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 3: MAKING DATA OPEN

LESSON 3.4 ANNEX: FARM ADVICE THROUGH OPEN WEATHER DATA

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Aims and learning outcomes

The lessons aims to provide successful narratives of the use of weather data providing 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.

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1. Introduction

Weather data is a key asset in providing actionable farm management advice to smallholders. Although information delivered directly by weather services, e.g. weather forecasts, is very valuable for farmers, many more complex farm advisory services require the combination of weather data with other data sources and knowledge. These service are commonly developed and delivered by 'service and information intermediaries', a wide group of actors, including providers of ICT services, extensionists, farm advisors etc. They generate added value by combining weather data with other (open and not open) data, such as soil data, crop data and agronomic knowledge and bringing that to farmers in different forms. This can be done either directly, e.g. by talking to farmers, through different kinds of media, through ICT services such as SMS, smartphone apps etc., or indirectly, by providing the output for further dissemination to organisations that deliver services to farmers. Examples are service delivery to farmer organisations or weather information designed to be used by microfinance or microinsurance companies.

While most of the work on open data has focused on the higher governmental and policy levels, the exploitation of open weather data by intermediaries provides a different perspective on achieving impact with open data. It focuses more on the economic aspects, for instance the development of an ecosystem of small and medium-sized businesses and more direct support to farmers with regard to improvement of farm management, yields and income. As such, successful narratives of the use of weather data also provide a different perspective on advocacy for open data, beside the more commonly used perspectives of, e.g., transparency and accountability.

2. Case: NOAA open weather data (United States)

Probably the most well known example of the added value of open weather data is the US-based initiative to provide open weather data for free through the portal of NOAA (the US National Oceanic and Atmospheric Administration). Opening up weather data has led to huge benefits in areas ranging from disaster risk management to development of commercial and non-commercial derived services.

> Opening up weather data through the United States National Oceanic and Atmospheric Administration (NOAA) has significantly lowered the economic and human costs of weather-related damage through more accurate forecasts; the development of a multi-billion-dollar weather derivatives financial industry; and the growth of a million-dollar industry of tools and applications derived from NOAA's real-time data. In many ways, the industry built around NOAA's weather data is seen as the paradigmatic example of how the release of open data can yield major

economic impacts. To further scale the impact of its data, NOAA has launched the Big Data Project (BDP), which provides an opportunity to combine NOAA's tremendous volume of high-quality environmental data and advanced data products, private industry's vast infrastructure and technical capacity, and the US economy's innovation and energy (Rogawski *et al., 2016*).

The open weather data forecasts provided through NOAA have been estimated to provide $31.5 billion in benefits, far exceeding the $5.1 billion spent annually by both private and public weather bureaus on generating forecasts. Specifically for agriculture, providing more accurate climate forecasts and more timely warnings of adverse weather has helped the industry improve decision-making and crop yields. According to one estimate, data provided by the NWS Climate Prediction Center – a component of NOAA – has benefited US agriculture by over $460 million by helping guide planting decisions in El Niño, normal and La Niña years. Data from NOAA (and other government agencies) has also created value through the development of a weather-related industry. In agriculture the best known example is Climate Corporation, which used weather data to provide 'weather insurance' to businesses and was sold in 2013 to Monsanto for $930 million.

3. Case: Providing farm management advice to smallholders in Bangladesh

Central in this case is a trusted seed supplier in Bangladesh with a large distribution network which is used to introduce the new service to farmers.
The case targets farmers in 14 Northern districts of Bangladesh, agricultural researchers and university students. It utilizes spatial and other geodata for providing effective, time- and location-specific advisory services to smallholder farmers in Bangladesh. It aims at improving agricultural productivity and farmer income, upgrading agricultural zoning and at improving the management of weather related emergencies. The initiative provides farmers with (1) weather related information, like early warning messages, (2) advice on the usage of seeds, land preparation, sowing, transplanting, irrigation, fertilizers and agrochemicals, and (3) advice on preventive and remedial measures for controlling pests and diseases.

The project is currently implementing and testing its weather data supported services for farm advice. It is also developing the infrastructure to provide resulting advice to farmers through different communication channels.
The aim is to achieve an economically viable service through a number of mechanisms, e.g. fee for a phone call to a customer advisor or interactive voice response, subscription to text messages or automated outbound calls, fee for advice from an extension officer, subscription to a web-based application.

4. How it uses open data

To provide actionable information to smallholders, data analytics, agronomic models and expert knowledge are combined to generate a range of advice, from plain weather forecasts to operational advice on farm management operations. Weather data is indispensable as one of the main sources

The project uses open weather data:
- NOAA Global Surface Summary of the Day archive (GSOD) – an open long-term global weather data archive delivered by NOAA
- NOAA Global Forecasting System (GFS) – a high-resolution open global weather forecasting service delivered by NOAA

The use of these open source products as a basis has many advantages:
- data is accessible, in this specific case without costs
- the service provides a reliable stream of weather data which can be a solid base to build sustainable services
- availability is guaranteed, so it allows service intermediaries in their turn to also deliver the required availability.

5. How it achieves impact

The developed services provide customers of the seed provider with information to improve their crop management. As such it can exploit an existing network of smallholders, and services can be directly targeted to specific crops and conditions of customers. Being connected with and knowing the end users and being able to provide targeted advice will improve the uptake of the developed services.

The initiative provides its information services to farmers through different channels: mobile phones, a call centre, a website, app-based services, personal advice via extension officers and the field staff of the seed provider. The estimate is that an individual smallholder can save from €33 to €137 annually thanks to the advisory service, depending on the crop.

The (foreseen) impacts for the initiative are:
- to enroll 330,000 farmers as users within 3 years
- to achieve that these 330,000 farmers will generate 10% savings in their cultivation practices thanks to the advisory services provided by the project.