

## EVALUATION OF THE ECOLOGICAL AWARENESS AMONG THE ORGANIC AND CONVENTIONAL FARMERS IN PODLASKIE VOIVODESHIP, POLAND

### Summary

*The purpose of this study was to evaluate and compare the environmental awareness of the organic and conventional farmers on the territory of the Podlaskie voivodeship. The results indicate that farmers engaged in conventional farming have lower environmental awareness about sources of environmental pollution of agricultural origin than the organic farmers. Despite the fact that most organic farmers have a higher awareness than conventional ones, not all of them confirm this rule. Many conventional farmers see the environmental benefits of organic farming, but only a few are interested in running such a holding. Among the efforts to increase the acceptance of the organic cultivation system in the first place should be education. Increasing the level of environmental awareness among the farmers will enable to reduce wrong practices in agriculture. It is also necessary to provide technical support in the field of organic cultivation technology and in terms of the interpretation of the legal rules relating to the organic method of production. This is a serious challenge for advisory services and institutions to disseminate knowledge about organic farming. The proper designing of the financial assistance for the organic farmers is of huge importance, especially in the new financial perspective of the EU CAP.*

**Key words:** ecological awareness, organic farms, conventional farms

## OCENA ŚWIADOMOŚCI EKOLOGICZNEJ WŚRÓD ROLNIKÓW GOSPODARSTW EKOLOGICZNYCH I KONWENCJONALNYCH W WOJEWÓDZTWIE PODLASKIM

### Streszczenie

*Celem pracy była ocena i porównanie świadomości ekologicznej rolników z terenu województwa podlaskiego. Wyniki badań wskazują, że rolnicy prowadzący gospodarstwa konwencjonalne mają mniejszą świadomość ekologiczną na temat źródeł zanieczyszczenia środowiska pochodzenia rolniczego niż rolnicy prowadzący gospodarstwa ekologiczne. Pomimo tego, że większość rolników gospodarstw ekologicznych odznacza się wyższym poziomem świadomości w stosunku do rolników gospodarstw konwencjonalnych, zasada ta nie zawsze jest potwierdzana. Wielu rolników gospodarstw konwencjonalnych widzi korzyści dla środowiska wynikające z rolnictwa ekologicznego, ale tylko nieliczni są zainteresowani prowadzeniem gospodarstw ekologicznych. Wśród działań mających na celu zwiększenie akceptacji systemu produkcji ekologicznej na pierwszym miejscu powinna znaleźć się edukacja. Podniesienie poziomu świadomości ekologicznej rolników pozwoliłoby ograniczyć stosowanie niewłaściwych praktyk w rolnictwie. Konieczne jest także zapewnienie wsparcia technicznego w zakresie technologii uprawy oraz w zakresie interpretacji przepisów prawnych odnoszących się do metody produkcji ekologicznej. Poważnym wyzwaniem dla usług doradczych jest upowszechnianie wiedzy na temat rolnictwa ekologicznego. Dla rolników gospodarstw ekologicznych duże znaczenie ma prawidłowe zaprojektowanie pomocy finansowej, zwłaszcza w nowej perspektywie finansowej dotyczącej WPR w UE.*

**Słowa kluczowe:** świadomość ekologiczna, rolnictwo ekologiczne, rolnictwo konwencjonalne

### 1. Introduction

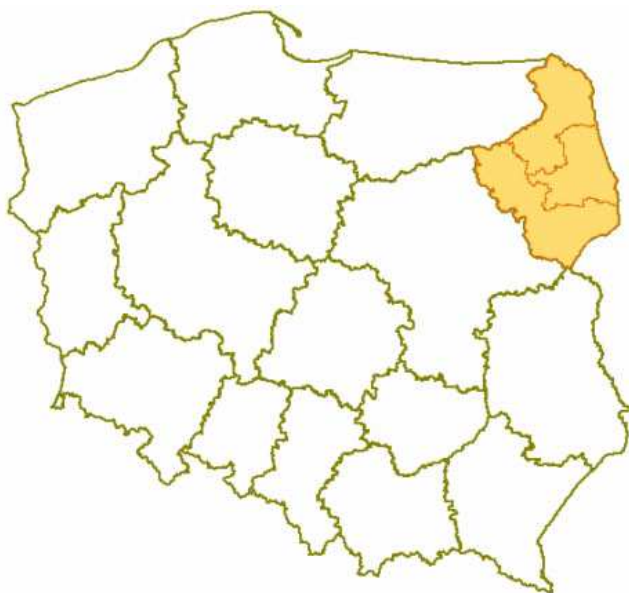
The primary purpose of agricultural production is to produce the food products, animal feed and certain raw materials for the industry. But in fact, agriculture has a much larger range of functions: environmental, social and cultural. Organic agriculture fulfills these multifunctions in the best way. Organic productivity in terms of the size of the harvest yield is, according to some authors, lower by 20% than conventional productivity (de Ponti et al. 2012), but in terms of overall productivity organic farming is more efficient, mainly due to the combined plant and animal production in one holding (Majewski et al. 2001). The undeniable advantage of this method of agricultural production, in addition to high-quality crops consists in its environmental pro. Because of the complete ban on the use of the synthetic substances, mostly pesticides and fertilizers, this management system contributes to the higher quality of crops, also protection of waters, soils and biodiversity (Rembiałkowska

et al. 2013). The development of organic farming support programs and then its implementation is a necessary condition to develop the organic agriculture sector. Although in recent years there has been a clear increase in the number of organic agricultural producers of (IJHARS, 2013), unfortunately there is still a lot of work to do in terms of the level of their environmental awareness (McCann 1997, Kucińska et al. 2009). Persons conducting the organic farms should better understand their environmental impact. A notion 'environmental awareness' according to Burger (1992, 2005) is a set of information and beliefs about the environment, as well as the perception of the links between the environment and quality of animal / human life. It is believed that environmental awareness is created at the time of learning about nature and, at the time of socialization. It can therefore be concluded that human consciousness is shaped by a number of factors (Perepeczko, 2012). Investigation of ecological consciousness of the Poles so far was included in several studies, but they were fragmented and did not constitute a

sound basis for resolute conclusions (Burger, 2005). The earlier study has proved that Poles living in rural areas and the eastern part of the country had the lowest level of pro environmental attitude (Burger 1992). Environmental awareness of Polish society was tested more recently by Bołtromiuk (2010), who has found that Polish society was characterized by a low level of environmental awareness.

Perepeczko (2009) has conducted a study on ecological consciousness of the inhabitants of the 14 municipalities in the 'Polish Green Lungs' - Natura 2000 and 5 municipalities not covered by the program Natura 2000. It has been shown that respondents living in Natura 2000 area had a higher level of ecological consciousness than in the other area. It was due to the educational activities carried out for the farmers whose lands belonged to the Natura 2000 (Perepeczko 2009). Similarly, according to Kings and Ilbery (2010) organic farmers in central-southern England have undertaken many more pro-environmental activities compared to their conventional counterparts.

The purpose of this work was to assess environmental awareness, as well as attitudes among organic and conventional farmers in eastern – northern Poland, in the Podlaskie Voivodeship (fig. 1).



Source: own work / Źródło: opracowanie własne

Fig. 1. Map of Poland and an area of research

It has been propounded that organic farmers should demonstrate better developed awareness of the impact of agriculture on the environment and more pro - environmental attitudes than the conventional farmers. It is important because only aware and motivated farmers are able to produce the highest quality food without pollution of soils, water and air.

Another aim of this work was to define more precisely the needs for environmental education of the rural inhabitants.

## 2. Methods

The method of this work included a survey conducted with 100 respondents from Podlaskie Voivodeship: 50 organic farmers and 50 conventional farmers. Organic farmers were selected from the address list available in the main Polish Agricultural Counselling Center in Brwinów, and

conventional farmers were selected depending on the logistics capabilities. The authors were striving to select the holdings of similar production profiles and similar surfaces from both groups.

It should be noted that this was a pilot study, because a number of tested holdings was small compared with the number of organic farms in Podlaskie voivodeship in the year 2010, the number of which reached 2033 (<http://www.ijhar-s.gov.pl>). The survey was anonymous and voluntary, and respondents before they joined the study were informed about the purpose of the carried out investigation. The survey consisted of 3 parts. Questions in the first part concerned the general characteristics of the holding, in the second part the respondents described their farm and household. The third part of questions had the aim to reveal the farmers' state of knowledge about environmental aspects of farming, especially organic one. A direct interview with the responders was the essential method to conduct surveys. The collected data have been elaborated in a standard way Podlaskie voivodeship occupies an area of over 20,000 sq km, which represents 6.5% of the surface of Poland. It is called "the green lungs of Poland" because of the outstanding natural values of the region. The share of grasslands in agricultural area is the largest in Poland - 19.8%, similarly the share of uncultivated (mostly boggy) areas - 3.0% and waters - 3.0%, as well as a high degree of forest cover > 29%.

Podlaskie voivodeship is a typical agricultural region. The average size of farms is 12 ha; in crop production cereals and potatoes are predominating. Agriculture in this region functions in a specific environmental surrounding: about 32% of the surface area of the voivodeship are different protective structures, which puts the Podlaskie voivodeship at the forefront. It consists of 4 national parks, 3 landscape parks and many NATURA 2000 areas. This results in the need for a responsible and rational management of natural resources in a way squaring the interests of wildlife and agriculture.

## 3. Results

The results of the study are presented as tables and figures. In a survey there were questions about the characteristics of the producers and their farms. Next questions have verified the farmers' knowledge about the impact of agriculture on the environment, their attitude to environment and organic farming methods. After collecting the farmers' answers the obtained data have been analyzed and the results are presented below.

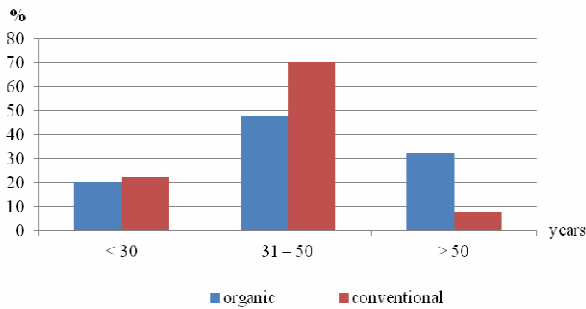
Gender analysis of organic farmers (tab. 1) has revealed that men were dominating in both kinds of farms, a bit more in the conventional farms than in the organic ones.

Both studied groups were similar in terms of age of people running a farm (fig. 1). In both cases, the most represented age was 31-50 years, although organic farmers created a bit older group (more farm leaders older than 50).

Table 1. Structure of farmers depending on farmers gender

Gender	Organic [%]	Conventional [%]
Female	30	22
Male	70	78

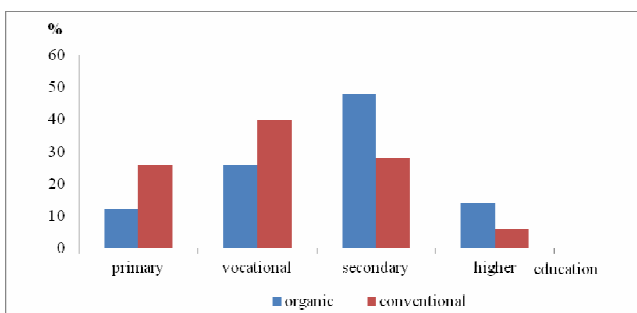
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Fig. 1. Age structure of farmers

The education level was clearly better in case of the organic farmers (Figure 2). In the conventional group the vocational and primary education were predominating, while in the organic group – secondary and higher education.



Source: own work / Źródło: opracowanie własne

Fig. 2. The education level of farmers

The survey hasn't revealed any significant differences in the sources of income between the organic and conventional farmers (table 2). It is symptomatic that only ca. 60% of farmers could live only on farm income, the rest had to look for additional income sources.

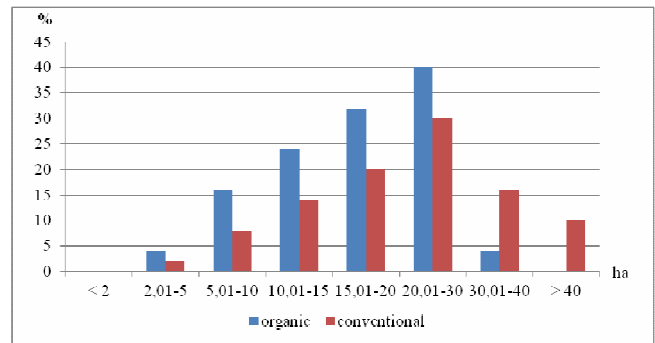
Tab. 2. The source of farmers' income

Source of income	Organic [%]	Conventional [%]
Farm - only	60	64
Farm and outside of farm	30	32
Farm and retirement / pension	10	4

Source: own work / Źródło: opracowanie własne

There were quite big differences in relation to the surface of the farms (Figure 3). In both cases, the most common size of farms was between 15-20 and 20-30 ha. However, most farms bigger than 30 ha belonged to the conventional farmers and opposite, most small farms 5-15 ha belonged to the organic ones.

In both types of farms husbandry was dominated by cattle farming, represented by 78% of organic farms and 92% of the conventional (tab. 3). The most common size of herds of cattle in organic production system was 6-10 pieces. A bit less popular were stocks of cattle with 11-20 animals (22%). In a conventional system most flocks were much bigger, numbering > 30 head of cattle and secondarily numbering 4-10 pieces. In case of pigs 52% of farms had these animals, organic farmers had smaller flocks, conventional farmers were keeping 20-30 pigs more frequently.



Source: own work / Źródło: opracowanie własne

Fig. 3. The farm size

Tab. 3. The rearing of animals on farms

Production systems Number of heads [units]:	Organic livestock		Conventional livestock	
	Cattle [%]	Pigs [%]	Cattle [%]	Pigs [%]
0	22	48	8	48
1-5	16	20	6	20
6-10	34	28	24	16
11-20	22	2	12	2
21-30	6	2	20	6
>30	22	0	30	8

Source: own work / Źródło: opracowanie własne

There was a considerable variation in terms of feed resources for livestock (tab. 4). 82% of organic farmers used only own feed, while 62% of the conventional farmers were using own and also purchased feed for animals.

Tab. 4. The origin of the animal feed

Source of fodder:	Organic [%]	Conventional [%]
own	82	38
own + with purchase	18	62

Source: own work / Źródło: opracowanie własne

The survey data showed that nearly half of the conventional farmers and only 24% of the organic farmers were using these medicines (table 5). The vast majority of organic farmers was of the opinion that the use of antibiotics in addition decreased the resistance of animals to diseases (80%).

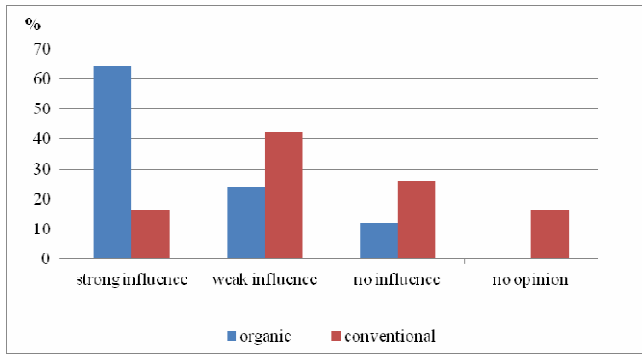
Tab. 5. The use of antibiotics in animal nutrition

Usage of antibiotics:	Number of farms	Indicator %
Yes	24	48
No	76	52

Source: own work / Źródło: opracowanie własne

The respondents were asked to express their views on the impact of agriculture on environmental pollution. The results obtained show the differences in the perception of environmental issues between both tested groups of farmers (fig. 4).

Vast majority of the organic farmers had the opinion that farming methods had strong influence on environment. On the other hand, most of the conventional farmers had the opinion that agriculture had only weak or no influence on the environment.



Source: own work / Źródło: opracowanie własne

Fig. 4. Farmers' opinion about agriculture impact on environment

There were major differences in the farmers' view on the impact of the synthetic pesticides - 94% of the surveyed organic farmers and 76% of the conventional farmers believed that the use of pesticides was causing the environmental contamination. Similar differences were found in the opinions about the impact of pesticides on human health and pest resistance. It was surprising that organic farmers believed more frequently than the conventional group that pesticides were quick and effective way of pests and weeds control.

Table 6. View of farmers on the use of chemical plant protection products in agriculture

Pesticides:	Organic [%]			Conventional [%]		
	Yes	No	No opinion	Yes	No	No opinion
Quick and effective way of pests and weeds control	86	20	14	78	14	8
Contaminate the environment	94	0	6	76	10	14
Harmful/toxic to human's health	90	2	8	70	26	4
Increase pests resistance to the pesticides	86	2	12	60	30	10

Source: own work / Źródło: opracowanie własne

The results showed that 94% of conventional farms were using pesticides, in that most popular were insecticides and herbicides, fungicides and other means were much less popular (table 7).

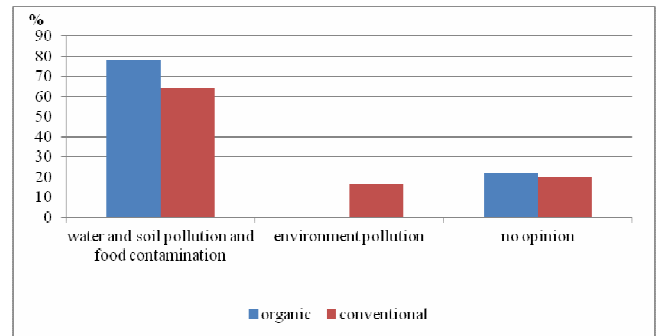
Table 7. Chemicals used in conventional farms

Types of chemical agents:	Number of farms using the pesticides:	Indicator in%
Insecticides	40	80
Fungicide	10	20
Herbicides	43	86
Growth stimulators	4	8
I don't use	3	6

Source: own work / Źródło: opracowanie własne

The majority of organic farmers (78%) believed that synthetic fertilizers were contaminating soil, water and food products (fig. 5). Many conventional farmers (64%) were of

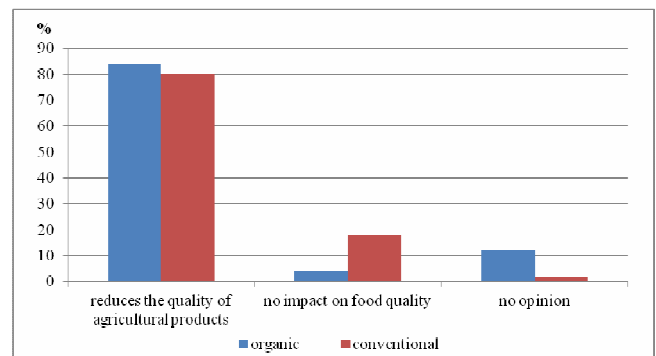
the same opinion, however 16% of them have grasped only the environmental danger. It was disappointing that ca. 20% of both farmer groups had no opinion in this respect.



Source: own work / Źródło: opracowanie własne

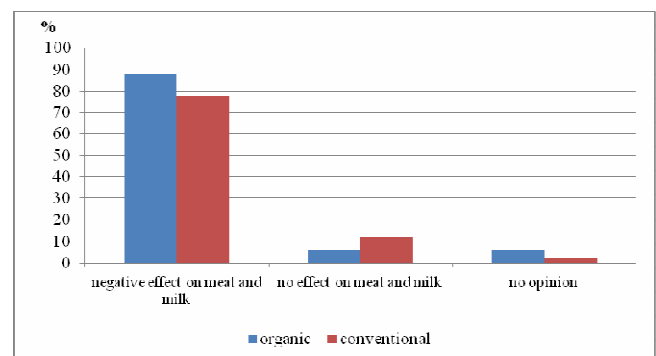
Fig. 5. Farmers' opinion about the impact of synthetic fertilizers on the environment

The majority of the surveyed farmers were criticizing the cultivation of plants and animals' grazing close to busy roads (fig. 6 and 7). However, 18% of the conventional farmers haven't seen any impact on food quality if the plants were grown close to busy roads. Similarly, 12% of them haven't seen any negative impact on milk and meat quality when cows were grazing close to busy roads.



Source: own work / Źródło: opracowanie własne

Fig. 6. Farmers' opinion about growing plants close to busy roads

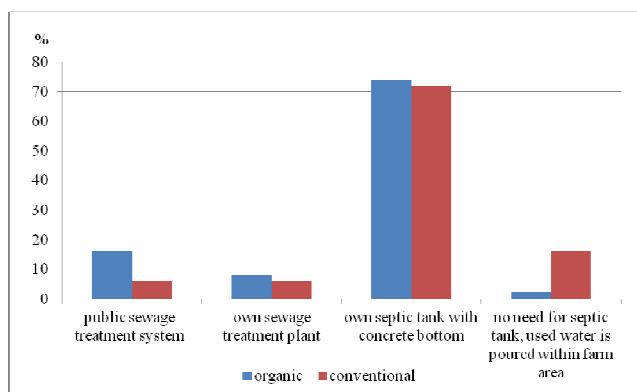


Source: own work / Źródło: opracowanie własne

Fig. 7. Farmers' opinion about grazing animals close to busy roads

The most popular way of the wastewater management was a septic tank with a concrete bottom. Such a system was used by 74% of organic farmers and 72% of the conventional farmers. However, this is not safe for the environment, since very often inadequate protection against

leakage leads to groundwater contamination. The most recommended way for the wastewater management is a connection to a public sewage treatment system. Such management is used by only 16% of organic farms and 6% of the conventional farms.



Source: own work / Źródło: opracowanie własne

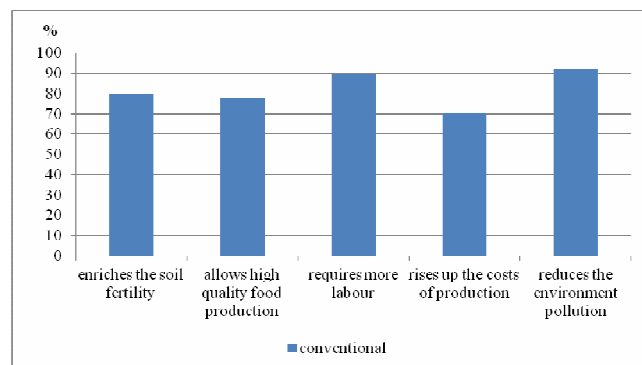
Fig. 8. Management of sewage from the households

Aspects important for the farmers during food shopping are presented in a table 8. It is clear that organic farmers are more interested than conventional ones in such aspects as preservatives and artificial colors presence, also expiry date and producer. They are on the other hand less interested in such aspects as packaging type; product price is important for both groups at the same level.

Aspects important for the farmers when buying laundry and washing detergents are presented in a table 9. It is evident that chemical composition, biodegradability and type of packaging are more important for the organic farmers compared to the conventional ones. On the other hand producer and advertising are more important for the conventional farmers. Smell, washing effectiveness and price are significant for both groups at the same level.

Knowledge of conventional farmers about the effects of organic agriculture is presented at figure 9. Most of these farmers understand that organic agriculture reduces the environmental pollution, allows high quality food production,

requires more labor and enriches soil fertility. However, not all surveyed conventional farmers shared this opinion, what results from inadequate education in this respect.



Source: own work / Źródło: opracowanie własne

Fig. 9. Knowledge of conventional farmers about the effects of organic agriculture

A septic tank with a concrete bottom was the most popular way of the waste water management. Such a system was used by 74% of organic farmers and 72% of the conventional farmers. However, this is not safe for the environment, since very often inadequate protection against leakage leads to groundwater contamination. A connection to a public sewage treatment system is the most recommended way for the waste water management. Such management is used by only 16% of organic farms and 6% of the conventional farms.

Table 10. Conventional farmers' knowledge about the institutions disseminating organic farming

Have you heard about the institutions disseminating organic farming?		
	The number of respondents	Indicator [%]
Yes	35	70
No	15	30

Source: own work / Źródło: opracowanie własne

Tab. 8. Aspects important for the farmers when buying food products

Features noted while buying a food products	Organic [%]			Conventional [%]		
	yes	no	sometimes	yes	no	sometimes
Preservatives presence	70	16	14	50	20	30
Artificial colors presence	56	28	16	40	40	20
Packaging type	20	60	20	38	50	12
Expiry date	100	0	0	80	10	10
Producer	70	14	16	52	36	12
Price	94	2	4	90	0	10

Source: own work / Źródło: opracowanie własne

Tab. 9. Aspects important for the farmers when buying laundry and washing detergents

Aspects important while buying laundry and washing detergents	Organic [%]			Conventional [%]		
	yes	no	sometimes	yes	no	sometimes
Chemical composition	50	40	10	30	66	4
Type of packaging	30	60	10	20	72	4
Biodegradability	48	20	12	30	70	0
Smell	70	20	10	70	30	0
Washing effectiveness	98	0	2	98	0	2
Producer	30	60	10	60	28	12
Price	80	10	10	88	4	8
Advertising	14	80	6	22	70	8

Source: own work / Źródło: opracowanie własne



Table 11. Awareness of organic food stores among conventional farmers

Have you heard about the existence of organic shops?		
	The number of respondents	The pointer in the [%]
Yes	30	60
No	20	40

Source: own work / Źródło: opracowanie własne

A notion 'preharvest interval' was known for 74% of organic farmers and for 80% of conventional farmers, who mostly have abided this interval; only 8% haven't done it.

The last question concerned the form of help desired by the farmers during the conversion period. Respectively 82% / 80% of organic farmers had the opinion that financial help / individual advisory would be most helpful. 42% of organic farmers had the opinion that qualifying trainings would be important.

Conventional farmers only in 38% / 36% had the opinion that financial help / individual advisory would be most helpful.

These results are interesting – they suggest that organic farmers are more interested in additional education than conventional ones.

#### 4. Discussion

According to strict requirements of the EU agriculture providing the protection of the environment is necessary in Europe (IJHARS, 2013). However, in fact very often current agriculture is the main cause of the destruction of ecological balance in the environment (Kucharska, 2010). One of the reasons is low ecological awareness of rural citizens. The problem of environmental awareness and ecological attitudes among Polish citizens has been studied since the 1980s (Motyka, Tyburski, 2009).

In a study of Gliński (1996) it has been shown that farmers had a low level of environmental awareness and showed little interest in environmental problems, they were mainly interested in financial benefits. Another study has proven that farmers decided to convert conventional farms into organic, since they wanted to achieve greater financial profits (Kucińska and Golba 2007, Kucińska et al. 2008). Runowski (1996) and Kazimierzczak et al. (2010) claimed that low status of environmental awareness among farmers was caused by an insufficient level of knowledge. On the other hand some studies have obtained different results; according to Majewski and Perepeczko (2001) many farmers believed that the problems associated with the protection of the environment were crucial. From a study carried out by Wiater (2011) it appeared that surveyed customers knew that the waste water discharged directly into the environment was harmful. Nevertheless, some people were doing so. It was a clear discrepancy between a declared attitude and real behavior. Therefore, environmental education is of the utmost importance for the implementation of the principles of sustainable development (Wiater 2011).

Obtained results clearly indicate that organic farmers from Podlaskie voivodeship in Poland have greater ecological awareness and more pro environmental attitudes than conventional farmers from the same area. Very similar results have been obtained by Rembiałkowska (2013) in the Mazovian voivodeship.

Also Kings and Ilbery (2010) in England have found that 96% of organic farmers have conducted conservation work on their farms, while it was true for only 76% of conventional farmers.

#### 5. Conclusions

Organic farmers in Podlaskie voivodeship have mostly smaller farms and less favourable age structure, but a higher level of education than conventional farmers. Organic farmers represent a higher level of environmental awareness in relation to conventional farmers, but in both groups it is necessary to educate farmers in appropriate agricultural practices. Most conventional farmers are familiar with the basic principles of organic farming, however 25% of them have very small knowledge of this production system, what can be a reason for small interest in converting their farms into organic ones. It is necessary to educate all citizens in the Podlaskie voivodeship about the organic farming and its environmental benefits. Growing interest in organic food among the consumers would increase the sale of organic products and the income of the organic farms.

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