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ANALYSIS OF DATA OF ORGANIC FARMS WITH THE USE OF NON-STANDARD REPORTS IN GEKKO SOFTWARE¹

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ABSTRACT

Gekko software is designed to keep reporting in organic farms, which is required by supervising institutions. The program enables collection in its base, data, which are required from a farmer and additional information as well. Based on these data, reports and lists are generated in the program. However, beside standard lists, the software enables programming by a user his calculations. These calculations enable generating unpredicted lists in a standard version of the software. Gekko software was developed within the National Centre for Research and Development (NCBiR) project No NR 12-0165-10/2010 titled "Innovative influence of technology and information management supporting system on production efficiency in organic farms"

Introduction

Organic farming means a system of farming, which activates natural environment production mechanisms through application of natural means, technologically non-processed, ensures at the same durable soil fertility and animal health as well as high biological quality of agricultural products (Sołtysiak, 1995). Rational use of environmental resources is a basis of organic farming, and one of the purposes of organic production is creating a sustained system of agricultural management, which includes environmental systems and cycles and influences the increase of biodiversity (Kuś and Jończyk, 2009). On the other hand, competitiveness of this activity towards other agricultural systems preconditions its development in future (Komorowska, 2006). Reporting, which is required at organic agricultural production, is a basic condition for obtaining subventions. Thus, farming is an area where implementation of IT systems may activate farmers to use modern tools, which support management (Szelaġ-Sikora, 2011; MINROL, on-line, 2014).

¹ The paper was carried out as a part of the project of the National Centre for Research and Development NCBiR NR 12-0165-10, titled „Innovative influence of technology and information management supporting system on production efficiency in organic farms”.

Although, there are considerably not many programs designed for farmers, one may find also such that are used to support agricultural producers' activity (Cupiał, 2006; Lorencowicz and Figurski, 2008). Gekko software is designed to keep reporting in organic farms, which is required by supervising institutions. The software enables collection in its base, data, which are required from a farmer and additional information as well. Based on these data, reports and lists are generated in the programme. However, beside standard lists, the software enables programming by a user his calculations. These calculations enable generating analyses and unpredicted lists in a standard version of the software. Gekko software was developed within the National Centre for Research and Development (NCBiR) project No NR12-0165-10 titled "Innovative influence of technology and information management supporting system on production efficiency in organic farms". Assumptions of the research project and an application program, which was developed within its frames, were described in literature (Cupiał, 2011; Cupiał et al., 2012; Kowalski et al., 2012).

Types of reports in Gekko software

Gekko software, in the module of lists has two bookmarks: "Zestawienia 1" and "Zestawienia 2". In both bookmarks, in a standard version of the software, one may find tables with lists generated based on the collected data.

In "zestawienia 1" (fig. 1) the following tables may be selected: Rejestr działań agrotechnicznych, Bilans produktów oraz Obsada zwierząt. This type of lists includes procedures written in the code of the software, which may not be modified by a user. However, it gives a possibility of obtaining additional functions, such as filtrating data in a table. In the present version it is possible to determine the scope of dates, but ultimately increase of the number of filters is planned. It is also possible to obtain additional information by clicking a selected position in a table. Presently, such information is available in the balance of products, where upon selection of a given product one may obtain information, what components are included in this product.

"Zestawienia 2" in a standard version consists in 10 tables: Rejestr działań agrotechnicznych, Wykaz działek, Bilans produktów, Zużycie nawozów i środków ochrony roślin, Zakup środków produkcji (produktów roślinnych), Zbiór produktów roślinnych, Ewidencja zwierząt, Żywnienie zwierząt, Ewidencja zbywanych produktów and Rejestr zakupów. Despite a higher number of tables placed in this bookmark, these data do not have filtration of data, there is also no possibility of obtaining contextual information (which were available in "zestawienia 1"). However, because "zestawienia 2" are formed based on batch files, which are not placed in the code of the software, but they are downloaded from the catalogue of the software, there is a possibility of modification of the calculation manner. As a consequence, this software may be easily upgraded by subsequent tables and lists without the necessity of creating next versions. Appropriate batch files which include a code which controls calculations, may be formed by a software user or supplied from other sources. A user may also modify the existing files provided along with the software, which enable calculations made in the second bookmark. Thus, one may create inter alia tables which include additional filters or create any analyses of data, which are in the software base.

Combining defined reports by an author of the software with a possibility of defining own schemes, gives a possibility of using the software by users, who apply only standard

functions and gives a chance for obtaining an increased functionality for those who need additional tables. It also gives a chance to third parties, who create non-standard reports, to join the process of the software development.

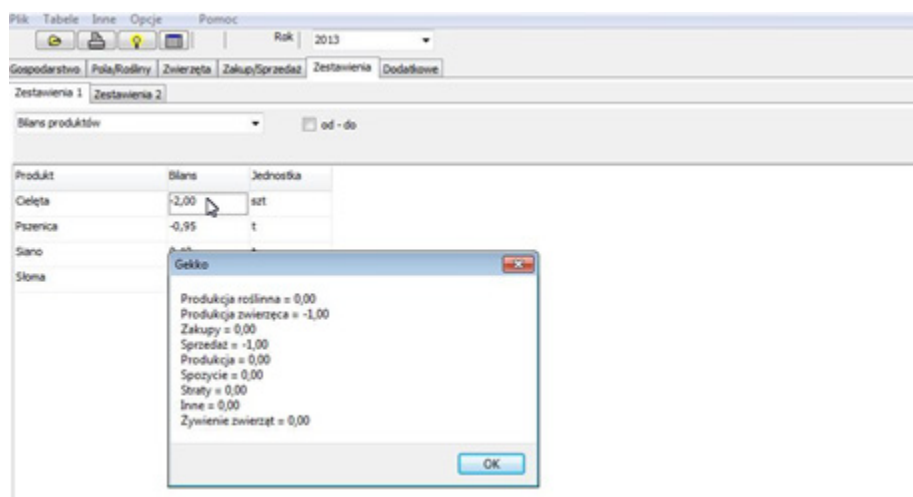


Figure 1. Exemplary standard report in Gekko programme (screen capture)

Structure of a file with a definition of a non-standard report

Information on the manner of creating a non-standard table is located in two files in the catalogue with application program libraries. File "raporty.dat" includes a list of defined tables. Each line includes a name of one table, the name may be given by description - which is user-friendly. However, it is recommended to provide short names - too long names decrease clarity and legibility of interface. These names appear in the developed field "combi" which serves for selection of a suitable list.

Next tables are defined in particular files numbered respectively "raport-1.sql", "raport-2.sql", "raport-3.sql", etc. A following number of a file corresponds to the number of a line from a file "raporty.dat", thus the number of files should be equal to the number of lines (names of tables). In case of a bigger number of files than the names of tables, the last tables will not be displayed, thus in case of adding a new report, one must remember to add the name of a table to the list.

Table 1

Exemplary definitions of non-standard tables

Item	Title of a table	Code included in a file
1	Rejestr działań agrotechnicznych	SELECT DziennikPola.data AS "Data wykonania czynności", Pole.nazwa AS "Oznaczenie działki rolnej",

<i>Item Title of a table</i>	<i>Code included in a file</i>
(plik raport-1.sql)	<pre> DzialkaEw.nr_dzialki AS "Numer działki ewidencyjnej", PoleSkladowe.pow AS "Powierzchnia działki rolnej", Roslina.nazwa AS "Rodzaj uŹytkowania", Czynnosc.nazwa AS "Rodzaj wykonywanej czynnoŹci", Produkt.nazwa AS "Nazwa Źrodka ochrony roŹlin/nawozu", DziennikPola.ile AS "Zastosowana iloŹ Źrodka", Warianty.kod AS "Numer pakietu lub wariantu", DziennikPola.uwagi AS "Uwagi/powierzchnia wykonanej czynnoŹci" FROM Pole,Roslina,DziennikPola,Czynnosc,Produkt, PoleSkladowe,DzialkaEw,Warianty WHERE Pole.id=DziennikPola.pole AND Pole.roslina=Roslina.id AND Czynnosc.id=DziennikPola.czynnosc AND Produkt.id=DziennikPola.produkt AND Pole.id= PoleSkladowe.pole AND DzialkaEw.id= PoleSkladowe.dzialka AND Warianty.id= Roslina.wariant ORDER BY Pole.nazwa,DziennikPola.data; # koniec zapytania t=80,50,50,50,150,150,100,50,80,100 Zastosowana iloŹ Źrodka=#0.## Powierzchnia działki rolnej=#0.00 # koniec formatowania liczb </pre>
2 Ewidencja zwierząt (plik raport-7.sql)	<pre> SELECT DziennikStada.data AS "Data", Zwierze.nazwa AS "Zwierze", Zwierze.szt AS "Szt", TypZdarzenia.nazwa AS "Zdarzenie", Przyczyny.nazwa AS "Przyczyna", DziennikStada.uwagi AS "Uwagi" FROM DziennikStada,Zwierze,GrupyZwierzat,TypZdarzenia,Przyczyny WHERE DziennikStada.zwierze=Zwierze.id AND Zwierze.grupa=GrupyZwierzat.id AND DziennikStada.zdarzenie=TypZdarzenia.id AND DziennikStada.przyczyna=Przyczyny.id AND DziennikStada.zdarzenie>0 AND DziennikStada.zdarzenie<5 ORDER BY Zwierze.id,DziennikStada.data; # koniec zapytania t=70,100,50,100,100,150 # koniec formatowania liczb </pre>
3 Rejestr zakupów (plik raport-10.sql)	<pre> SELECT Zakupy.data AS "Data zakupu", Produkt.nazwa AS "Produkt", Zakupy.ile AS "IloŹ", Jednostka.nazwa AS "produktu", Zakupy.cena AS "cena", Typeko.nazwa </pre>

<i>Item</i>	<i>Title of a table</i>	<i>Code included in a file</i>
		<pre> AS "Status eko", Firma.nazwa AS "Firma", Zakupy.uwagi AS "Uwagi" FROM Zakupy,Produkt,Jednostka,Firma,Typeko WHERE Produkt.id=Zakupy.produkt AND Produkt.jed=Jednostka.id AND Zakupy.firma=Firma.id AND Zakupy.typeko=Typeko.id AND Zakupy.typ=1 UNION SELECT DziennikStada.data AS "Data zakupu", Produkt.nazwa AS "Produkt", DziennikStada.ile AS "Ilość", Jednostka.nazwa AS "produktu", DziennikStada.cena AS "cena", Typeko.nazwa AS "Status eko", Firma.nazwa AS "Firma", DziennikStada.uwagi AS "Uwagi" FROM DziennikStada,Produkt,Jednostka,Firma,Typeko WHERE Produkt.id=DziennikStada.produkt AND Produkt.jed=Jednostka.id AND DziennikStada.firma=Firma.id AND DziennikStada.typeko=Typeko.id AND DziennikStada.zdarzenie=4 ORDER BY 1; # koniec zapytania t=80,100,50,50,80,150,150 Ilość=#0.## # koniec formatowania liczb </pre>

For Gekko application program, a format of files was designed, where non-standard analyses will be defined. Table 1 presents the content of exemplary batch files added to Gekko software. Information included in the file, which defines a non-standard table includes a SQL question, columns size in a table and a manner of formatting of numbers. According to the above information, in order to create own table, knowledge of SQL language and the structure of data bases is required, in particular, names of tables, relations and names of particular fields. This last information may be read out from a present scheme of a data base of Gekko software. Following information in a line starting with "t=" determine the size of subsequent columns in the table. If these numbers are not provided, columns will have a standard size (in such case, a table may be not be clear enough). Since, some real numbers determining selected columns require proper formulation, it may be done in the following lines of a file. SQL question defined in the batch file is processed to the moment a line beginning with # sign occurs.

Manner of processing a non-standard report

In the moment of starting Gekko software, from the file "raporty.dat" names of non-standard tables are collected. Then, each table has an ordinal number ascribed and simultaneously the file name with a definition of the report. Non-standard reports are started after a proper bookmark is selected in the programme. Upon indication of an appropriate report

(selection from the drop-down list box) the software loads a proper batch file with a report definition (such file must be available in the catalogue with the program libraries). After loading the content of the file to the program, its subsequent lines are analysed and processed. The first part means the SQL question, which determines the table content and its headings. Still, the width of columns and a proper numbers format in the selected columns are determined. Upon a correct processing of data, the content of a table is shown in the program window.

It must be emphasised here, that the program has many security protections which improve its stability. However, implementation of the possibility of "programming" the reports by the user may destabilize the application in case an incorrect batch file is designed. Although, it is a significant danger, it was accepted that advantages obtained from the possibility of defining new program expansions, which may occur in relation thereto. As a consequence, the user may increase the possibility of application but it should do it consciously with the use of his own knowledge or using the verified sources.

Conclusions

Frequent change of provisions and requirements concerning reporting by farmers who own organic farms, enforces constant adjustment of computer software which supports management of a farm. It also concerns Gekko software, which supports reporting in organic farms. Authors, try to predict directions of incoming changes in legislature, however, they can not determine in full, which requirements will exist in future. In order to prevent software from being outdated in future years, a scope of data, which may be collected there, was determined. This scope is wider than present needs, although entering all data is not required from the user. Since, it was assumed that respectively a big number of data will be in the base of the programme, the use of them was enabled by formation of own analyses and reports. Those lists may be defined in such a manner that they enable placing results of calculations in tables, not predicted in the basic version of the application program. It will also create a possibility of grouping data in a different manner than the previous one. Therefore, one may say that it gives a possibility of considerable increase of functionality of Gekko software and also will enable in future adjusting the software to new requirements without necessity of developing its new versions.

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ANALIZA DANYCH GOSPODARSTW EKOLOGICZNYCH Z WYKORZYSTANIEM RAPORTÓW NIESTANDARDOWYCH W PROGRAMIE GEKKO

Streszczenie. Program Gekko przeznaczony jest do prowadzenia w gospodarstwach ekologicznych sprawozdawczości wymaganej przez instytucje nadzorujące. Program umożliwia gromadzenie w swojej bazie, danych wymaganych od rolnika, a także informacji dodatkowych. Na podstawie tych danych generowane są w programie raporty i zestawienia. Jednak poza standardowymi zestawieniami, program umożliwia programowanie przez użytkownika własnych obliczeń. Te obliczenia umożliwiają wygenerowanie zestawień nieprzewidzianych w standardowej wersji oprogramowania. Program Gekko opracowany został w ramach projektu NCBiR Nr NR12-0165-10 pt.: „Innowacyjne oddziaływanie techniki i technologii oraz informatycznego wspomaganie zarządzania na efektywność produkcji w gospodarstwach ekologicznych”.

Słowa kluczowe: program komputerowy, gospodarstwo ekologiczne, sprawozdawczość, język SQL