

Information and communication support for the agricultural sector of Ukraine

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ABSTRACT: In the article, the current state of information and communication provision of the agricultural sector of Ukraine is studied; the main results of the information and consulting services activity in Poltava region are represented; their contribution to the spread of the new information technologies in the agricultural sector of the country economy is demonstrated.

1 FORMULATION OF THE PROBLEM

Under market conditions, the issue of the development of communication technologies is highly important for the agricultural sector of Ukraine, as possessing information and its use in the production process organization is directly related to ensuring the food security of the state.

Rural area development is largely determined by applying more advanced forms of management that provide efficient use of economic mechanism under specific production conditions. For this purpose, diverse informational means of processing and analysis must be considered. Currently information, transmission, software and hardware processing are the equally important resources as material and energy. Information transmission in the system of management of enterprises in the agricultural sector requires effective organization (Khudyakov 2016).

Therefore, improving the quality of information and communication software can play a crucial role in improving the efficiency of agrarian enterprises of Ukraine. It will enable a more clear focus in the legislative area, forecasted rates of production and marketing, geography of prices for the products and the resources in order to define a strategy for economic development, implement and use new technologies, assure production, storage and sales and build financial relationships in a tactically proper way (Khudyakov 2016).

2 ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

Under current conditions, one of the crucial factors in the effective development of the agricultural sector is the design of an effective system of

information and communication security. Theoretical and methodological basis of the agricultural production informatization, formation of information security and its role in the management of the agricultural sector, foundation of information and consulting services were covered in the works of the ukrainian scholars O.A. Halych, M.F. Bezukrovnyi, V.V. Derlemenko, T.P. Kalna-Dubynyuk, I.M. Kryvoruchko, M.F. Kropyvko, and others. However, systematic study on the formation of the information and communication provision of the agricultural sector as well as the analysis of information needs of an entity has not been covered.

The importance of the abovementioned issues, the need for their thorough theoretical study and practical specification predetermined the topicality of the subject of our study, its goals and objectives.

The main purpose of the article is to study the current operating conditions of the information and communication provision in Ukraine, underscore the main results of the information and consultancy services in Poltava region, their international cooperation and contribution to the spread of new information technologies in the agricultural sector.

3 THE MAIN MATERIAL OF THE RESEARCH

The implementation of the Information and Communication Technologies (ICTs) and their widespread use in various areas of human life, society and state is one of the most important tools that promotes the increase of the level of economic, social, cultural and technological development (Larin & Rudenko 2013).

Taking into consideration the global trends, in the last ten years, Ukraine embarked on the development of the Information Society; it was confirmed in a number of conceptual and strategic documents, primarily in the Law of Ukraine "On the Fundamentals of Information Society in Ukraine for 2007–2015" (Larin & Rudenko 2013). At the same time, a set of unresolved issues of legal, organizational, technical, scientific and methodological, analytical, resource support for the information society development remains. A large number of government decisions on these issues has non-systematic and declarative character, is not financially supported and is largely "borrowed" from other countries without considering the peculiarities of the current state and trends of Ukraine. The official confirmation of this point of view is the annual report on the state of information and communication provision in Ukraine, which is developed and submitted for the Parliament by the government along with the draft of the state budget for the next year according to the National Informatization Program. It is necessary to underscore that this document has some shortcomings in its formulation and implementation, namely:

- lack of the study on the documents and the real impact on the budget process;
- incomplete and inaccurate data of the State Statistics Committee and other bodies of the public authorities included;
- delay in the consideration of the document in Parliament;
- ignoring the procedures of the strategic monitoring, analyzing and forecasting the state in the process of its formation.

Despite the drawbacks mentioned it performs a very important function, namely, informing citizens, society and state about the situation in this area, the main factors and trends that are influential, short-term priorities of the state policy (Larin & Rudenko 2013).

Due to the economic crisis and the war in Ukraine, in the last year there was a decrease in the rate of computerization of enterprises in various sectors of economy; financing of the information projects from the state budget has decreased almost in two times and the National Informatization Program in ten times (Larin & Rudenko 2013).

Therefore, according to the World Economic Forum, the ratings of Ukraine which were found in the ICT indexes are the following:

- WEF Global Competitiveness Index 2015 – the 79th place out of 140 countries (in 2014, it was the 76th out of 144 countries);
- WEF Networked Readiness Index 2015 – the 71st place out of 143 countries (in 2014, it was the 81st place out of 148 countries);

- WEF Technological Readiness Index 2015 – the 86th out of 140 countries (in 2014, it was the 94th place out of 148 countries).

In correspondence to the UN Global E-Government Development Index, in 2014, Ukraine was ranked the 87th place in the world out of 193 UN member states (in 2012, in the ranking, Ukraine was on the 68th place out of 190 countries). Despite the loss of positions in the rankings, in particular, in the index of online services, Ukraine joined the group of countries with a high index of e-government in 2014 that is considered to be a positive trend for the country (Information Society 2016).

According to the report of the International Telecommunication Union "Measuring the Information Society 2015", which includes the rankings of 167 countries, in the index of ICT development, Ukraine was rated the 79th place (according to the ITU Report for 2014, it was the 73rd one out of 166 countries).

One of the reasons for the low rate of Ukraine in that ranking is an uneven access to ICT in the regions that is confirmed by the results of the analysis on the development of information and communication infrastructure and ICT in different areas of the region.

According to the data of the International Organization World Wide Web Foundation on the Internet development ranking in 2014, Ukraine was given the 46th place out of 86 countries in the Web Index.

According to the annual report "The State of Broadband 2015", prepared by a joint initiative of the International Telecommunication Union and UNESCO, the level of Internet penetration in Ukraine was ranked the 95th place out of 191 countries (in 2013, it was the 94th place out of 191 countries) (Information Society 2016).

Unfortunately, nowadays in Ukraine, both a strategy and effective mechanisms for the information society development are absent. In the process of the formation of these mechanisms, the global trends in ICT development, the peculiarities of Ukraine in the area of information and information society, modern approaches and methods of government (Larin & Rudenko 2013).

As for the process of the agricultural sector informatization, it is worse than in Ukraine in the whole. It is explained by the peculiarities of the agro-industrial complex. Agriculture is an ideal environment for the use of modern information technology. However, the lack of funds in the area of agricultural science and production does not assure their widespread use (Tzyferova 2012).

Besides, the role of the state has not been determined in the agricultural sector in this area so far. A separate national program on informatization

and automation of agriculture is necessary. In this case, work steps, targets and results must be clearly defined. It is important to consider this issue in a complex way and it is necessary to design a system that would take into account a wide range of information agribusiness development (Tzyferova 2012).

Conducting an analysis on the implementation of ICT in agriculture, it can be concluded that compared with the other sectors of economy there is a noticeable lag in terms of their use. It can be explained by the following main points: the lack of facilities in the majority of modern computer technologies, unpreparedness or lack of qualified experts in information technology, the lack of appropriate information and software that allows you to automate the management of enterprises of agricultural sector (Tzyferova 2012).

Among all abovementioned reasons, the latter is the most important. It is explained by the fact that the purchase of computer equipment and the training of relevant professionals to use it do not cause any problems nowadays. With regard to the development and the creation of software and information management, there are some difficulties which are primarily associated with the lack of appropriate techniques that would allow to use computers and related software in the process of the fulfillment of the management tasks by agricultural production to the whole extent (Tzyferova 2012).

Despite a very large number of problems in the implementation and the provision of the agricultural sector with the latest information and communication technologies, in Ukraine, a constant work is being performed to improve the current situation.

First of all, the training of the qualified staff is assured for the information and analytical provision of the branches of Ukrainian economy. A contribution to the spread of new information technologies and the systems for information and communication software is made by the educational institutions that train specialists for the agricultural sector. It is noteworthy to draw attention to the National University of Life and Environmental Sciences of Ukraine (NULES), the largest agricultural university of Ukraine where more than 26 thousand students are studying. Besides the Information Technology Department, the University includes Ukrainian Education and Research Institute (ERI) of the information and telecommunication support of agricultural and environmental sectors of economy (Ukrainian ESI 2016).

For the purpose of students' practical training, specialists of the leading world manufacturers of hardware and software are involved. In particular, under the "IBM Academic Initiative" program, the IBM Corporation in Ukraine holds educational seminars and training courses at the Faculty of Computer Science and Economic Cybernetics. The software of the companies Apple, Micro Strategy,

Sun, IBM, SearchInform, etc. started to be implemented in the learning process.

The Research Institute for Information Technologies in Environmental Management, which is a part of ERI, combined the scientific activity of the research and innovative laboratories. During the first years of its functioning, the experts were conducting a study and completed a number of IT application lay-outs (Ukrainian ESI 2016).

Among the useful innovations that have been introduced and have already received a due recognition, there is an information-analytical system of monitoring the socio-economic development of the agro-industrial complex of Ukraine. This analytical software set of monitoring agricultural market objects is based on the technology that allows to conduct the structural analysis on the location and the infrastructure of agriculture as well as a list of characteristics to them. The results are represented by using the most informative map service. This lay-out was awarded the golden medal of the international exhibition "Agro-2012"; it allowed to develop an effective model of a system of storage, display and analysis of the socio-economic information on the status of agricultural and environmental sectors on the basis of the use of a software platform of the Microstrategy business-analytics (Ukrainian ESI 2016).

The software system of information and analytical support of the producers in the crop of spatial data was developed ("Agro-2012" Diploma); the geoportal of NULES of Ukraine with a set of the geological and informational services was created. A research was conducted in several areas within the state program on the development of information technologies for the agricultural sector of Ukraine.

A contribution of the Institute in the improvement of the access to agricultural information became the creation of the Internet portal "The Agricultural Sector of Ukraine" AgroUA.net (<http://agroua.net/>).

The purpose of its creation was the development of the universal and the comprehensive information resource to meet the needs of agricultural information, agricultural producers, commercial organizations, advisory services, researchers, teachers, students and other users (Ukrainian ESI 2016).

Recently, in the collaboration with leading advisory services and their leaders, the staff of the Institute is successfully creating a system of electronic counseling eXtension on the basis of the NULES of Ukraine.

It is of common knowledge that the lack of information provision in the modern Ukrainian village is the reason for numerous problems. Agricultural practice of the majority of developed countries points to the need for continuous training of producers, distribution of agricultural information and knowledge. Therefore, it is necessary to provide the powerful channels of knowledge dissemination. Nowadays

there are the qualitatively new forms of operational information dissemination based on the use of the advantages of modern computer networks and telecommunications. Special attention must be paid at the US experience in developing an electronic system of agricultural extension, which was called eXtension. The studied experience can be used for the creation of the electronic extension system (*e-Extension*) in Ukraine (NULES of Ukraine 2016).

It is necessary to underscore that during a long period of time, the system of providing information and consultation fulfills a difficult task of disseminating information and knowledge among agricultural producers of Ukraine. The purpose of this project was to found an electronic educational advisory system (*e-Extension*) for the informational support of farmers, inhabitants of rural areas and rural areas development electronic extension system (*e-Extension*) in Ukraine (NULES of Ukraine 2016).

The task of the electronic system of *e-Extension* extension is to provide objective, scientific-technical and educational information for the public to answer the users' questions. It is achieved by creating a national online database of high-quality information, which is based on innovation and the concept of sustainable development of agriculture electronic extension system (*e-Extension*) in Ukraine (NULES of Ukraine 2016).

The system developers have foreseen and defined the basic idea of the project that is the following:

- *e-Extension* must meet the needs of users who want to obtain the necessary information “in any place and at any time” more properly, give them a quick access to the resources of the organized personalized access that is necessary to make informed decisions;
- *e-Extension* applies to modern Internet technologies to help the counselors at the national level by providing the necessary information support to the users of agricultural goods and promoting the establishment and the development of the practitioners community by organizing discussion groups, establishing local contacts and interacting with the counselors of all existing services;
- information databases and *e-Extension* services must be available via the Internet to a wider audience of web users who can access the educational resources at any time in the various subject areas;
- *e-Extension* users will be able to find an objective, evidence-based information collected by universities, research centers and experts in the whole system of Advisory Services electronic extension system (*e-Extension*) in Ukraine (NULES of Ukraine 2016).

Newsletters, innovation, on-line responses, thematic discussion groups and training modules,

everything that is created by the advisory service specialists and the related industries, will help the users to find the information they need quickly.

All the abovementioned issues will make it possible to improve the state of information and consultation provision of the agricultural sector of our country and the communication capabilities of advisory services in the future. It is worth noting that over the last decade, advisory service made a significant contribution to the development and the establishment of an information system of the agricultural sector of Ukraine.

In Ukraine, the process of creating advisory services became the most prevalent after the adoption of the Law of Ukraine “On Agricultural Advisory Activities” of 17 June 2004. According to the latest register of the Ministry of Agrarian Policy of Ukraine, in the beginning of 2016, 71 Agricultural Advisory Service was founded in Ukraine (in 2008 there were only 26 of them) (Chekhlatyi 2008).

In Poltava region, the first advisory service called “Poltava Regional Agricultural Advisory Service” (PRAAS) was established in 2004. This project was a result of the intergovernmental agreement of 15 June 2004, signed between the Federal Ministry of Food, Agriculture and Consumer Protection and the Ministry of Agrarian Policy of Ukraine. Much effort was put by the teachers of Poltava State Agrarian Academy to found PRAAS (Chekhlatyi 2008).

Along with the establishment of advisory services, information technologies such as Internet resources were involved to advise producers of agricultural workers and leading specialists of the field in order to improve the efficiency of their operations. The site “Tip”, which is a universal resource to meet the information needs of the agricultural areas, was designed. The site has a large number of structured sections which represent an abundance of materials on the most pressing issues for agricultural producers. Among them, the most significant ones are the following sections: Accounting, Current Issues, Beautification, Livestock, Crops, News, Tips and others. On the advisory service page there are the links to the sites that are the most popular with farmers as well as a forum for the public discussion of important issues and problems. It is also possible to write a personal message, send a request to the administrator or ask questions relating to the scope of the service moderator. On the site, a lot of practical advices on agricultural advisory activities, manufacturing issues that a counselor faces with in everyday work, news and posts that directly relate to agricultural producers can be found. Here the experience and recommendations by the leading experts in the agricultural area, Poltava State Agrarian Academy (PSAA) and the Department of Agricultural Development of the Poltava Regional State Administration were gathered (Chekhlatyi 2008).

Besides the web-site of Poltava regional agricultural advisory service, its employees have their personal Internet blogs created on the free service Google—Blogger.com (blogspot), where they are able to share the information on the issues that are the most interesting for agrosphere.

Due to the increase in the demand for qualified advisory services, the need to solve the lack of effective mechanisms for the agricultural science cooperation, education and agriculture, was faced in the foundation of advisory services which would be alternative to the existing ones in Poltava region. Applying to the existing technical, scientific and organizational potential of PSAA it could provide effective social-focused advisory services to agricultural producers and the rural areas.

This service was established in 2007 on the basis of PSAA, and it was given the right to provide the socially oriented advisory services using state budget. This body was called Poltava Regional Public Organization “Official Agricultural Advisory Service” (TRPO “OAAS”) (Kalinichenko et al. 2011).

In order to disseminate the information on the activities of a new advisory service an Internet resource was established; it was the site called TRPO “OAAS”. However, the financial crisis which took place in Ukraine in 2008 had a negative effect on financing the service activity and the design as well as the support of its site. Taking into consideration that the work of the service was not organized on a commercial basis, but was aimed to provide the socially oriented advisory services from the state budget, a sharp reduction of state funding in almost ten times in 2009 in comparison with the previous year, raised its activities in an extremely difficult situation. However, the “Official Agricultural Extension Service” has not slowed down its active functioning despite the difficult financial situation of its funding from the state. Its work has shifted largely to cooperation with the international organizations and projects. Besides, thanks to the cooperation with the local authorities, another source of funding became the local budget (Kalinichenko et al. 2011).

TRPO “OAAS” has gained a considerable experience in the international cooperation and participation in various projects, which makes it possible not only to adopt the best practices, but also the necessary funds for a variety of educational events. One of the results of such projects was the creation of a training manual for the distance learning in advisory services (Kalinichenko et al. 2009).

Using modern information technologies, which enable to carry out distance learning without a direct personal contact between a teacher and a learner, was laid on the basis of distance education. An important and a necessary part of distance education are electronic manuals (Pustovit 2008). In order to train the specialists of advisory

services and the students of the higher educational establishments, the scholars of PSAA developed an electronic guidebook in advisory services which is correspondent to the special curriculum and was ordered by the Ministry of Agrarian Policy and Food of Ukraine; it included 5 modules: Theoretical, Legal, Economic, Ecological training and ICT. Besides, the guidebook provides the necessary background information and the modules are accompanied by the tests for self-control (Pustovit 2008).

This tutorial is the first electronic textbook in Ukraine, which is classified by the Ministry of Agrarian Policy and Food of Ukraine.

In the process of developing an electronic handbook, programming languages that are modern and available for mastering have been used, namely, HTML, XML, JavaScript. To ensure software compactness program wrapper was used.

It should be highlighted that electronic textbooks and manuals have a number of advantages. They include the automation of data storage; virtually unlimited amount of information, relatively low production costs. It is necessary to notify that structuredness, user-friendliness and clarity of the material in the manual are assured by using hypertext. A user has an opportunity not only to “surf” the pages, but also he/she can manage the issuance and the acceptance of the material (Pustovit 2008).

PSAA and TRPO “OAAS” successfully completed another joint ecological project “Tempus-Tacis 2006” (JER_27168_2006) which was aimed to found the “Agro-Ecological Center of Poltava region”; it had to address such major challenges in the environmental areas as:

- improvement of the environmental education;
- gaining experience by the Ukrainian experts in the area of environmental problems;
- study of the possibility for the introduction of the international standards for environmental protection in Ukraine;
- dissemination of environmental information and results of studies [Kalinichenko & Chekhlatyi 2009].

In order to disseminate information about the work of the Centre, the site “International Agro-Ecological Center” was designed. For agricultural producers, both in a certain region and Ukraine as a whole, the information posted on the website of the Centre is very valuable. In the issue of effective distance learning of agricultural producers, an idea of a digital library center is interesting. The site contains the electronic publications of the series “Environmental Library of Poltava region”, booklets on the state of environment in Poltava region, which provided analytical information on air quality, water resources, drinking water quality, land resources, waste and recreational resources of Poltava. Electronic ecological library of the center continues to be improved and updated with

new material environmental issues. Currently, it contains hundreds of books, manuals, textbooks, scientific papers and various materials on agroecological subject already [Kalinichenko et al. 2009].

It is evident that the main task of advisory services in the agricultural sector of Ukraine is to disseminate information among agricultural producers. Their efficient functioning is possible primarily due to the use of modern information and communication technologies by the agricultural manufacturers. The use of information technology in advisory services significantly reduces management costs, expands the access of the agricultural producers and rural populations to information sources and communications and facilitates profitable farming.

4 CONCLUSIONS AND SUGGESTIONS

Nowadays due to the the absolute cost, Ukraine occupies the last place in Europe in all indicators of information (density coverage area and capacity of telecommunication and computer networks, Internet users, the proportion of broadband internet to the total number, etc.). In the area of the access to the Internet, Ukraine considerably lags behind developed countries.

The experience of developed countries demonstrates that the use of the latest informational technologies and information support systems is a prerequisite for the high-tech agricultural production and management. It is of common knowledge that Ukraine is one of the world's largest potential agricultural producers. Improving information and communication for the agricultural sector provides a significant opportunity to increase the production of agricultural products significantly and to become one of the largest food manufacturers. Of course, these tasks fulfillment should help the producers and the state. Its aid should be one of the main priorities of the State agricultural and information policy. Considering the fact that advisory services make a significant contribution to the agricultural producers awareness, expanding their competitiveness, solving the problem of employment of the rural population there is a need to support them at the state level.

Currently, the most serious challenge to the existence of agricultural advisory services in Ukraine is primarily the practical lack of state funding. Nowadays the only way to solve this problem is to attract local budget funds, international grants and financial assistance to foreign investors. The situation may change for the better only if the financial crisis is overcome, and the economic situation in the country is improved. Only under improving the financial security of advisory services in Ukraine it will be possible to state on the prospects of

providing them with innovative technologies. In its turn, it will improve the efficiency of the work of agricultural advisory services, the quality of information and consultative support, promote the organization of competitive production.

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