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ANNA KŁOCZKO-GAJEWSKA, PIOTR SULEWSKI

Warsaw University of Life Sciences – SGGW, Poland

FARM SUSTAINABILITY AND FARMERS' INFORMATION GATHERING HABITS[1]

Key words: sustainability, farms, information

ABSTRACT. Obtaining accurate and up-to-date information, followed by deepening knowledge, is a prerequisite for proper farm management. This also refers to the sustainability of a farm, understood as achieving a high score in economic, environmental, and social dimensions. Basing on a representative sample of 601 farms participating in the Polish FADN it was checked if information gathering habits of farmers are correlated with the level of farm sustainability. The analysis was carried out basing on the FADN data supported by face-to-face interviews with farmers. The analysis revealed that farmers managing more sustainable farms are more active in looking for information, and use more sophisticated channels (e.g. conducting discussions in Internet forums or reading magazines, as compared with watching TV programmes). Farmers managing more sustainable farms usually looked for information concerning plant production technology, farm production economics, environmentally-friendly farming, renewable energy sources, and farming machines.

INTRODUCTION

In agriculture a serious conflict between economic and environmental goals can be observed, even though in EU countries it is partially levelled out by Common Agricultural Policy (CAP) instruments [Majewski et al. 2018, Dillon et al. 2010, Matthews 2003]. There is no doubt that implementing the sustainability concept in agricultural practice requires broad knowledge concerning methods of farm management and their consequences. Research carried out among Polish farmers proved that, most often, farmers lacked practical skills concerning particular agricultural practices, even though they seemed aware of the needs and problems faced [Kiełbasa 2018, Majewski 2008]. Scholars publishing papers dealing with sustainability stress that science and technology must play a central role in sustainable development [Cash et al. 2003]. According to some authors, the level of knowledge is strongly correlated with the level of sustainability [Djeflat 2010, Carreón et al. 2011, Miller 2011]. Here, it is important to distinguish between data, information, and knowledge. Gathered and organized in a certain way, data (formatted, retrieved, printed, etc.) becomes information. Information received and interpreted by an individual or

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group to increase understanding or apply to a task becomes "knowledge" [Creech 2005]. Due to the dynamic changes in the farm (economic, social, and natural) environment and technological progress, knowledge quickly becomes outdated. Consequently, farmers who want to stay competitive have to improve their knowledge and skills on their own upon completing their education. Each farmer makes an individual choice on whether to deepen his/her knowledge and where to look for information.

Nowadays, there is a huge variety of various sources and channels of information; in fact, it can easily be said that there is information overload. Sources include e.g. government agencies and other farmers, while channels include farm magazines, the radio, the Internet or individual talks. It is important to gain up-to-date information on where farmers look for information they need. Research carried out by Michał Cupiał in 2005 showed that the most common channel of agricultural information used was TV. At the same time, a long-term ethnographic study carried out in 2004-2007 by Amanda Krzyworzeka [2011] revealed that the most popular source of information were specialized magazines, followed by radio/TV programmes. Research carried out in the Mazowsze region [Krzyżanowska, Sałata 2010] revealed that the most important turned out to be talks to extension service workers, TV programmes and specialized magazines. Of course, the choice of information channels is strongly dependent on the level of development, access to infrastructure, organization of official channels and traditions. It is also important to be aware of the strengths and weaknesses of each information channel [Tucker, Napier 2002, Nazari, Hassan 2011]. In various countries, regardless of their level of development, farmers usually indicated TV and radio broadcasts as important or main information sources [Cupiał 2005, Krzyworzeka 2011, Krzyżanowska 2013, Tucker, Napier 2002, Shakhid et al. 2007]. "It seems the main reason for the popularity of television lies in its simplicity for the audiences" [Tucker, Napier 2002, cited after Nazari, Hassan 2011]. Radio programmes "provide a limited range of information and offer only one-way communication" [Aker 2011]. Farm magazines offer more detailed and specialized information, even though it is still only one-way communication. Two-way communication is possible when attending traditional trainings. Such trainings offered in Poland are quite often not well tailored to the needs of participants [Krzyworzeka 2011]. "The Internet is quickly gaining acceptance and use among farmers, particularly those who are younger and have achieved higher levels of education" [Tucker, Napier 2002]. The net offers up-to-date, wide information free-of-charge, which is not the case when reading specialized magazines [Krzyworzeka 2011].

According to the literature, the types of information sources and channels used by farmers in various countries can depend on age, level of education, farm size, membership in organisations, production type, farmer's personality and previous experience with different sources (including personal trust) [Garforth et al. 2004, Cupiał 2010, Krzyżanowska 2013, Mittal, Mehar 2015, Stuart et al. 2018]. Another important issue is the type of information searched for. In general, several studies revealed that Polish farmers were more interested in economic information than in technical knowledge [Krzyżanowska 2013, Cupiał 2010]. This analysis should bring new knowledge concerning information channels currently used by farmers in the whole of Poland. Earlier studies were carried out in areas limited to one NUTS 2 region or smaller. Moreover, the habits could change with time. Accord-

ing to the authors best knowledge, there are no papers analysing dependencies between information channels used by farmers and the level of farm sustainability.

MATERIAL AND METHODS

The main goal of the research was to find out if Polish farmers' information gathering habits differ according to the level of their farms' sustainability. These habits were analysed in two dimensions: the information channels used and the types of information searched for. The sustainability level was measured with a composite indicator consisting of three sustainability dimensions: economic, social, and environmental. In order to create the sustainability indicator, 109 variables were used. The data came from the Polish Farm Accountancy Data Network (gathered in 2016) and face-to-face interviews carried out by extension service workers in 2017. The detailed description of the method of creating the index can be found in Problems of Agricultural Economics [Sulewski, Kłoczko-Gajewska 2018]. The composite indicator values could vary between 0 (very low sustainability) and 1 (very high sustainability).

The sample consisted of 601 farmers participating in the Polish FADN system, representing 730 thousand Polish farms exceeding EUR 4,000 of standardized production. The respondents were selected using a layer/random procedure, which covered: 4 layers based on the criterion of specialization, 3 layers based on the criterion of standard production, 4 layers corresponding to macroregions understood as groups of the administrative regions NUTS 2. The number of farms surveyed in each layer was determined using the Neyman method [Neyman 1934], in a manner analogous to that used for determining the sample size for FADN.

In order to assess differences between farmers' information gathering habits depending on the sustainability level of their farms, the sample was divided into four groups according to the following procedure:

– farms characterised by a sustainability index ranging between 0 and the first quartile were marked as "low sustainability";
– farms characterised by a sustainability index ranging between the first quartile and the second quartile (median) were marked as "lower middle sustainability";
– farms characterised by a sustainability index ranging between median and the third quartile were marked as "upper middle sustainability";
– farms characterised by a sustainability index ranging between the third quartile and 1 were marked as "high sustainability".

RESULTS AND DISCUSSION

As we can see in Figure 1, the most useful information channels were talks to the extension service workers, followed by specialized magazines and traditional trainings (over 50% of answers were rated 5 or 6 in a 0-6 scale). Earlier research carried out in Poland [Cupiał 2005, 2010, Krzyżanowska 2013] showed that these information channels were perceived as the most important ones in the past, too, and the differences in order might

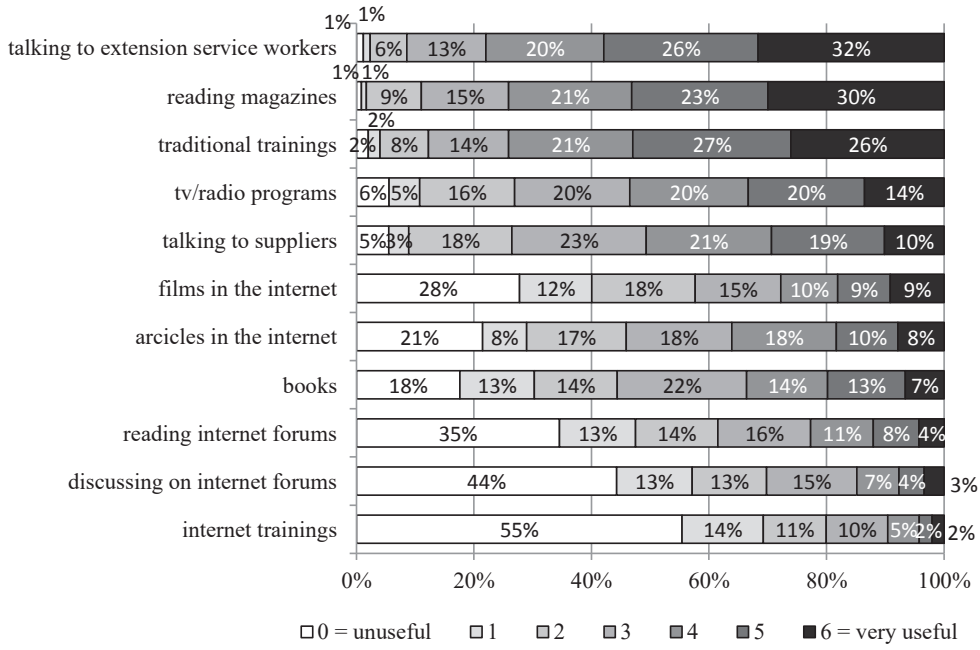

Figure 1. The farmers' assessment of usefulness of selected information channels to broaden their agricultural knowledge (0 = unuseful, 6 = very useful)

Source: own research

result from the wording of the question (e.g. "how often do you use" vs "how important do you find") or the size of the farms (bigger farms found such talks more useful, as stated in the literature [Krzyżanowska, Sałata 2010]). As the least useful, farmers assessed Internet trainings, conducting discussions on Internet forums, and reading Internet forums.

According to our research, farmers usually look for information concerning production technology and the availability of additional funds (Figure 2). This is a change in comparison with the results obtained by M. Cupiał [2010]. Perhaps, after 12 years in the EU, farmers have already gotten used to operating on the European market, or perhaps this difference is a result of sampling procedures (excluding semi-subsistence and subsistence farms from the FADN sample). It is also worth mentioning that farmers declared a very low interest in renewable energy sources and environmentally friendly farming, similarly as in the research carried out in 2012 [Krzyżanowska 2013]. It is possible that they treated these issues as secondary, while production technology, farming economics, and machines could be perceived as more crucial for the success of the farm. Taking into consideration the work overload of farmers [Kłoczko-Gajewska, Sulewski 2019], we can assume that looking for information less directly connected with farmers' everyday obligations is left for some time in the future, when farmers hope to be less busy.

In order to analyze the differences in information gathering habits according to the farm sustainability level, the sample was divided into four groups depending on their sustain-

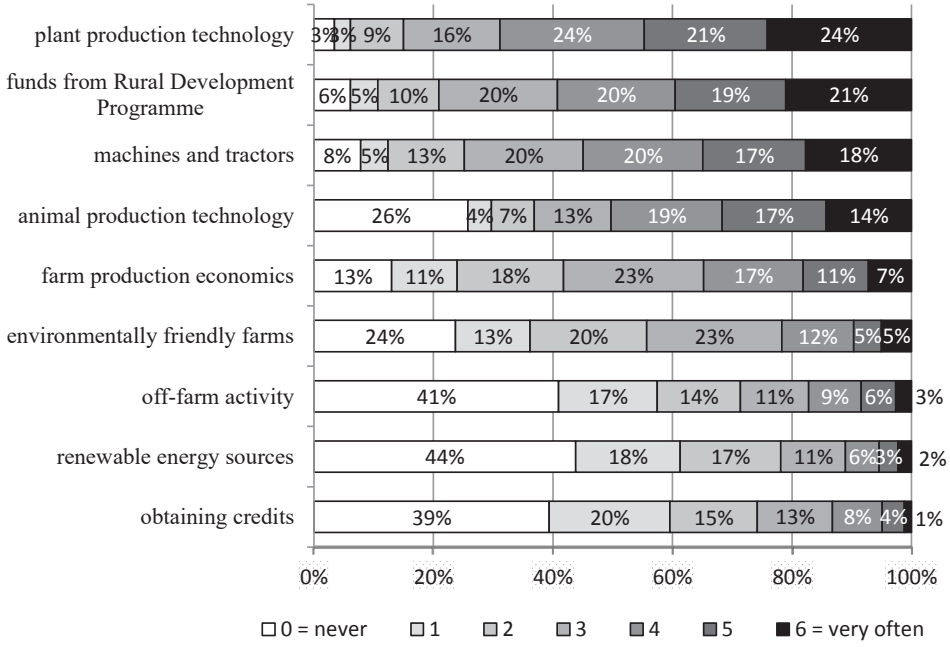

Figure 2. Self-assessed farmers' frequency of looking for information on selected topics (0 = never, 6 = very often)

Source: own research

ability level (see the "Goal and methods" section). The analysis of variance (ANOVA) was used to assess statistical significance of the differences between the groups. The results of the F test ($p = 0.05$) revealed significant differences in declared usefulness of reading magazines on farming, watching or listening to TV/radio programmes, conducting discussions on Internet forums, talking to suppliers, and reading books about farming. The remaining information channels did not differ significantly depending on the sustainability level of the farm.

Figure 3 presents average values of usefulness of particular information channels, depending on the level of farm sustainability (only significantly differing channels are presented). Higher values of the sustainability indicator come with higher scores for the usefulness of reading magazines about farming, conducting discussions on Internet forums and talking to suppliers. The reverse correlation is visible in the case of TV programmes, while reading specialist books gives an unclear result. This information channel was checked by dividing the sustainability indicator into social, economic, and environmental dimensions, but still there was no clear pattern.

In general, farmers managing farms characterised by higher sustainability tend to use more active (discussions) and demanding (specialised magazines) forms of looking for information than those with lower sustainability (TV as a rather easy way of broadening knowledge). It is not sure whether these more sophisticated channels of obtaining infor-

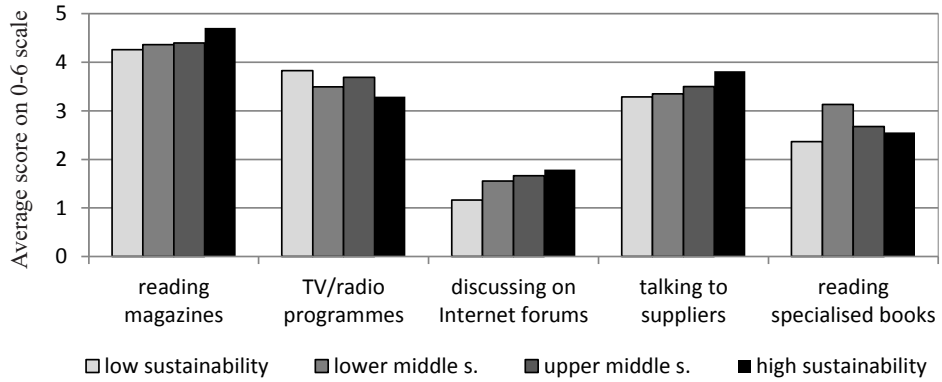

Figure 3. Average scores of selected information channels depending on the level of farm sustainability (only statistically significant differences)

Source: own research

mation gave them knowledge that made the farms more sustainable, or the reverse – the farmers that are open-minded are more willing to use more sophisticated channels of information gathering and, at the same time, are able to reach higher farm sustainability.

The second part of the research concerned the types of information looked for by farmers. The analysis of variance revealed that there were significant differences (at $p = 0.05$) between farmers managing farms of different sustainability levels in the following information types: plant production technology, farm production economics, renewable energy sources, environmentally friendly farming and machines and tractors.

Figure 4 presents average scores (on 0 to 6 scale) for these variables depending on the farm sustainability level. We can see that almost all types of information (except from renewable energy sources) are scored higher in more sustainable farms. It could be concluded that the higher the interest of farmers in information seeking, the higher the farm's sustainability.

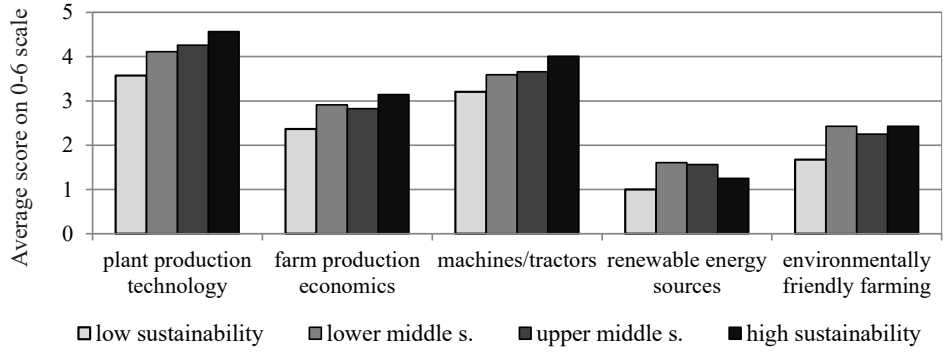

Figure 4. Average scores of kinds of information searched for depending on the level of farm sustainability (only statistically significant differences)

Source: own research

CONCLUSIONS

According to our research, farmers usually look for information concerning production technology and the availability of additional funds. It partially contradicts earlier findings of M. Cupiał, but supports research conducted by Krystyna Krzyżanowska, according to which farmers were more interested in economic rather than technological information. The difference in results obtained might be caused by the time lapse or differences in farm size in the samples.

The respondents most often look for information during traditional trainings, in magazines dealing with farming, and talking to extension service workers, which were also very popular sources of information in the past. Sustainable farmers more often than others look for information concerning plant production technology, farm production economics, environmentally-friendly farming, and machines and tractors. It can be inferred that the higher the interest of farmers in information seeking, the higher the farm's sustainability.

Farmers with a higher sustainability indicator prefer active forms of obtaining information (discussing on Internet forums, talking to suppliers, reading magazines). The direction of influence is not clear: using more sophisticated channels of obtaining information could result in farmers acquiring knowledge that made their farms more sustainable, or the reverse – farmers that are open-minded are more willing to use sophisticated channels of information gathering and, at the same time, are able to reach higher farm sustainability. Observed significant differences between information channels used by farmers is a starting point for future research on the causal relationship. Additionally, the conclusion that less sustainable farmers use rather less active information channels might be useful for decision-makers and scholars who plan information campaigns aimed at improving farm sustainability.

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TRWAŁOŚĆ (SUSTAINABILITY) GOSPODARSTW A NAWYKI ROLNIKÓW ZWIĄZANE Z POZYSKIWANIEM INFORMACJI ROLNICZYCH

Słowa kluczowe: trwałe (zrównoważone) rolnictwo, gospodarstwa rolne, informacje

ABSTRAKT

Uzyskanie dokładnych i aktualnych informacji, a następnie pogłębienie wiedzy rolniczej jest warunkiem prawidłowego zarządzania gospodarstwem rolnym. Dotyczy to także trwałości (sustainability) gospodarstw postrzeganej w wymiarze ekonomicznym, środowiskowym i społecznym. Głównym celem badań było ustalenie, czy nawyki polskich rolników związane z gromadzeniem informacji i zdobywaniem wiedzy rolniczej różnią się w zależności od poziomu trwałości gospodarstw. Badania przeprowadzono na próbie 601 gospodarstw rolnych należących do bazy danych polskiego FADN. W analizie wykorzystano dane zebrane w trakcie bezpośrednich wywiadów z rolnikami oraz dane zgromadzone w bazie FADN. Analiza wykazała, że rolnicy zarządzający gospodarstwami o wyższej wartości współczynnika trwałości charakteryzowali się większą aktywnością w poszukiwaniu informacji i wykorzystywali w tym celu bardziej zaawansowane kanały (np. dyskusje na forach internetowych lub czytanie czasopism rolniczych, nie ograniczając się jedynie do oglądania programów telewizyjnych). Rolnicy z gospodarstw o wyższym wskaźniku trwałości zazwyczaj poszukiwali informacji o technologii produkcji roślinnej, ekonomice produkcji rolnej, rolnictwie przyjaznym dla środowiska, odnawialnych źródeł energii oraz o maszynach rolniczych. Zebrany materiał przedstawiono z wykorzystaniem metody tabelaryczno-opisowej.

AUTHORS

ANNA KŁOCZKO-GAJEWSKA, PHD
ORCID: 0000-0002-6839-8831
Warsaw University of Life Sciences – SGGW
Faculty of Economic Sciences
Department of Economics and Economic Policy
166 Nowoursynowska St., 02-787 Warszawa, Poland

PIOTR SULEWSKI PHD
ORCID: 0000-0002-7983-4651
Warsaw University of Life Sciences – SGGW
Faculty of Economic Sciences
Department of Economics and Organisation of Enterprises.
166 Nowoursynowska St., 02-787 Warszawa, Poland