FOODIE

FARM-ORIENTED OPEN DATA IN EUROPE

BOOKLET

FOODIE Consortium
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STATEMENT FOR OPEN DOCUMENTS

FOODIE

PLATFORM

FOODIE is a platform hub providing a set of **datasets**, **services** and **applications** deployed and/or running on top of a cloud-based infrastructure.

This infrastructure is delivered through an IaaS+ service model. IaaS enables the provision and management of virtual machines (VMs) and their associated virtualized resources (e.g., compute, storage, and network), which support the execution of complete operating systems as well as arbitrary software stacks.

In a similar way, DbaaS delivers relational and non-relational database engine functionality, which FOODIE partners and third-party data providers use for the storage and management of different datasets.

The platform supports providers by applying vocabularies based on standards for the representation of data that enable their interoperability and integration; and it follows a dual API approach, supporting the use of existing standards-based service interfaces (e.g. OGC and ISO 19119) while supporting new, open and easy-to-use APIs for the non-GIS experts, which can be used for accessing resources or for the development of new services/apps.

Additionally, providers usually face scalability issues for their products. This can also be alleviated by FOODIE platform, running on top of the infrastructure provided by PSNC.

FOODIE partners and third-party service providers, use VMs to develop and deploy their own software components for the FOODIE platform.

CUSTOMER PROFILE

• Data and service providers related to the agri-food domain (farming, satellite imagery, statistics, environment, meteorology, etc.)

• End-users and stakeholders in the agri-food sector (farmers, advisory bodies, food industry, public sector, researchers, etc.).

CUSTOMER PAINS

Customers need to access and use multiple systems to conduct their daily operations. In many cases, these systems do not interoperate; therefore data has to be duplicated.

Users do not count with enough resources for storing, and processing large amounts of data, or for running and deploying complex applications/services.

Data and service providers also have to find the most cost-effective solution for the development and deployment of their components. This requires analysis, not only of the costs of infrastructure (e.g., from commercial vendors), but also existing services and their interfaces, which they can use to build upon.

PAINS RELIEVERS

FOODIE Platform alleviates the typical struggle of users and stakeholders in the agri-food sector, who need to search and use different services and applications, usually isolated and heterogeneous, in order to perform their daily operations. With **FOODIE Platform**, they will be able to fulfil their needs in a centralised environment with integrated applications. Similarly, for data and service providers, **FOODIE Platform** provides an integrated and single environment where they can offer their products.

CUSTOMER GAINS

Customers, including end-users' stakeholders, data and service providers, will have access to multiple datasets, services and applications through a single platform. **FOODIE Platform** enables to have the power of desktop analytics on server side, and facilitates the creation of a new generation of products based on a low-cost cloud deployment.

GAIN CREATORS

FOODIE Platform benefits two types of user groups:
• It provides a set of services and applications for end-users and stakeholders in the agri-food sector supporting them in their planning and decision-making processes. All these applications are accessible through a single sign-on and security mechanism.
• The platform enables data and service providers to store and make their resources (data, services, applications) available via **FOODIE Platform** (for other users), and to develop and deploy new services and applications building on top of existing components.

PRODUCT

FOODIE Marketplace provides a virtual space to connect consumers and producers of agricultural data and applications.

It enables customers to find and consume relevant resources, in the agri-food domain including datasets, services, applications, training materials, etc., by exposing flexible searching mechanisms and exploiting semantic technologies. These resources include both internal resources in FOODIE platform, but also information and links to relevant resources, available externally, but collected and described in the **marketplace.** Similarly, the **marketplace** enables producers to publish their own datasets, services and applications. They are able to upload and deploy these resources directly to FOODIE platform or to provide an URL to an external source.

Moreover, the marketplace supports different access methods (free or paid) to support the commercialisation of products, and implements different social features to enable the collaboration between users in the community.

CUSTOMER PROFILE

The target customers for **FOODIE Marketplace** are mainly data and service providers addressing the agri-food and other relevant areas (farming, satellite imagery, statistics, environment and meteorology), but also end-users and stakeholders in such areas (farmers, advisory bodies, food industry, public sector, researchers, etc.). The providers pay to marketplace operator based on the resources they allocate for their products or following an income share approach, while end-users access the marketplace through a freemium model, where some content and functionalities are available for free, and payment may be required (in money or in resources) for premium content including added-value resources and enhanced functionalities.

CUSTOMER PAINS

Users and stakeholders in the agri-food sector need to find relevant resources in the domain, including datasets, services and applications. They need specialised portals, enabling them to find the most suitable resources in an easy and fast manner. Although there are some portals at the EU level for searching datasets/services in the agri-food sector, none is widely used. Besides, they provide catalogues instead of a marketplace. Such kind of social and business space is missing at the EU level, specially targeted to the agri-food sector.

Moreover, services/apps discovered are usually dispersed and accessible in different locations using different credentials, while **marketplace** is part of a larger ecosystem (FOODIE platform) and thus integrates with other services/apps in the platform.

Additionally, typical users in the agri-food sector prefer the use of portals in their own language.

CUSTOMER

PAINS RELIEVERS

To address such issue, **FOODIE Marketplace** implements flexible searching mechanisms, exploiting the resource associated type, category and semantic annotations generated automatically during the resource publishing.

FOODIE Marketplace addresses the issue of language barrier by providing a multilingual interface to ease the adoption and lower the usage barrier. Semantic annotations that can be used for searching are also shown in multiple languages.

Moreover, data, services and application providers can face the problem of finding the right place for offering and commercialising their products. In some cases, they would need space and resources for making this resources publicly available.

FOODIE Marketplace tackles these issues by providing a virtual space focused in the agri-food sector enabling users to publish their products either by uploading them to the marketplace or by referencing them to an external place (e.g., institution repository for a dataset or source forge for applications). Also, as described above, marketplace supports different methods for commercialising products.

CUSTOMER GAINS

Users will have a single place where they can search and find, offer and sell, discover and communicate with different stakeholders in the agri-food sector, including both producers (data, service/app providers) and consumers (end-users, advisory bodies, etc.).

smart

SmartV is a web-based solution that provides advisory services in different aspects related to winegrowing, like disease prevention, production estimation or harvesting schedule. The cloud infrastructure allows providing the best service (available everywhere, no installation needed, always updated...). Its user-friendly design allows the winegrowers to apply precision viticulture techniques to manage the variability of the vineyard. It also stores historical information about the status of the vineyard, and the actions carried out to exploit it in a future to get the best results. We provide a unique solution for the farmers, where they can get all the functionalities needed for the proper management of the vineyard.

CUSTOMER PROFILE

• Farmers, that are experts in viticulture, but that may do not have advanced technological knowledge.

• Expert advisors to help farmers to carry out the best actions.

CUSTOMER PAINS

Although most of farmers knows that applying precision viticulture techniques is key factor on this sector in terms of sustainability, less costs, production increase and quality improvement, in the market there are no tools that easily enable the continuous process of observation and collection of all the data related to grape production. **SmartV** provides all the facilities to apply the most advanced techniques to obtain the best product.

PAINS RELIEVERS

All the valuable information now manually managed by the farmer, difficult to collect and analyse is now accessible in a fast, easy and usable way. (S)He can also reduce the application of phytosanitary products to be more sustainable, or plan ahead a possible grape acquisition in a better position.

CUSTOMER GAINS

With **SmartV**, each customer can improve the results that they are looking for their business, in the ways they want:
- Being more sustainable.
- Saving costs.
- Increasing the production.
- Improving the quality.

GAIN CREATORS

SmartV will help customers to make the best management decisions based on the processing of heterogeneous information collected from different sources, resulting in better economical results and environmental benefits.

CUSTOMER

FarmTelemetry is a web-based system consisting in hardware (monitoring units and agrometeo sensors), and software (server-side application with database system and user web application). Modularity and variability of **FarmTelemetry** satisfy different types of users. Collected tracing data can be visualized with a variety of combination of map layers (topographic maps, orthoimagery, satellite images, etc.)

User web application written in HTML5 and Javascript allows all-day accessibility both on desktop PC from office as well as on smartphones in fields.

Analyses are run in the database system and user gets visualization of their results in the form of maps, tables and charts. At the basic level, **FarmTelemetry** provides records of any operation on the fields.

CUSTOMER PROFILE

Customer can be both farmer as well as farm company that require management support, evidence of operations or tool for decision support. Customer can be without any experience with precision farming. At the basic level, **FarmTelemetry** provides records of any operation on the fields. **FarmTelemetry** allows management and optimisation of any machinery operation on the farm. User application is intuitive and initial training is taken for granted from us.

CUSTOMER PAINS

Needs of management support, evidence of operations or tool for decision support.

PAINS RELIEVERS

FarmTelemetry is uniquely able to empower farmers and farm companies to make right decisions and optimize the level of farm inputs in time.

KEY BENEFITS SPOTLIGHT

FarmTelemetry is modular innovative solution that can be used as standalone tool.

It supports farmers in the management aspects of farming activities. **FarmTelemetry** provides detailed tracing of machinery in connection to LPIS blocks information.

This data combination allows:

• to reduce the energy consumption and to improve carbon balance;

• maintain high level of outputs.

Complex observing of machinery efficiency and analysis tools provides extensive variability for management support.

Due to available API it can be connected to your existing Farm Management System as additional data source. To provide complete data series, machinery have to be equipped with monitoring units. Acquisition costs of can be issue for making the decision of starting using the **FarmTelemetry** system.

CUSTOMER
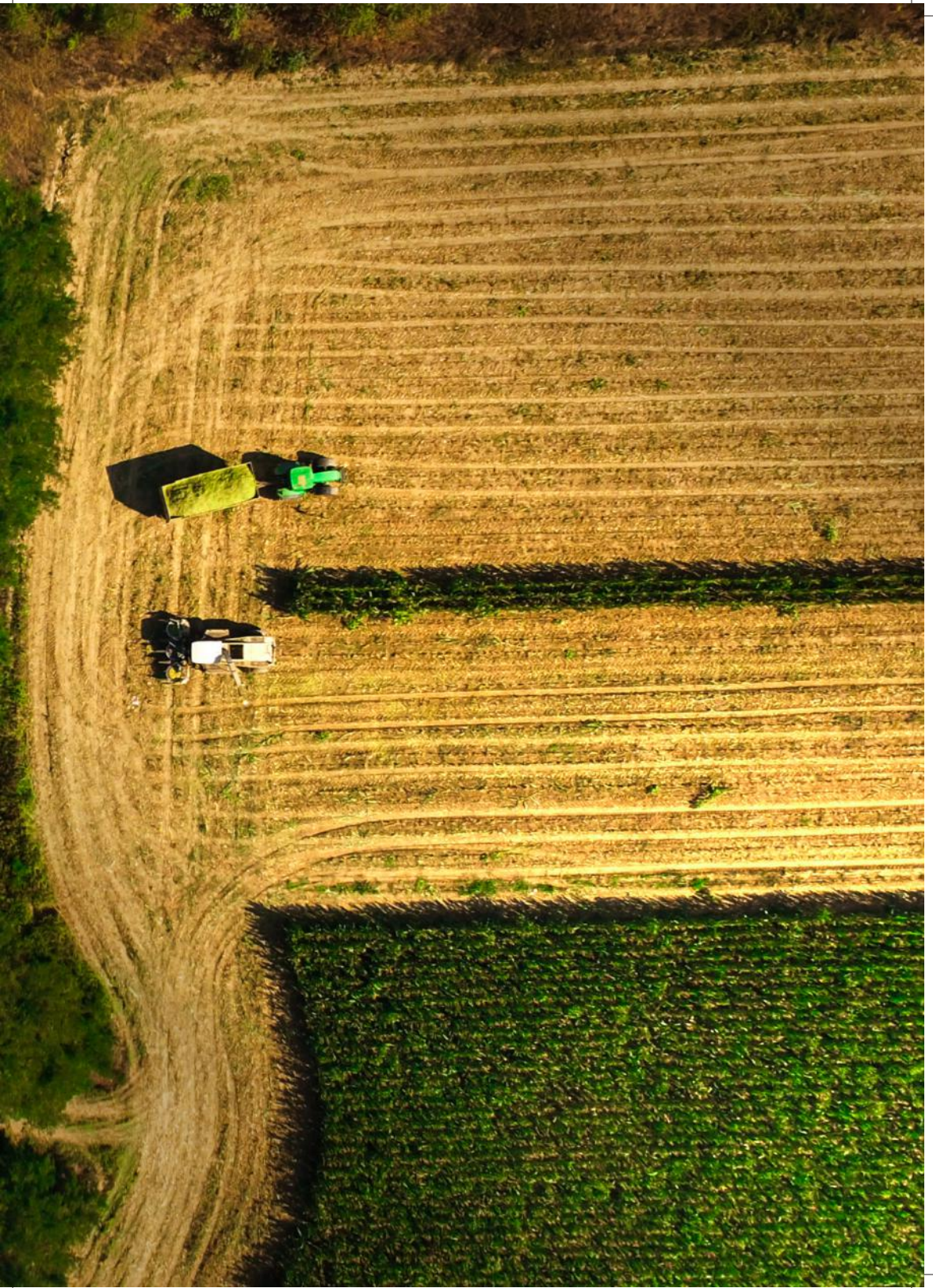
Yield Potential

Identification of management zones within the fields is crucial step for site specific crop management practices in precision farming. FOODIE tool **Yield Potential** is a web-based application for delineation of management zones based on the remote sensed satellite data. Main aim is to identify high yielding and low yielding areas related as the percentage to the mean value of the field, which are input information for variable rate application.

Yield Potential algorithm implements spatial-temporal analysis to estimate crop variability and its trends from spectral characteristics of crops over the recent 8 years. As the main data source, LANDSAT satellite images are used in combination with farm data related to the field geometry and crop rotation. Later imagery will be extended by ESA Sentinel products.

CUSTOMER PROFILE

Customers can be both farmer as well as farm companies that require management support, evidence of operations or tool for decision support. They come from farms that are already using technologies of precision agriculture or are considering implementing them into their farming practices.

CUSTOMER PAINS

Interpretation of **Yield Potential** must be carried out with the knowledge of field specific condition (soil, climate, topography), land use history, occurrence of risk phenomena's (weed infestation, local plant damages by biotic and abiotic factors) and other factors, which can by specific by site, user and weather condition.

22

PAINS RELIEVERS

Implementation of **Yield Potential** tool allows a creation of prescription maps for VRA without any additional data about the field variability, which is suitable for adoption of a precision farming system by new users.

Maps of **Yield Potential** can be used in existing Farm Management System for preparing of site specific treatments. However for fully implementation into cropping practices, initial equipment of machinery by precision farming technologies is needed (GNSS navigation, VRA controllers, sensing technologies, etc.).

KEY BENEFITS SPOTLIGHT

Yield Potential zones allows optimization of crop management intensity according to the soil productivity. It allows an efficient use of material inputs with the reduction of environmental risks. It can be utilized for variable rate technologies of:

- soil fertilizing and liming (P, K, Mg, lime rate)
- soil tillage (depth, intensity)
- seeding (seeding density, depth)
- nitrogen topdressing (N rate)
- crop protection (patch spraying of herbicides and fungicides)
- plant grow regulators (rate)
- irrigation (water supply).

Yield Potential can be used both for the initial determination field heterogeneity and its division into management zones for the site specific crop management. This tool can also help users advanced in PF to evaluate their already collected data, interpret obtained results in relation to field variability and to support decision making and cropping strategy for next growing season.
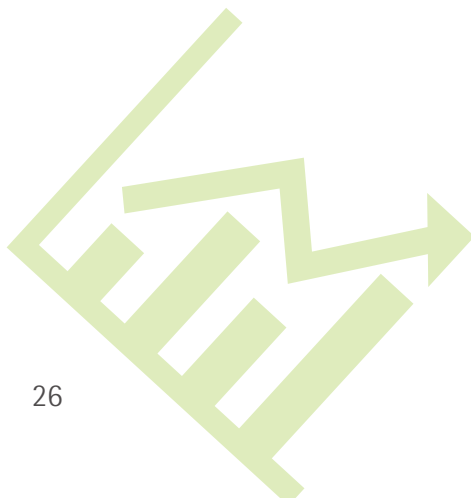
CUSTOMER
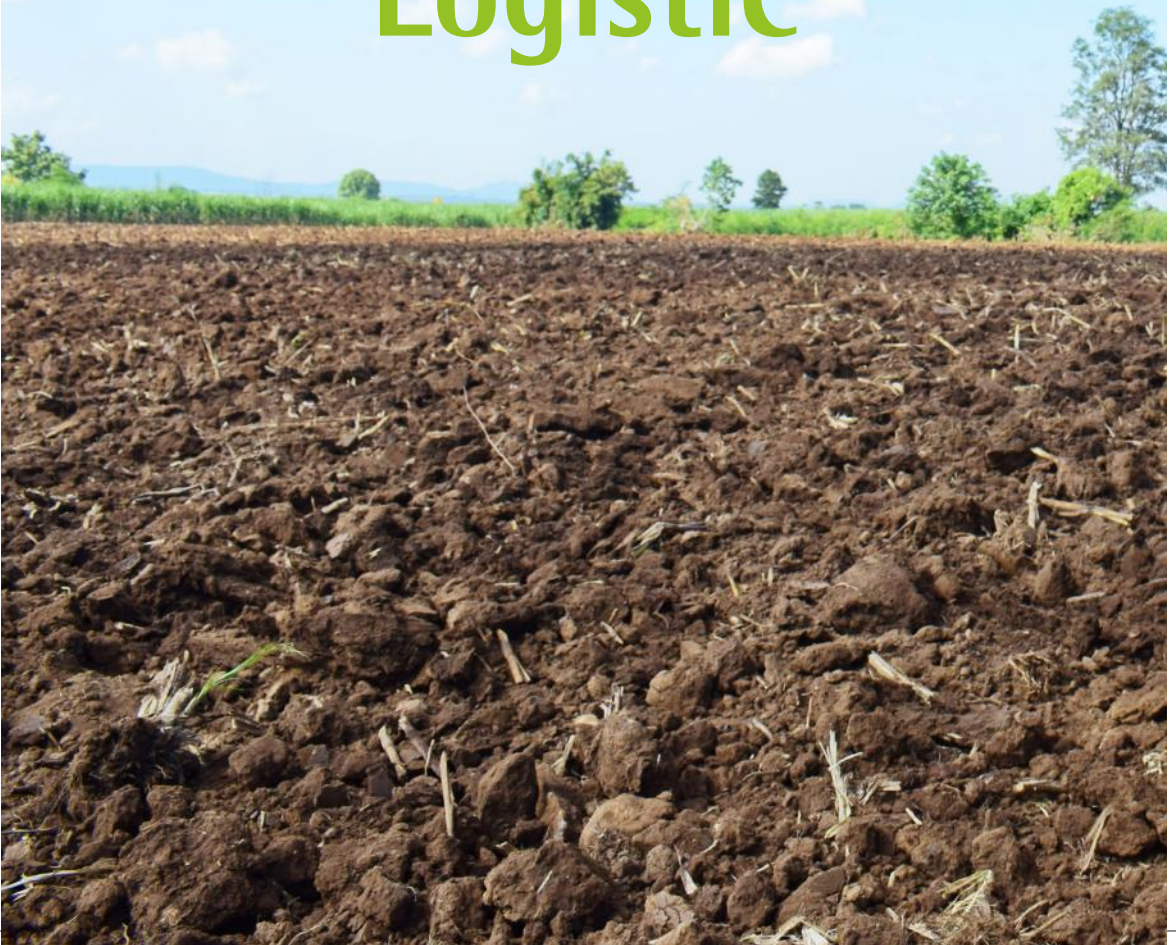
Web Based Logistic

PRODUCT

Web Based Logistic is based on combination of OpenTransportMap and pgRouting.

Open Transport Map (OTM) is an open road network dataset based on OpenStreetMap and compatible with the INSPIRE data specifications on transport network.

The routing component is a wrapper on top of PostgreSQL, PostGIS and pgRouting that enables users to execute three common routing scenarios from JavaScript without having to have access to their own server infrastructure or data.

CUSTOMER PROFILE

Customers are farmers, service organizations, farm associations, food industry, forest owners, wood industry. Focus is mainly on smaller organization that does not have large commercial logistic solution. This system could be also easy used by other software like Dokuplant using open API.

CUSTOMER PAINS

Logistic module offers set of services for small organizations, who need to improve their logistic. It could be used in free mode with limited functionality or could be customized for concrete needs.

PAINS RELIEVERS

Web Based Logistic is environment for customization of applications for concrete purposes. It is based on Open Data and Open Source software with Open Interfaces and could be easily modified. It could be combined also with Farm Telemetry. Through the API it could be connected with numbers of clients.

KEY BENEFITS SPOTLIGHT

The solution allows optimizing transport expenses. Systems offers possibilities of shortest paths, travel sells person and accessibility.

27
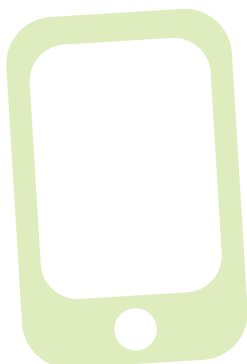
Decision Support System for Integrated Pest Management (IPM-DSS)

The **IPM–DSS** implements the following functionalities:

• Storage and management of users' and agro-meteorological data that serve as the source for the DSS calculations, including:

    - users (farmers/advisors) data collected through the system interface.

    - farms and crop data collected from the farmers' inputs in the system.

    - agro-meteorological data collected from the regional/ national stations network.

• Algorithms for the control of plant diseases in the form of a restful service. This service provides the vital information for farmers or agricultural advisors about the risks and the conditions conducive to the occurrence of diseases and pests. Currently, the models implemented and tested include potato late blight, colorado potato beetle, Turnip moth on beet, Leaf Beetle on wheat and cercospora leaf spot on beets.

• Presentation of data and calculation results from the plant diseases algorithms in the form of tables and graphs.

• Presentation in a map of the current meteorological conditions collected from the stations network, and visualisation of the historical data.

• Notifications of personalized events to directly inform the recipient about the crossing of exceeding limit of the de-fined threshold threats of the output.

The system will be provided following a freemium model, where basic functionalities are available for free, while some more advanced, personalised services (e.g., notifications, graph analysis) will have a cost after an initial free-trial phase (e.g., first year).

CUSTOMER PROFILE

The target customers for the IPM-DSS are farmers, farm cooperatives and advisory centres, and any professional user of plant protection products.

CUSTOMER PAINS

Farmers and farm associations constantly have to deal with the management of pests in their crops, as they can have highly negative economic, ecological and social consequences.

At the same time, all professional users of plant protection products are obliged (since 2014) to apply general principles of integrated pest management, as outlined in detail in the provisions of Art. 14 Directive 2009/128/EC and art. 55 of Regulation No 1107/2009/WE.

As part of these activities, they need to know when to apply the products. However, this usually means a continuous tedious and time-consuming manual inspection, and if they forget or missed to do it in time, the consequences can be very high.

PAINS RELIEVERS

Users and stakeholders in the agri-food sector should have at their disposal information and tools for pest monitoring and decision making, as well as advisory services on integrated pest management. The **IPM-DSS** i supports these activities, providing the user with the information required to determine the optimal terms of crop protection.

CUSTOMER

KEY BENEFITS SPOTLIGHT

The web-based Decision Support System is useful in determining the optimal terms of crop protection, thus allowing obtaining high efficiency of these treatments while reducing the use of chemical pesticides to a minimum.

Farmers and farm associations will have a single place where they can easily see the current environmental conditions of their crops, analyse the behaviours throughout time of their crops in terms of pest management, and get notifications whenever the conditions in their crops require attention.

Additionally, the **IPM-DSS** facilitates the implementation of the general principles of integrated pest management by all professional users of plant protection products, obligatory for EU Member States.

About the project

FOODIE project aims at creating a platform hub on the cloud where spatial and non-spatial data related to agricultural sector is available for agri-food stakeholders groups and interoperable. It will offer: an infrastructure for the building of an interacting and collaborative network; the integration of existing open datasets related to agriculture; data publication and data linking of external agriculture data sources, providing specific and high-value applications and services for the support of planning and decision-making processes.

FOODIE project is addressed to four basic groups of users: a) stakeholders from the agriculture sector as end-users of final applications, b) public sector for communication with farmers about taxation, subsidies and regulation, c) researchers for large scale experimentation on real data and d) ICT companies for the development of new applications for agriculture and food sector, mainly using implemented tools

FOODIE specifically works on three pilots:

• Pilot 1: Precision Viticulture (Spain) will focus on the appropriate management of the inherent variability of crops,

• Pilot 2: Open Data for Strategic and Tactical Planning (Czech Republic) will focus on improving future management of agricultural companies (farms) by introducing new tools and management methods,

• Pilot 3: Technology allows integration of logistics via service providers and farm management including traceability (Germany).

FOODIE

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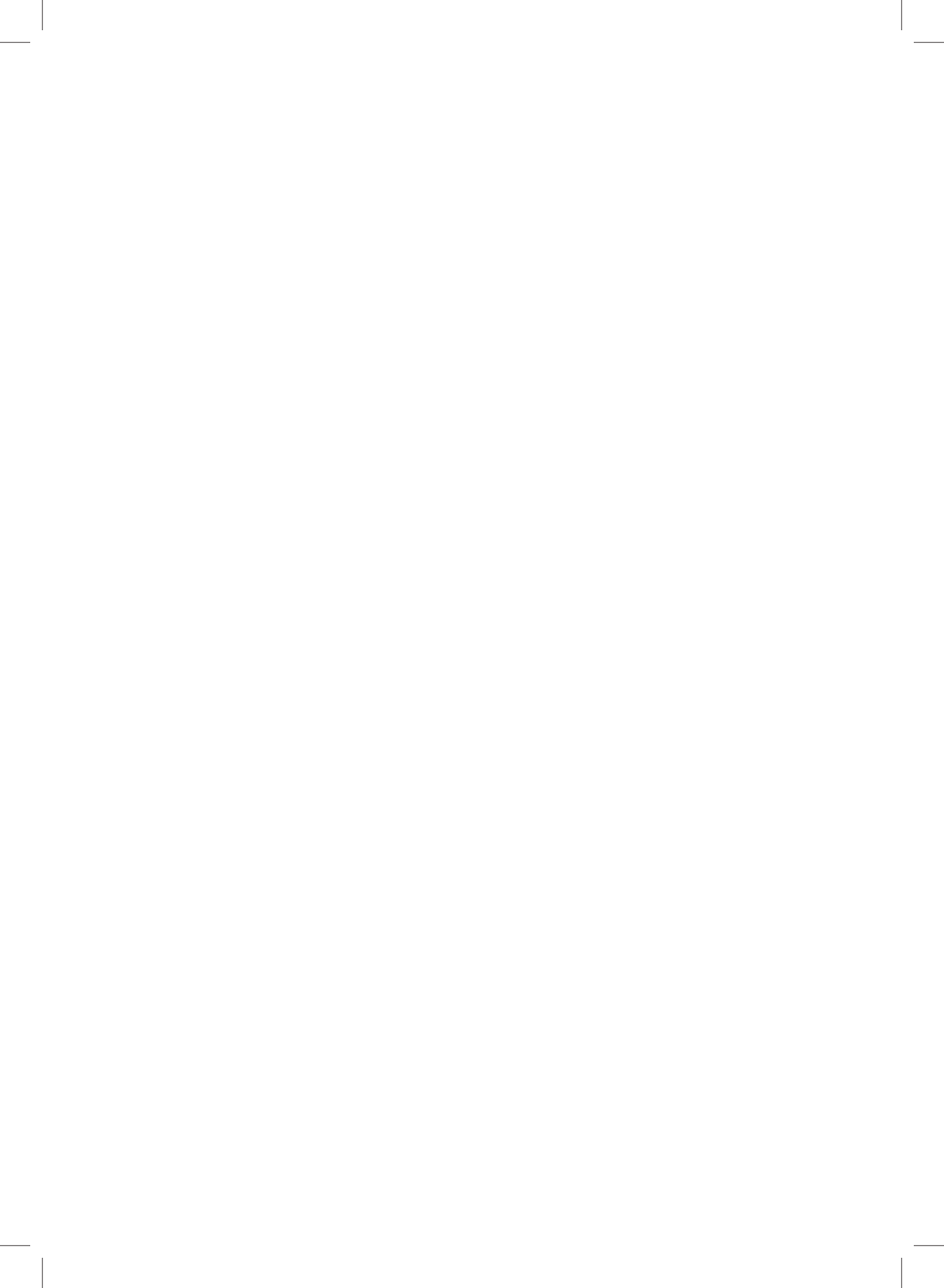
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PSNC

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