

INFORMATION ACQUISITION METHODS AND THEIR RELATION TO THE LEVEL OF EQUIPMENT OF A FARM IN INFORMATIVE INFRASTRUCTURE ELEMENTS

Maciej Kuboń

Institute of Agricultural Engineering and Informatics,
University of Agriculture in Krakow, Poland

Dariusz Kwaśniewski

Institute of Agricultural Engineering and Informatics,
University of Agriculture in Krakow, Poland

Urszula Malaga-Toboła

Institute of Agricultural Engineering and Informatics,
University of Agriculture in Krakow, Poland

Marcin Niemiec

Department of Agricultural and Environmental Chemistry,
University of Agriculture in Krakow, Poland

Oleg Ovcharuk

State Agrarian and Engineering, University in Podilya, Ukraine

Sławomir Kocira

Department of Machinery Exploitation and Management of Production Processes,
University of Life Sciences in Lublin

***Abstract.** All item flows are always accompanied by information flows. The condition of the goods flow between a sending point and a receipt point is exchange of information between a sender and a consignee. The role of scientific-technical and economic information in modern agriculture grows successively. It is hard to imagine efficient management that would guarantee rational use of the factors of production, including respect for the environment, ensuring high quality of products and satisfaction of market requirements without it. Information is indispensable for both agricultural producers as well as producers and providers of production means and agricultural products consignees. Farms which strive to be competitive and which want to develop must use facilities of modern information technologies. The aim of the paper was to determine information acquisition methods and the relation to the level of equipment and the use of information infrastructure elements on commodity farms. The paper covered 50 agricultural farms located in the south Poland region. Information acquisition methods and the level of equipment and use of information infrastructure elements were determined. Respondents also evaluated which of the information acquisition methods*

was the best and which was the worst. It was concluded that the level of farm equipment in elements of information infrastructure was satisfactory and the information infrastructure methods guaranteed efficient farm management.

Keywords: *logistics, information, equipment, farm, production.*

Introduction

Agriculture, similarly to the remaining types of activities, more and more depends on modern technologies (Szelaǳ-Sikora, Cupiał, & Niemiec, 2015; Cupiał, Szelaǳ-Sikora, & Kuboń, 2018a), which themselves require specific resources of knowledge. Besides, changes in external conditions require that (functioning of a farm as a system with a great threat of instability, e.g. crisis) and changes in agriculture (increase of the meaning of the so-called GRIN technologies e.g. genetics, robotics, the Internet and nanotechnology) are noticeable. All these processes require a farmer to have knowledge of a wide range of fields. (Janc, 2013; Gródek-Szostak, Szelaǳ-Sikora, Sikora, & Korenko, 2017). Fast access to information, keeping pace with global trends, possibility to obtain information on sale markets, contact with suppliers, clients, co-producers are indispensable to them (Kuboń & Krasnodębski, 2010; Cupiał, Kobuszewski, Szelaǳ-Sikora, & Niemiec, 2015a). Thus, in relation to changes in a political, technological and socio-economic surrounding of agriculture, constant acquisition of information, build-up of knowledge and rising qualifications by farmers is indispensable (Janc, 2013). A dispersed character of agricultural production results in the decrease of its meaning in the access to traditional sources of knowledge (education and resources collected in libraries and institutions). Informative and communication technologies, including access to and ability to use the resources collected in the global network enable extension of knowledge and obtaining indispensable information and simultaneous reduction of unfavourable localization conditions (spacious isolation) (Małeck, & Moisel, 2008; Lorencowicz, Kocira, Uziak, & Tarasińska, 2014; Lorencowicz, Koszel, Kocira, & Uziak, 2015; Uziak, Lorencowicz, Koszel, & Kocira, 2017). Resources of the global network Internet are presently a significant and popular source of information for agricultural producers. It, and more precisely ability to use it, decides on the ability to function and compete on the economic arena - in agriculture (Janc, 2013).

According to Kuboń (2007), Cupiał (2006; 2010), Kania (2014), Cupiał, Szelaǳ-Sikora, & Sikora (2018b) the role of scientific-technical and economic information in modern agriculture rises successively. It is hard to imagine efficient management that would guarantee rational use of the factors of production, including respect for the environment, ensuring a high quality of products and satisfaction of the market requirements, without it. Information is

indispensable for both agricultural producers as well as the producers and suppliers of production means and consumers of farm products. Updated scientific-technical and market information is needed mainly by developing farms that modernize their production and introduce modern technologies in plant and animal production based on the relevant selection and rational exploitation of technical and energy means (Cupiał, Szelaż-Sikora, & Niemiec, 2015b; Zahran, Yousef, Kassem, & MA Naba, 2016). Ability to effectively acquire information, and as a result knowledge depends mainly on two groups of factors. The first one are farmers' abilities to acquire knowledge. The ability to acquire knowledge should be taken into account here – knowledge of knowledge sources, willingness to learn. Moreover, access to knowledge sources is significant (e.g. relevant software or having an Internet connection). The second group of factors relates to the resources of knowledge (that can be obtained). Except for the quantitative dimension, easiness of finding necessary information or links among complementary knowledge sources are significant (Janc, 2013). According to numerous research studies on the amount and quality of obtained data and the manner of their acquisition, results to a great extent are contingent upon the specificity of a farm, and mainly depend on the production trend (Cupiał & Wnęk, 2008; Kuboń, 2007).

Objective, scope and methodology of research

The aim of the paper was to determine information acquisition methods and the relation to the level of equipment and the use of information infrastructure elements on commodity farms. The studies covered 50 agricultural farms from 8 communities from the southern Poland region. The facilities were selected randomly, but the basic criterion of selection was the size of a farm adequate to the farm structure in Małopolska region and the size and structure of commercial production that decided on the farming trend. The selected farms completely describe the region of Małopolska, and the assumed division of farms according to the production trend reflects the scale and structure of the commodity production that is carried out.

The studies were carried out in the form of a guided survey. The questionnaire included questions based on which the following were determined: the structure of land use and the cropping pattern, the size and structure of production, the size and structure of commercial production, access to information infrastructure, the scope and type of applied informative technologies, the frequency of application of particular information technologies, the manner and frequency of access to information. Moreover, sources for obtaining information were learned about, as well as it was determined which sources for obtaining information were the best and which were the worst.

Results and discussion

Based on the data obtained from the Main Statistical Office, it can be concluded that equipment of Polish households with computer technology improves every year. It also takes place in rural areas. According to Bilali & Allahyari (2018), computerization and development of telecommunication gives farmers new possibilities of fast acquisition of technical and economic information and their effective use in decision-making processes. Modern farmers become managers that try to optimize organization of their farms (Mokotjo & Kalusopa, 2010). Their management is not only a lifestyle for them but business where they can earn high incomes providing that they use all offered possibilities, but where they may fail to sustain if they do not manage their farms more efficiently than the majority of competitors (Morrow, Kelly, & Kirley, 2004). Equipment of farms with information infrastructure elements includes information systems and information equipment (mobile and home phone network, desktop computers, laptops and specialist software). Table 1 presents the level of present equipment with elements of information infrastructure.

Table 1 Level of equipment of farms with information infrastructure elements (%) (own elaboration)

Farms/Specification	Telephone		Fax	Desktop or laptop computer	Internet network Home/Mobile
	Home	mobile			
Single trend - plant production					
Average	63.0	100.0	18.6	94.4	84.5/15.5
Single trend - livestock production					
Average	70.8	91.7	7.8	100.0	69.3/30.7
Double-trend					
Average	53.3	100.0	4.7	80.0	33/67
Mixed					
Average	57.1	95.7	-	72.9	62.7/37.3

It was concluded that in all the investigated facilities telephones constituted the highest number of teleinformation means - with a prevailing number of mobile phones (20.9-46.7%). Fax is being replaced with e-mails, which is proved by a high concentration of facilities with desktop or laptop computers (72.9-100%). All the investigated farms had access to the Internet, but it varied with regard to the connection type. Permanent connections were in 33-84.5 % of the facilities, and in the remaining cases radio connection was used (15,5-67%). Computers with suitable software were used the most often for registration of economic problems, collection and processing of legal provisions and to a small extent for supporting management of production processes (e.g. crop rotation, herd

turnover, calculation of fertilization doses). Table 2 presents the information base of logistic processes that take place on a farm.

Table 2 Information base of logistic processes taking place on a farm (%) (own elaboration)

Specification	Collects legal provisions	Uses system of registration of farming processes	Uses specialist software	Maintains obligatory documentation of transfers and turnovers	Uses documents for circulation of information
Single trend - plant production					
Average	60.5	58.1	79.5	62.8	30.2
Single trend - livestock production					
Average	45.8	25.0	84.2	66.7	25.0
Double-trend					
Average	83.3	70.0	50.0	50.0	50.0
Mixed					
Average	71.4	42.9	57.1	42.9	52.9

The research shows that collection of legal provisions and recording economic processes was mainly carried out by double-trend farms and the least often by single-trend livestock farms. Specialist software occurred the most often on single-trend plant and livestock farms (79.5 and 84.2%), more rarely in the remaining groups of farms (50 and 57.1%).

There are different methods of collecting information in agriculture. Table 3 presents methods of information acquisition (press, TV, radio, the Internet) that are the most often used by farmers in percentage terms.

Table 3 Methods of collecting information (%) (own elaboration)

Specification	Specialist press	TV	Radio	Internet
Single trend - plant production				
Average	67.7	90.7	76.7	84.0
Single trend - livestock production				
Average	77.5	95.8	45.8	88.3
Double-trend				
Average	53.3	100.0	50.0	66.7
Mixed				
Average	100.0	85.7	71.4	38.6

The studies that were carried out show that the press was the main source of obtaining information for mixed farms and television for double-trend farms.

Information provided on television was very often used also by single-trend farms. High equipment of farms in computers is reflected in their wide and frequent use for obtaining information by the Internet. It occurs the most often on single-trend farms (84% and 88.3%) and the least often on mixed farms (38.6%).

Among the investigated farmers, computers were the most often used to connect to the Internet. The most important objective of using the Internet was searching for varied information both concerning production (technological, economic, food and marketing), as well as others (inter alia meteorological information, prices of produce). The use of the Internet for communication to write emails any time, available all day was very important for the owners. The respondents used it very often for education purposes and to create various types of letters and forms for various entities. However, responses concerning issues relating to the use of a computer technique in agricultural activity were more varied. Table 4 presents the level and structure of use of the Internet for obtaining information.

According to the research that was carried out, the respondents the most often use the Internet, regardless of their production, for external communication (68.6-83.3%) and for collecting various information (77.6-82.6%). The farmers more often searched for professional (83% of the farmers), price (67%) and meteorological information (79%). Also, a prevailing majority of the investigated farmers (81%) used e-mails. For internal communication, advertisement of products and contacts with suppliers and recipients the network was used the least often. It results from the fact that commercial farms do not need to search for suppliers, recipients nor advertise their products since the supply and sale is planned and contracted beforehand.

Table 4 Use of Internet for obtaining information (%) (own elaboration)

Specification	Internet network							
	Internal communication	External communication	Advertisement/marketing	Commerce-farm-supplier	Commerce-farm-supplier	Decision-taking	Quality control	Collection of information
Single trend - plant production								
Average	4.7	83.3	7.0	18.6	11.6	7.0	2.3	82.6
Single trend - livestock production								
Average	4.2	44.2	-	4.2	26.7	8.3	-	79.2
Double-trend								
Average	-	69.3	-	-	-	16.7	-	68.0
Mixed								
Average	-	68.6	33.2	-	-	14.3	-	77.6

In order to analyse the available sources of information more extensively (not only those related to the ITC infrastructure) and knowing the farmers preferences in obtaining information, the farm owners were asked which of the mentioned manners of obtaining information was the best and which was the worst? The results are presented in Tables 5 and 6.

All the respondents said that telephone was the worst method of obtaining information (33.3-66.7%), followed by radio and television (25-44.5%) and representatives of companies (28.6-56.3%). Then, the respondents mentioned: the industry press, exhibits and shows. The question: which of the methods of informing is the most misleading, was answered the most often by the respondents that information from radio and television and information obtained by phone.

Table 5 Which of the method of providing information is the worst (own elaboration)

Specification	Telephone	Radio, television	Agricultural press	Computer, www	Representatives of companies	Agricultural advising centres	Fairs and collection centres	Exhibitions/shows
Single trend - plant production								
Average	50.3	41.9	25.6	9.3	56.3	-	-	14.7
Single trend - livestock production								
Average	33.3	25.0	25.0	-	40.2	-	-	16.2
Double-trend								
Average	66.7	44.5	33.3	-	36.7	-	-	-
Mixed								
Average	44.3	28.6	54.5	-	28.6	-	-	3.7

Table 6 Which of the methods of providing information is the best (own elaboration)

Specification	Telephone	Radio, television	Agricultural press	Computer, www	Representatives of companies	Agricultural advising centres	Fairs and collection centres	Exhibitions/shows
Single trend - plant production								
Average	11.4	7.0	7.0	82.6	11.6	9.3	20.9	50.9
Single trend - livestock production								
Average	8.3	16.7	-	66.2	-	-	75.0	48.3
Double-trend								
Average	8.6	16.7	-	75.1	-	12.5	50.0	-
Mixed								
Average	14.3	-	14.3	72.8	14.3	-	28.6	-

However, the best methods of providing information, regardless of the production trend, were fairs and collection points (20.9-75%) and information obtained from the Internet (32.6-82.8%). For the single-trend farms, shows and industry exhibitions were an important place of obtaining information (50.9 and 48.3%).

Conclusions

The studies carried out in the southern part of Poland enable us to conclude that the level of farm equipment with IT infrastructure elements is satisfactory and the methods and manners of obtaining information guarantee efficient farm management. It was concluded that the higher the level of farm equipment with elements of ICT infrastructure, the more extensive is the scope of use of those measures for acquisition, collection and processing of information indispensable for agricultural production. Farmers more often use specialist software that supports the production process, and the Internet is the most popular and the most thorough method of searching for information on the Internet. These two key information technologies are very significant in the context of the direction of development of the software for agriculture as well as placing relevant information on the Internet. The obtained results may serve for improving agricultural information.

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