

Organic farms in the Czech Republic – Map Portal presentation opportunities

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ABSTRACT

The paper is aimed at presenting the map portal of organic farms in the Czech Republic. The pilot project is concerned with the South Bohemia Region. Extensive map data and resources are displayed by means of a purpose-developed universal software solution called Regional Development Map Portal (RDMP) version 1.0. The database was generated and updated on the basis of detailed content validation and strives for maximum accuracy of map object location. The software solution – apart from supporting all standard functions – represents qualitatively a brand new perspective of map data creation and entails many original elements and functionalities.

Keywords: ecological agriculture; multifunctional agriculture; rural development; Google Maps; map outputs

Recent agriculture has to face new challenges and adapt to demanding global environment conditions. In relation to solving global problems and reflecting sustainable development questions, the importance of non-production functions of agriculture has been growing in developed countries recently. In the course of implementing the multifunctional agriculture concept in the EU, organic farming has been gaining more attention and support.

The Czech Republic, member state of the European Union, accentuates the role of multifunctional agriculture and is dedicated to supporting organic farming within the framework of its rural and regional development policies. Thanks to the agrarian policy, interest of farmers and NGOs and last but not least thanks to the consumers' demand, organic farming has become an integral and essential part of the Czech agrarian sector.

The attention paid to the organic farming sector by the Czech state is expressed as well by substantial financial support (both from European and national resources) to its development. These inflows undoubtedly have a decisive influence (by means of a different amount and structure of subsidies on different cultures) on both the dynamics and level of ecological agriculture development.

Ecological agriculture has been developing in the Czech Republic since the beginning of the 90's whereas the greatest expansion can be observed especially in the past few years. As at 31st December 2010, the total of 3 517 organic farms were registered in eco-agriculture. In absolute terms, the increase in the number of organic farms on the year was by far the highest in the history of ecological agriculture (an increase by 828 entities). Analogically, the increase of organically farmed land area (to 448 202 ha on 31st December 2010) over the last two years is the highest absolute increase recorded since 2002 (increase by 56 775 ha in 2009/2008 and by 49 795 ha in 2010/2009). More information on the organic farms in the Czech Republic as such was published e.g. in Brožová (2011).

Following the expansion and growing importance of organic farming, the sector in question should be presented with a view to meet needs of various users. In other words, it ought to provide all involved parties with quality access to relevant sector information. Map portal using relevant data resources – map portal of organic farms of the Czech Republic – is a suitable tool for effective presentation. Map data and maps related to organic farming have not been created yet, as far

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as the authors of the present paper are aware. Regional Development Map Portal 1.0 (RDMP 1.0) constitutes the first solution and reacts – ahead of time – on recent needs and challenges of the Czech state (determined in the Action Plan for Organic Farming Development in the Czech Republic in 2011–2015) concerning research activities in this field and raising consumer awareness of organic farming and its products MZe CR (2011).

MATERIAL AND METHODS

The organic farms map portal was prepared in 2010 and the pilot stage was subsequently realized by means of a universal software solution RDMP 1.0 (Regional Development Map Portal). The region of South Bohemia was chosen deliberately because of its long-term predominance in both the number of organic farms and the area of organically farmed land.

Organic farms map portal – database methodology. Primary mapping data were obtained from the database of the Czech Ministry of Agriculture that is composed by control bodies and organizations during the registration process of organic farms and their subsequent controls in the course of the year. Accurate farm positioning and high data validity were the most important portal requirements. For this sake, the data were processed using the LPIS enterprise evidence (Land Parcel Identification System) and, in numerous cases, verified in cooperation with the Institute of Agricultural Economics and Information (IAEI) – Division Brno. Moreover, the data were confronted with publicly available databases and information sources (e.g. Companies Register), checked and, if need be, complemented by own survey (telephone survey, local enquiry).

Other information resources that have been considered, originated from the Czech Statistical Office (CSO) and the Institute of Agricultural Economics and Information (IAEI), Division Prague. However, there occurred several obstacles that prevented further use and processing of these data:

The Czech Statistical Office, similarly to the Institute of Agricultural Economics and Information, does pursue statistical surveys and research in the organic farming sector. However, these surveys are carried out only in limited extent and on quite an irregular basis. Therefore, these data could not have been exploited.

The Institute of Agricultural Economics and Information, Division Prague, offers a wide range

of relevant economic characteristics in its FADN (Farm Accountancy Data Network) data network. Nevertheless, in this aggregate database of agricultural enterprises (both conventional and organic), organically farming enterprises account only for about 8%. That is why the data cannot serve for ecological agriculture as a whole.

The above steps resulted in the creation of a credible and precisely specified database, presented in a relevant map output and valid to a specific date. For the solution of 2010, the data from 2009 were used (as at 31st December 2009, to be precise). The total of 344 South Bohemian farms was registered in the database of the Czech Ministry of Agriculture; this number accounts for almost 13% of all organic farms in the Czech Republic. The map, however, depicts only 334 farms due to the fact that 10 of them were eliminated from the database in the course of the data verification process (incorrect enlistment in the South Bohemian Region). The farms displayed in the map are subdivided into specialized organic farms and those combining both conventional and organic agriculture. Demonstrative outputs were generated from the above-mentioned map portal.

Software solution RDMP 1.0. As mentioned above, a self-created software solution that enables geographical object presentation within the World Wide Web platform were used. The present SW solution is called Regional Development Map Portal, version 1 (RDMP 1.0).

Basic map application functions include e.g. visualizing object location in the map using an intuitive icon; visualizing basic information on the object marked; 'detailed farm information' option, map scale change (zoom), aggregation of objects into cluster groups (preview with more objects), declustering into individual objects (more detailed preview, zoom); customized object filtering and classification by specific criteria. The solution allows setting up basic information display for concrete purposes as well as setting information structure for a detailed view. It is possible to open several of these 'previews' over the database. Basic features of the presented map application include universality, intuitive navigation, transferability to most end-use devices, primarily high speed, modifiability of displayed information and its filtering.

The RDMP 1.0 was created and runs within the Apache Web Server in combination with the MySQL 5 database environment. To visualize geographical position of the objects, Google Maps API version 3 by Google Inc. Company was implemented as it provides good quality as well as it

enables own basic map data updating and makes other Google Inc. functions available – information in e.g. Choimeun et al. (2010) or Lewis et al. (2007). The SW solution is developed in JavaScript (in which the Google Maps application itself is accessible) using the JQuery framework and implementing jQuery plugin bMap 1.3 – see e.g. Blocsoft.com (2010) and MarketCluster Library for Google Maps API version 3. Data loading into maps was realized by means of the JSON technology JSON.org (2011) using PHP Nette Framework Nette.org (2011) and Dibi database layer DibiPHP.com (2011). To display the individual objects in the maps, graphic icons from the Google Maps Icons set (modified to the required form) were used as graphic elements Google (2011).

The final SW solution on the WWW platform was created as an application available on a wide range of end-use devices, including PCs, portable computers (notebooks, netbooks etc.), mobile devices or dedicated devices. It works on different versions of the most used web browsers (MS Internet Explorer, Mozilla Firefox, Google Chrome, Safari, Opera) and many minor web clients. The SW solution was created as a modern robust application enabling further enhancement and development – version 2.0 development is planned for the next period. Detailed information on the technical solution as such was published e.g. in Vaněk et al. (2010).

The universality of the RDMP allows users to work virtually with any database. It is output-parameterizable with regard to problem analysis or user requirements. Taking the above-mentioned into account, its wide applicability can be taken for granted.

Basic application philosophy (user interface) is schematically shown in Figures 1–2 while Figures 3–5 represent demonstrational outputs. Please note that the visuals have been trimmed for the purpose of this paper.

RESULTS AND DISCUSSION

The map portal was developed and implemented within the framework of the Research Program. The final solution resulted from intensive co-operation between the Faculty of Economics and Management of the Czech University of Life Sciences Prague (Department of Information Technologies, Information and Consulting Centre, Department of Economics, other departments of the Faculty) and external partners, in particular the Ministry of Agriculture of the Czech Republic.

The map portal of organic farms was certified by the Ministry of Agriculture of the Czech Republic (Department of Environment and Organic Farming, Unit of Organic Farming) as 'Expert Map with Specialized Content'. The survey, research results and pilot project are freely available on the following portal: <http://mapy.agris.cz/ekologicke-farmy/mapove-podklady/>

The portal of organic farms is intended to be primarily used by the state administration and agrarian professionals (detailed characteristics of the production base of agricultural enterprises). Moreover, it will prove useful especially to producers – farmers (promotion of their products and services) and last but not least to customers and consumers (interested in purchasing bio food, bio products or take advantage of other services offered by the farms – accommodation, educational activities etc.). The portal information can be provided as well under secured access (login, password) e.g. to control and certification authorities who can take advantage of a detailed inventory of the individual enterprises but as well – in the extended version – keep records and evidence of the controls and their results etc.

As the organic farming sector shows significant development dynamics, the database has to be updated yearly (or continuously) because of both

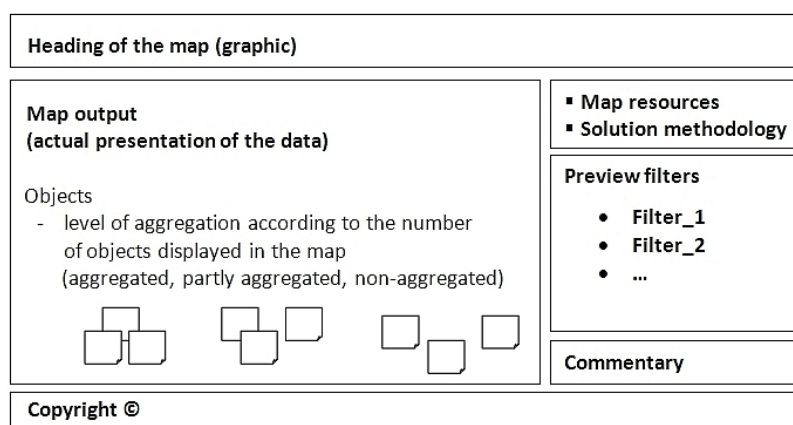


Figure 1. User interface – basic map screen

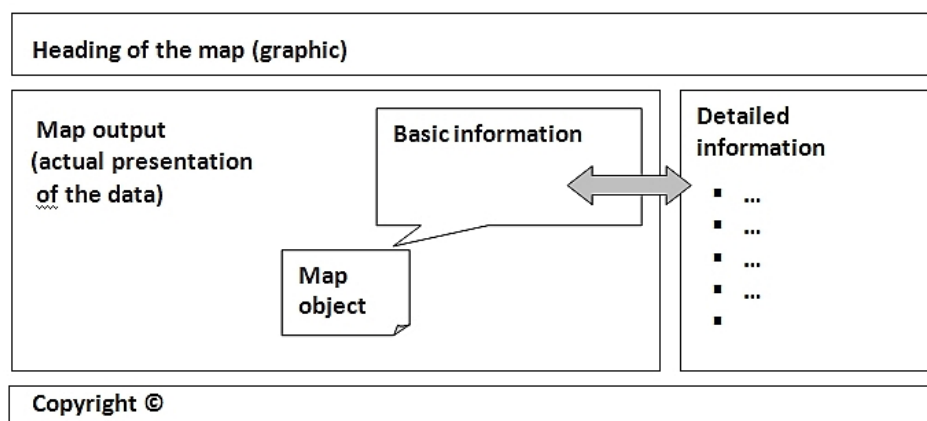


Figure 2. User interface – basic information and detailed information on the map object

newly registered subjects (it is again vital to verify the data, complete and mark them in the map) and subjects that stopped their operation or lost the respective certification. During this year's update, a significant increase in the number of farms (by 33.4% in comparison to 31st December 2009) was recorded in the South Bohemian region. It means that 459 enterprises, representing 13% of all organic farms in the Czech Republic, operate recently in the region. South Bohemian enterprises farm the area of almost 65 000 ha of agricultural land; i.e. the area that accounts for 14.5% of the total area in the organic farming regi-

men. The South Bohemian Region ranks among those with the highest number of enterprises and at the same time the biggest organically farmed land area. Approximately 28% of the whole organically farmed land was in the so-called transition period in 2010, i.e. a significant area widening can be expected very soon. The highest share of land resources accounts for permanent grassland (almost 86%) while arable land stands for 9% and orchards and vineyards for mere 0.4%. Animal production on these farms is primarily focused on suckler beef breeding – solely or in combination with other livestock (sheep, goat, horse breeding).



Figure 3. Preview of the individual organic farms or organic farms groups (South Bohemian Region). (1) Links; (2) Preview filters: – Map resources; – All farms; – Solution methodology; – Farms with conventional and organic farming; – Only organic farms

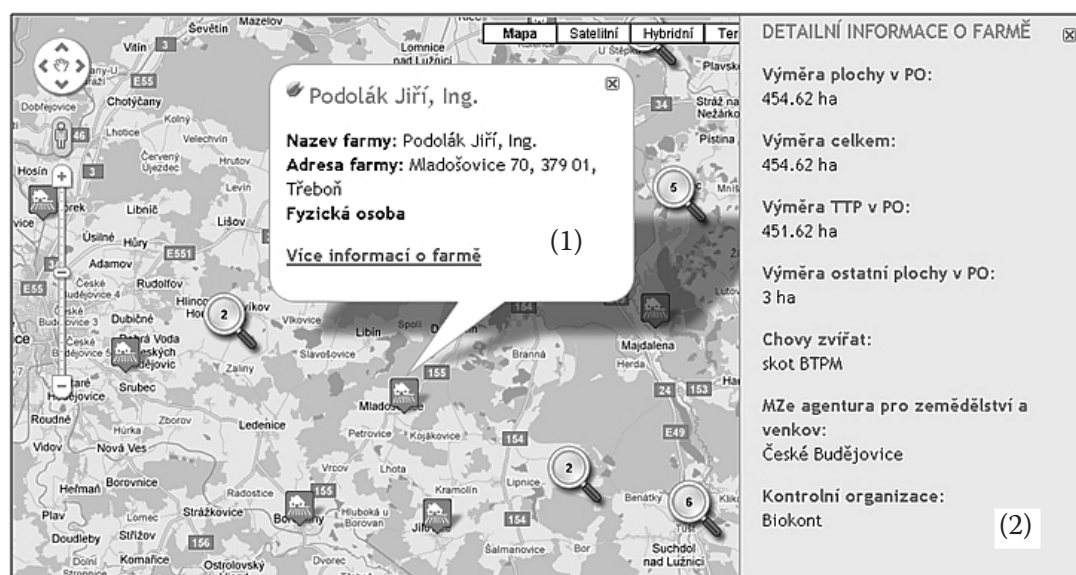


Figure 4. Basic and detailed information on the object – organic farm (South Bohemian Region). (1) Basic information on the object (farm) – farm name, address, etc. and link ‘More information about the farm’, that are documented in the notes. (2) Detailed information on the object (farm) – land area in the transition period, total area, area of permanent grassland in the transition period, animal production focus, Regional Agency for Agriculture and Rural Areas, control body

The focus of both animal and crop production is reflected as well in a bigger average size of organic farms in this region – 141 ha (This area slightly exceeds the average of the Czech Republic which is 127 ha. However, it is significantly higher than the average of the most European countries where organic agricultural enterprises are represented mostly by family farms of several tens of hectares

in average). The structure of agricultural land resources and animal production focus are quite similar to the average of the Czech Republic. They only confirm higher organic farms concentration into higher altitude areas and areas with worse natural conditions.

The above-mentioned changes in the number and structure of farms in 2010 are currently being



Figure 5. Detailed zoom (detailed visualization of exact object/premises location). (1) Links; (2) Preview filters: – Map resources; – All farms; – Solution methodology; – Farms with conventional and organic farming; – Only organic farms

incorporated in the new version of maps that will be available within the next two months. Apart from this update, the data will be complemented with further farm characteristics, e.g. internet address, nature of farm processing and other services provided by the farm (on-farm selling, participation in markets, farm tours, open doors days etc.).

Note – the fore-mentioned database of the Ministry of Agriculture – i.e. the mapping data foundation – is usually published in March of the following year.

If the subject of interest is bound to a concrete location or region, map portal presentation inclusive of other presentation functions brings an important opportunity for clear and effective information sharing. Agriculture and rural areas in general are domains with high potential for map portal use – apart from the organic farming sector, it can be useful for many other fields such as e.g. agrotourism, biogas stations etc. Map portal over a valid database constitutes then a very perspective and well-arranged tool for presenting the pieces of information that would otherwise be difficult to share and publish.

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