis to discover any potential policy solutions.

Another big benefit of publishing open data as part of the policy implementation process is the allowing of markets to evolve around the data and take on the challenge of solving policy problems on your behalf, such as with food hygiene ratings in San Francisco:

Highlighting restaurant inspection scores and improving food safety: LIVES. Open data is being used to help consumers choose where to dine, while incentivising improvements in food safety. Local Inspector Value-Entry Specification (LIVES) aims to 'normalise restaurant inspection scores across jurisdictions, allowing consumers to get a sense for restaurant food safety compliance across municipalities and within their home town.'[9]

LIVES was launched in 2013 as a project between San Francisco, Socrata, Code for America, and Yelp, and is providing the standard for publishing open data on restaurant inspections. By allowing citizens to make better use of inspection results, LIVES facilitates food transparency and decision making on approved restaurants. When the City of Los Angeles began to require that restaurants displayed hygiene grade cards on their entrances, studies found it was associated with a 13% decrease in hospitalisations due to foodborne illness.[10]

While most think of data as simply an input in policy making, the benefits can be multiplied and policy realised quicker if open data is considered throughout.

As the world grows in population the role of open data in agriculture and nutrition will be key to driving effective policy and efficiency to ensure that everyone has an equal chance. Agricultural policies will be of critical importance in the next fifty years, especially as the world's climate also changes.

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[9] Socrata blog (2015), Could the LIVES standard reduce food poisonings?, http://www.socrata.com/blog/lives-helps-prevent-food-poisoning-in-restaurants (accessed 18/05/15)

[10] Code for America (2013), Foodies and Open Data Enthusiasts Rejoice, http://www.codeforamerica.org/blog/2013/01/17/foodies-and-open-data-enthusiasts-rejoice (accessed 18/05/15)

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