

THE KNOWLEDGE TRANSFER IN THE AGRICULTURAL SECTOR IN SOUTH-CENTRAL REGION OF BULGARIA

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Abstract

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The aim of this study is to explain the mechanisms through which knowledge is transferred in the agricultural sector in Bulgaria. To identify these mechanisms of interaction between science and practice and existing limitations and weaknesses, three scientific institutes, one experiment station and the Agricultural University were selected. Case study approach was used for selected small- and large-scale agricultural producers in South-Central of Bulgaria, utilizing the scientific achievements and consultancy services of the regional scientific institutes and University. The questionnaires incorporated open questions to understand how the knowledge transfer process towards its practical application works and the requirement of innovations and the establishment of new technologies in Bulgaria. The results of the study show that large-scale agricultural producers require specialized knowledge related to fighting diseases and pests, knowledge for implementation of new technologies offered by the scientific institutes etc., while, the small-scale producers seek knowledge related to the production process itself and methods to reduce production costs and achieve higher yields. The knowledge transfer from the Agricultural University and scientific institutes to the agricultural producers is performed through various channels, like demonstration and commercial fields at the scientific institutes, advice provided on site, international trade companies and informal channels. The difficulties that the agricultural producers and suppliers face regarding knowledge transfer is the poor access to agricultural advice for farms located away from the district administrative centers, the lack of information about events organized by the scientific centers, the lack of proper promotion of the results from the demonstration fields and a underdeveloped system for technology and knowledge transfer towards the farms.

Key words: knowledge; transfer; farms; institutions; advisory

Introduction

The contemporary business environment in the agricultural sector is characteristically highly dynamic due to globalization and the expansion of market competition. The above conditions very frequently create threads to the successful functioning of the agricultural farms. In such environment, the farms' managers require new means and tools for keeping the business (Yanakieva et al., 2011). In that sense, the new knowledge can contribute to the improvement of the operations and resistance to the competition pressure. But to

achieve that in practice, a working mechanism for knowledge transfer that ensures the prompt and in-time knowledge implementation by the agricultural producers needs to be developed.

Processes of knowledge generation and exchange, innovation and learning among multiple actors have a long tradition in extension sciences (Blum, 1991; Röling and Wagemakers, 1998; Klerkx et al., 2012). Therefore, there is not constructive line that can create one approach and explain knowledge system. Rivera et al. (2005) separated the knowledge system in subsystems as 'agricultural producers,

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research, extension, education and support systems and according to him it forms the agricultural knowledge and information system (AKIS). In our study, we will use AKIS more in comprehensive sense and understand knowledge system as a process for exchange information and knowledge.

The aim of this study is to explain the mechanisms through which knowledge is transferred in the agricultural sector in South-Central region of Bulgaria. In order to identify these mechanisms of interaction between science and practice the existing limitations and weaknesses need to be identified.

So far, there is no comprehensive study related to knowledge transfer in Bulgaria. In 2013, a study was carried out on the need to provide advisory services to small agricultural farms by Nikolov et al. (2013). The results revealed that the basic needs of the small agricultural farms in the field of innovations are: need for up-to-date market information and ensuring there is access to new technologies and knowledge. The farmers are particularly interested in biological production. The transfer from conventional to biological production by the small farms is limited due to the high certification costs, high prices of plant protection preparation and fertilizers that are approved for application in such production types as well as by a lack of information level related to market tendencies. Another limiting factor is the lack of experience and knowledge concerning developing biological production. According to Bashev and et al. (2010), in order to overcome these obstacles the following steps need to be adhered to: Firstly, an actual market information system needs to be well developed, one exists currently but does not function well and it is an unpopular source of information among the farmers. Secondly, technological transfer from scientific organizations towards small farms through the National Agricultural Advisory Services (NAAS) as a link between research and practice needs to be encouraged. Thirdly, biological production as a successful form of agricultural business needs to be promoted. Fourthly, the development of local structures, mainly between universities and farms for creating and developing new products and technologies also need to be encouraged.

Materials and Methods

Descriptive analysis and personal interviews were used in the study. The descriptive analysis is applied to determine the potential of the scientific centers to provide innovations to the agricultural producers. Through this method the main direction of scientific work of these centers and the areas with scientific achievements were determined. In order to

gather detailed information related to the knowledge transfer process personal interviews with the heads and internal experts of the scientific centers were carried out. With the help of the interviews the specific problems hindering interactions with agricultural producers and possible solutions for facilitating the process were determined. In order to acquire feedback related to the information provided by the experts, interviews with agricultural producers using the services of the scientific centers at of the South-Central region were carried out. All the interviewees were eager to share their experiences of the knowledge transfer process and to express their satisfaction with the beneficial cooperation with the scientific centers and their wish to continue working with them. Farmers were selected from the database of producers which work with the scientific centers.

There are several scientific centers, located in the area of South-Central region, related to the agriculture with national significance due to the fact that they are only ones for the country. They are: Agricultural University – Plovdiv, Fruit Growing Institute – Plovdiv, Institute for Plant and Genetic Resources – Sadovo, Vegetable Crops Research Institute – Plovdiv and Experimental Station of Irrigation – Pazardjik. Each of these institutions is specialized in a particular area and provides advisory services to farmers on thematic topics. Between them there is no hierarchical links and they operate as independent units.

Although the National Office of Agricultural Extension (NAAS) is recognized by farmers as an important institution for consultation, in the present study representatives are not involved. They offer basic advice on administrative issues, but the emphasis of the study is the transfer of innovation and new production technologies.

The average duration of the interviews was about 60 minutes and the main subject areas were determined in advance: 1) consulting activities; 2) innovations; 3) social capital – events, fairs, seminars etc.; 4) cooperation with other institutions; 5) public resources. All of the interviews used open questions and different methodological techniques in order to acquire the appropriate information. The flexibility of the method allowed us to acquire detailed information about the concerned questions, and when required, additional questions were asked in order to clarify each individual case. The respondents were informed that there were no right or wrong answers and we hoped to have an open conversation where they could freely express their views. It was also explicitly stated, that the both positive and negative opinions on the subject discussed were equally important.

The interviews were carried out in the following manner: 1) short introduction to the project; 2) clarification of the outline of the conversation; 3) clarification of the respondent's

tasks; 4) proper implementation of project techniques. Use of this method established trust between the respondents and the interviewer, which is a guarantee for the quality and reliability of the information gathered. A characteristic feature of the interviews was their evolutionary type. All interviews were concluded with recommendations related to the facilitation of the knowledge transfer process with regards to the agricultural producers in the country and the practical application of knowledge.

In order to study the knowledge transfer process within the agricultural sector 15 agricultural producers from Plovdiv were interviewed. The interviewed individuals develop each grow more than two varieties which requires a wider knowledge base. The agricultural farms are between 2 and 1750 hectares which allowed the researchers to identify the differences with regards to knowledge transfer between small and large producers. According to Nikolov et al. (2013) small farms in Bulgaria have an economic size of 8000 EUR and above this level are defined as large farms. In our case seven of the farms are under this level of 8000 EUR, they are defined as small farms, and the other eight are large ones.

All farms have been in business for more than 5 years and therefore we can assume that the results that are achieved are typical of well-established business structures with good professional experience. Generally, the small agricultural farms do not work on projects funded by RDP but mainly rely on funding for production amount per hectare for instance or for the type of products. On the other hand, the large producers are actively participating in various funding programs, direct payments per hectare and RDP measures.

Farmers consider various alternatives before making a decision for their farming. Different channels of knowledge transfer

can be used by farmers. According to Hajidimitriou et al. (2012) trust determines the degree of knowledge transfer and the efficiency and effectiveness of the process. The method required to assess degree of trust of channels. The interviewed farmers responded to question related to the level of trust for the different knowledge transfer channels and they rated from 0 to 10. The higher score presented higher degree of trust.

Results

In the Table 1 is summarized briefly the difference between small and large farms. In the follow sections are described the differences in the ways of knowledge transfer.

Summarized results of the large agricultural farms

Large agricultural producers are those who are mainly participating in different measures of the Rural Development Programme (RDP) and they frequently use consultancy services. They are mainly looking for advice related to the preparation of business plans for the RDP, consultancy services related to investments in their production, specialized advice for their production and consultancy services related to implementing new types of products.

The biggest problem for the large agricultural producers, as they highlighted themselves, is disease and pests on their produce which determines the requirement of appropriate consultancies with specialists in the area. They frequently use the consultancy services of the Agricultural University Plovdiv experts and scientific institutes in the region. Some of the farms are in active cooperation with the scientific institutes and have contracts for seed production. They have access to the full scientific potential of

Table 1
Difference between small scale farms and large scale farms

Features	Small scale farms	Large scale farms
Production problems	- high production costs - problems with implementing production; - low quality seeds	- diseases and pests on produce types
Implemented innovations	- new varieties	- new methods to fight diseases and pests
Purpose of the applied innovations	- higher yields	- better quality of the production
Information sources	- friends and acquaintances	- specialized events and literature
Type of the innovation contracts	- informal	- formal
Benefits from participation in demonstrations	- useful information and contact with fellow farmers	- establishment of contracts and implementation of innovations
Problems with participation in demonstration days	- high transaction costs - lack of advertising	no problems
Recommendations for the improvement of the knowledge transfer by the scientific institutes	- to be organized close to the agricultural producers or on demonstration farms	- more frequent demonstrations and training; - events on demonstration farms

Source: own table based on the interviews

the institute so they do not have technological problems.

The farmers of the region regularly attend the specialized events for the demonstration of agricultural innovations. One has even organized the demonstration of mechanical gathering of sesame in his fields for other farmers, which was developed together with the Institute of Genetic Resources Sadovo. The farmers definitively state that there are many benefits gained from participation in events related to knowledge promotion and some benefits are related to the acquisition of useful information, opportunity for contacts with fellow farmers or identifying a solution to a specific production problem. These are major motives behind the farmers' participating in knowledge distribution events. Formal contracts for the delivery of seeds and preparations and consultancy services are concluded during the events.

Large agricultural farms have worked successfully with the scientific institutions for several years but believe that if the institutions receive higher target budgets for knowledge promotion then more farmers are going to use their scientific products.

Summarized results of the small agricultural farms

The farmers that own small farms identify three major issues for their operations – high production costs, problems with production and the use of low quality seeds. Because of these issues, they are looking for knowledge that would help them to reduce the production costs and would provide higher yields and quality of their production.

The farmers are interested in innovations in agriculture and they are getting their information mainly through personal contacts, specialized issues, television and occasionally the Internet. They also state their desire to visit specialized events related to agricultural innovations demonstrations but identify some issues that prevent them to attend all of the events they are interested in.

They identify poor advertisement of these events as the main issue – the information about the date, location and subject of the events is not available early enough so they can plan their participation. They frequently learn about a scientific institute or the Agricultural University organized event from the other agricultural producers in the area. Most frequently their participation is hindered due to the following reasons: remoteness of the location of the event or high transactional and financial costs. These costs are the second issue that stops the farmers participating in knowledge transfer events.

The farmers definitively state that they gain many benefits from participation in such events and some related to the acquisition of useful information, the opportunity of contact with fellow farmers or finding a solution to a specific production problem. In fact, finding a solution to a specific

production problem is the main motive for the participation of farmers in knowledge distribution events. The farmers are looking for information on where to obtain high quality seeds and solutions for fighting diseases and pests on their products at these events.

The farmers also establish informal contracts for the delivery of seeds and preparations and advisory services during the events. The farmers recommend more frequent knowledge transfer events and that the locations of these events are closer to their farms or in nearby demonstration farms. In such a way more farmers would have the opportunity to participate and acquire the required knowledge.

Discussions

The transfer of knowledge from the scientific centers to the agricultural producers is performed through various channels. Each centre uses a combination of several channels according to the nature of the innovation proposed. These channels are (Figure 1):

Demonstration fields at the scientific institutions

The experiment stations offer mainly seeds, seedlings and production technologies. In order to provide these, demonstration fields at the scientific centers are used as well as exploring the option of using the farmers' land for innovations demonstrations. Thus it is expected that by shortening the distance between the farmers and the institutes a wider audience would be reached.

Points of sale at the scientific institutions

The seeds and seedlings are offered through points of sale established at the scientific centers and during the participation of agricultural exhibitions (AGRA exhibition). No external commercial companies are used which leads to limitations of the distribution of such products and the farmers are expected to play a more active role to get the required seeds and seedlings.

Advice the field

The agricultural producers rely on the scientific centers to get advice for fighting diseases and pests on their produce. As every case is specific, the visits on site are an effective means to satisfy this issue. In order to find effective solutions for such problems, the laboratories for analysis of the scientific centers are used.

International trade companies

In order to implement new machinery and get it being used by the agricultural producers, we rely on international

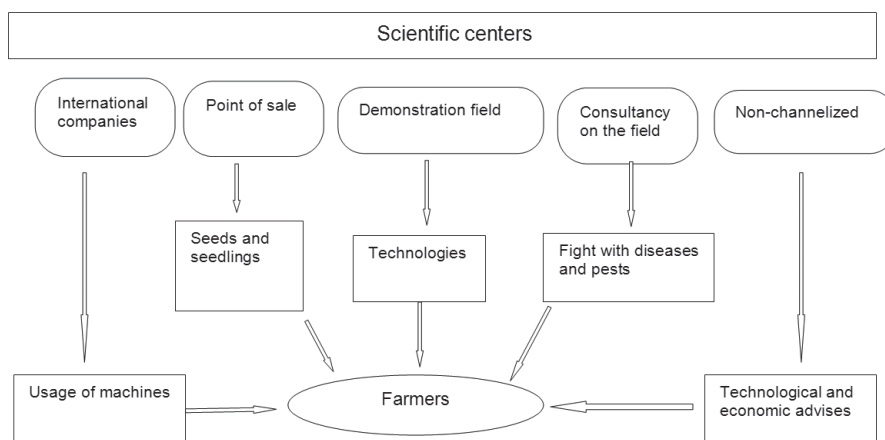


Fig. 1. Knowledge flows from scientific centers to farmers

Source: own figure

trade companies who import equipment. Only the Agricultural University Plovdiv organizes demonstrations of equipment but in such demonstrations, the companies play the leading role in the realization of such innovations. These events have a commercial purpose. The economic benefits are that the international companies and the experts, farmers and students get the opportunity to become acquainted with the most modern equipment available on the market.

Informal channels

The agricultural producers frequently suffer economic problems with their production operations as well as with finding appropriate, and the services, of the markets. In order to solve such problems, they look for information provided by informal channels. They are not keen to pay for such ad-

vice. For example, the agricultural producers buy seeds and seedlings and frequently get free advice on the implementation of new technologies. The advice on economic matters is generally provided as additional service on top of the most highly demanded advice.

Figure 2 presents the degree of trusts of different channels for knowledge transfer. The interviewed farmers assessed the informal channel (7.20) and advice on the field (6.53) as the most trustful manner to obtain knowledge and information. International trade companies (3.73) received the lowest degree of trust from interviewers.

We can summarize that the scientific centers have established good practice in the transfer of technology towards the agricultural manufacturers. But we should keep in mind that their potential for promoting scientific products is very lim-

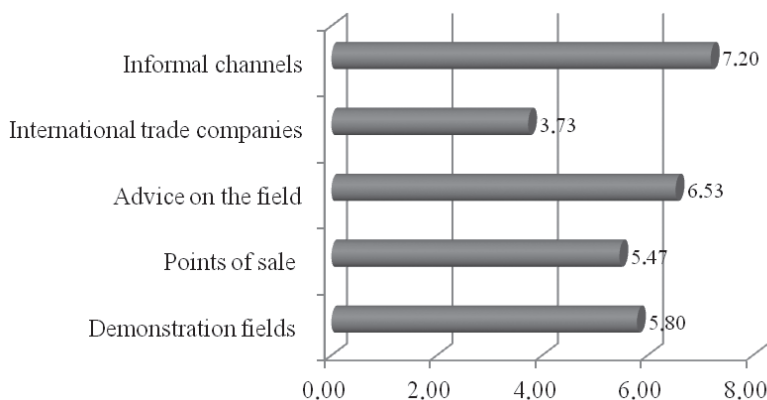


Fig. 2. Average degree of trust of different transfer knowledge channels

Source: own figure

ited which does not allow for a huge impact on the market. The transfer of knowledge is mainly performed with active input from the agricultural manufacturers themselves who are also seeking solutions to their own problems. The farmers rarely provide their farms for demonstrations of knowledge to scientific institutions. The lack of long-term contractual relations between the farmers and institutions is due to the desire of the farmers to have more freedom for choosing their advice providers. Before making final decisions, the farmers check various alternative sources for obtaining knowledge and also make connections with other farmers, who recommend particular advice providers.

Conclusion

The current study clarified the mechanism for knowledge transfer in the agricultural sector in Bulgaria. The existing limitations are determined and the weak points in the interaction between the science and practice are established. In the beginning questions that concerning the processes and methods of knowledge transfer between the scientific institutions and the producers in South-Central region were asked.

The results are summarized below as answers to the overall research questions of the study:

Large agricultural producers require specialized knowledge related to fighting diseases and pests, knowledge for the implementation of new technologies offered by the scientific institutes etc., as well as organizational and managerial knowledge (for example, methods for management of their farms, preparation of monthly and annual accounting reports etc.), while, on the other hand, the small producers seek knowledge related to the production process itself and methods for reducing their production costs and achievement of higher yields.

Small agricultural farms are interested in innovations in the agricultural sector and they get information from various sources such as personal acquaintances, informal contacts, specialized issues, television and rarely, Internet. Whereas, large agricultural farms get information from consultants with whom they work for long time.

The universities and scientific institutes offer knowledge and specialized information. The knowledge transfer from these centers to the agricultural producers is performed through various channels, such as demonstration and commercial fields at the scientific institutes, advice provided on site, international trade companies and informal channels. Each centre uses a combination of several channels according the nature of the innovation or desired knowledge.

The knowledge is promoted through organized events and seminars by the scientific institutes and the university,

both individually or together. Also, participation in international and national exhibitions and demonstration events are widely used.

The difficulties that the farmers and suppliers face in knowledge transfer is hindered access to agricultural advice for farms that are located away from the district administrative centers, the lack of information about events organized by the scientific centers, the lack of proper promotion of the results achieved in the demonstration fields and non-developed system for technology and knowledge transfer towards the farms. In Bulgaria, the farms are not effectively using the existing options for technology transfer as they have limited human and financial resources and have difficulties in realizing the benefits for the farm development when modern production methods are applied.

Scientific centers are recognized as institutions that can meet the needs of knowledge. But due to limited financial resources and problems of an institutional nature of their scientific potential, they cannot be fully used by farmers. This allows international trade companies to work more closely with the farmers and to increase their trust in near future.

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