

DAIRY FARMERS' VIEWS ON ENVIRONMENT, RESULTS OF QUESTIONNAIRE SURVEY FROM REGIONS OF MAZOWSZE AND PODLASIE IN POLAND

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Abstract. Intensive agricultural production has a negative impact on the environment. Therefore, almost thirty years ago, as a part of the Common Agricultural Policy (CAP), the Agri-environmental schemes (AES) were implemented. Since the first introduction, AES have been reconstructed and their budget increased. Despite these changes, many studies still show the negative impact of agricultural practices on the environment as an unresolved problem. The main reason for this is the inefficient implementation of AES by farmers. The greater knowledge and ecological awareness among farmers may facilitate the policy development. This paper presents a view of dairy farmers towards environmental threats in Poland, in the region of Mazowsze and Podlasie. The survey was conducted in 2017, in 20 dairy farms participating in AES and in 22 farms non-participating in AES. The results present that 91 and 75 % non-AES and AES dairy farmers, respectively, declared the impact of own farm activity on the environment. However, a higher % of AES respondents stated that intensive agriculture has a negative impact on the environment. All risks to the environment were assessed as higher by AES farmers when compared to non-AES. For both groups of farmers the usage of high pesticide and fertilization doses has the most harmful effects on the environment. As much as 95 % of the respondents from AES and non-AES farms stated that application of financial incentives may encourage farmers to implement solutions improving the state of the environment. The need to raise ecological awareness was the second factor reported by them. The attitude of non-AES farmers towards environmental regulations has been less positive than of AES farmers. The similar % of respondents from both groups declared that it is important for them to manage farms without damaging the environment and to make a profit. The principal finding of our research shows that all the surveyed farmers were characterized by high environmental awareness.

Key words: dairy farms, environment, risk, survey.

Introduction

Expansion and intensification of agriculture are the most important drivers of biodiversity loss. Therefore, in 1992, the Agri-environment schemes (AES) were introduced into the Common Agricultural Policy (CAP). The aim of AES is to protect the environment in agricultural landscapes [1]. Since the first implementation of AES, the scope of applying friendly farming practices has increased, which resulted in the budget increase. The efficiency of AES schemes was assessed by many researchers and some of them claimed that effectiveness of AES is lower than planned [2;3]. Analysis of participation in AES in Europe has shown that personal factors were equally important to financial motivation [4]. Personal factors include values, attitudes, motivations and perceptions, and various social-psychological models and theories have been developed to explore and explain their influence on farmers' behaviour [5]. The lack of success of AES implementation has been explained by insufficient understanding of how farmers perceive AES and their individual reasons for and against participation [6]. As farmers are the key to effectiveness of AES implementation, better knowledge about their views on environmental values can be very helpful for policy makers to further improve AES. This attitude is based on the assumption that farmers are a very heterogeneous society, think differently and have various approaches towards AES, thus, they need to be addressed accordingly. Batary et al. [2] stated that schemes applied after 2007 were not more effective than those applied before 2007. AES were effective in both periods but there was no sign of progress in efficiency over time. The aim of this study was to evaluate dairy farmers' views on environment in the region of Mazowsze and Podlasie in Poland.

Material and methods

The geographic area investigated in this study was the region of Mazowsze and Podlasie. The studied area is a part of the Farm Accountancy Data Network (FADN) and includes four voivodships, namely: Mazowieckie, Podlaskie, Lubelskie and Łódzkie. At the time the survey was carried out, the share of farmers from this region, who applied for AES payments, amounted to 35 % of all applicants, and the requested amount represented 25 % of the national quota [7]. In the selected area the utilized

agricultural area (UAA) of the region represents 37.2 % of the country's UAA and 48 % of all cattle stocks [8]. The sample was constructed using the FADN database from the period of 2010-2015. The survey covered only dairy holdings, which were in the FADN system during the whole selected period. To be a dairy farmer (TF 5) based on EU standard classification of "Type of farming" (TF) [9] at least 66 % of farmer's standard output must come from milk production. The study was done for two groups of farms. The first one included farms taking part in AES and the second – not participating in AES (non-AES). In this study 60 dairy farms were chosen to contribute in the survey. 50 % of them were non-AES farms located as near as possible to AES farms. In order to gather information about the farmers' attitude towards environmental aspects, the authors developed a questionnaire. Then it was reviewed by social experts and agricultural advisors and next tested on a limited number of targeted farmers. Due to the fact that the sample comes from the FADN database, questions in the survey related to socio-demographic variable were omitted. It allowed to limit the number of questions and reduce the farmers' time dedicated to answering them. The survey consisted of five sections. The first four sections consisted of questions related to assessment of environmental awareness. The respondents were asked to answer "Yes", "No" or "I have no opinion". The last part of the survey included questions measuring the farmers' values related to environmental behaviour and attitude towards environmental regulations. The farmers stated their degree of agreement on a five-point Likert scale (1 = strongly disagree and 5 = strongly agree). The survey was conducted in 2017, in the region of Mazowsze and Podlasie, in dairy farms through a face-to-face interview performed by agricultural advisors. The interviewers explained the questions to the farmers and directly wrote down their responses, which minimalised the risk of misunderstanding the Likert scale or the questions. Data from the received questionnaires were manually introduced into the excel database. The obtained data were analysed using descriptive statistics (the means and standard deviations). This research was carried out as a part of a larger study for the Ministry of Agriculture and Rural Development.

Results and discussion

Representatives of the survey

In this survey, the participation rate was 67 % (20 completed questionnaires) and 73 % (22 completed questionnaires) for AES and non-AES dairy farms, respectively. Due to involvement of agricultural advisors from the Extension Services and the small sample of farms, the response rate was high. Schroeder et al. [6] obtained a similar response rate (73 %) for the sample of 44 holdings contacted via telephone. When the tested samples are larger and different distribution channels of surveys are used rather than the face-to-face interviews, the percentage of answers slower. Using the online survey platform, Hejnowicz et al. [10] received 29.9 % valid forms, whereas Woods et al. [11] – 36 %. In order to encourage respondents to participate in the survey some researchers offer them gifts [12;13].

Descriptive statistics

The descriptive statistics of the surveyed dairy holdings are presented in Table 1. All presented variables for non-AES dairy farms were higher compared to AES farms. In both types of farms the total assets were of high value. The average value of total assets of non-AES farms was by 6 % higher than of AES farms, but the index of assets' productivity measure as a ratio of total output to total assets of these farms was by 3 % higher. This shows that non-AES dairy farms were better managed. In Poland, after joining the European Union in 2004, there were substantial investments in dairy holdings due to necessary adjustments to market conditions.

Table 1

Descriptive statistics of sample dairy farms in 2015

No	General information	Type of farms	
		AES	Non AES
1	Number of farms (SYS03)	20	22
2	Economic size (SE005) (EUR)	42 717	47 345
3	UAA (SE 025) (ha)	33	36
4	Rented UAA (SE030) (ha)	10.9	15.3

Table 1 (continued)

No	General information	Type of farms	
		AES	Non AES
5	No animals per farm (LU)	34.1	38.6
6	Labour input (SE010) (AWU)	1.93	1.98
7	Total output ((SE131)(PLN)	161 476	215 437
8	Family farm income (SE 420) (PLN)	62 364	64 319
9	Machinery (SE 455)(PLN)	249 270	277 546
10	Total assets (SE 436)(PLN)	1 236 412	1 316 997

Notes: PLN – Polish currency, UAA – Utilised Agricultural Area, AWU – Annual Work Unit

Source: authors' calculations based on the FADN data

General perceptions towards the environment

91 % of non-AES farmers declared opinions on their impact on the environment (Table 2). The share of AES farmers, who confirmed this statement, amounted to 75 %. However, up to 20 % of AES dairy farmers did not have any opinion on this issue. The same percentage of respondents did not have an opinion about the negative impact of intensive agriculture on the environment (Table 3). But 80 % of AES farmers expressed an opinion that intensive agriculture is not good for the environment. The obtained results present that AES dairy farmers, compared with non-AES farmers, are more aware of the negative impact of intensive agriculture on the environment. Both AES and non-AES dairy farmers believe that the greatest risk to the environment is created by using high doses of fertilizers and plant protection products (Table 4).

Table 2

According to your opinion, do you have an impact on the environment?" (%)

Farm types	Yes	No	I have no opinion
AES Dairy	75	5	20
Non AES Dairy	91	9	0

Source: authors' calculations based on the survey

Table 3

According to your opinion, do you think that intensive agriculture has a negative impact on the environment? (%)

Farm types	Yes	No	I have no opinion
AES Dairy	80	0	20
Non AES Dairy	73	14	13

Source: authors' calculations based on the survey

Table 4

According to your opinion, what is the highest risk to the environment? (%)

Items	AES Dairy			Non AES Dairy		
	Yes	No	I have no opinion	Yes	No	I have no opinion
Intensification of crop production	45	35	20	41	14	45
High concentration of livestock	75	10	15	73	0	27
High fertilization doses	85	10	5	82	0	18
High pesticides doses	95	0	5	86	0	14
Soil erosion	55	25	20	45	14	41
Waste management	50	15	35	59	14	27
Decline of biodiversity	55	0	45	27	9	64
Emissions of pollutants to the atmosphere	75	5	20	73	5	23

Source: authors' calculations based on the survey

The further threats to the environment are high concentration of livestock and emissions of pollutants to atmosphere. Intensification of crop production is seen as a lower risk to environment. AES farmers valued the impact of all factors on environment slightly higher compared to non-AES respondents. Nevertheless, the performed survey showed that environmental awareness is high among both types of farmers. Somewhat surprising, however, are the low scores (41-45 %) of the danger resulting from the intensification of crop production, despite the fact that application of high fertilization doses was seen as the highest risk to environment (82-85 %). It can result from the fact that the research was carried out in dairy farms, which focus mainly on intensification of milk production. The improper waste management was one factor, the risk of which was valued higher by non-AEA than AES farmers. Also, in both farm groups large number of people did not have an opinion on this threat. The results of our studies are in line with the research results found by Mroczek et al. [14]. Concerning the measure to be taken to improve the state of environment, the application of financial incentives is the key for 95 % respondents in each group (Table 5).

Table 5

According to your opinion, what should be done to improve the state of the environment? (%)

Items	AES Dairy			Non AES Dairy		
	Yes	No	I have no opinion	Yes	No	I have no opinion
Raise ecological awareness	85	0	15	82	0	18
Apply financial incentives	95	5	0	95	5	0
Control and punish for environmental pollution	55	30	15	45	18	36

Source: authors' calculations based on the survey

The need of raising ecological awareness was important for 85 and 82 % of AES and non-AES respondents, respectively. Control and punishment for environmental pollution was not so important as the actions mentioned above. As much as 36 % of non-AES dairy farmers did not have an opinion on this topic. The same subject was evaluated by Mroczek et al. [14]. Their studies were performed on a sample of farms chosen from the Agency for Restructuring and Modernisation of Agriculture's database located in Podkarpackie voivodship in 2012. Despite the fact that the period between the two surveys was 5 years, the introduction of financial support was also the most frequently chosen answer. But control and punishment was the second one. The necessity of education on environmental threats was pointed out only by 4 % of AES farmers and 10 % of non-AES producers in Mroczek et. al [14] research. In our opinion the significant difference in the needs of raising the ecological awareness between both studies comes from sample selection. Our questionnaire survey was performed among dairy producers, who are the most progressive group of farmers in Poland.

General attitudes and values towards environment

The results of the survey confirmed the popular view that involvement in AES schemes has increased the labour input in a farm (Table 6). It is proved by the data presented in Table 1. Half of the interviewed AES farmers agreed that implementation of environmental regulations lowers the farm income and 72.8 % of non-AES farmers confirmed this statement. The view of these farmers is supported by the financial data shown in Table 1. Despite the fact that the total output of non-AES farms was higher by 33 % in relation to AES farms, the difference in family farm income was only 3 % in favour of non-AES holdings. It shows how big the influence of subsidies on family farm income is and confirms that payments in frame of environmental regulation are their key component. Our results confirm Hannley et al. [15] opinion that farming is perceived as a source of income through market opportunities, whereas AES as a regular revenue, is understood as a source of ecosystem services and an insignificant fund for further investment. The survey revealed a belief that environmental regulations are good for the future of agriculture, as expressed by 95.5 and 75 % of non-AES and AES respondents, respectively. Up to 25 % of the AES farmers did not have an opinion on this issue. Regarding the values related to environmental behaviour, the mean responses were higher for non-AES dairy farmers (Table 7). Further braking down the results shows that: for over 90 % of non-AES farmers it is important to manage farms without damaging the environment and to make a profit, which was confirmed also by 85 % of AES farmers. However, 90 % of AES

interviewees compared to 77 % of non-AES stated that is important for them that the soil quality does not deteriorate.

Table 6

Responses showing farmers' attitudes towards environmental regulations (%)

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean (StDev)
AES Dairy						
Environmental regulations increase the farmer's work input	0.0	5.0	10.0	65.0	20.0	4.00 (0.73)
Implementation of environmental regulations lowers farm income	0.0	15.0	35.0	45.0	5.0	3.40 (0.82)
Environmental regulations are good for the future of agriculture	0.0	0.0	25.0	55.0	20.0	3.95 (0.69)
Non AES Dairy						
Environmental regulations increase the farmer's work input	0.0	9.1	36.4	40.9	13.6	4.09 (0.73)
Implementation of environmental regulations lowers farm income	0.0	9.1	18.2	36.4	36.4	3.59 (0.83)
Environmental regulations are good for the future of agriculture	4.5	0.0	0.0	9.1	86.4	4.00 (0.95)

Source: authors' calculations based on the survey

Table 7

Responses showing farmers' values related to environmental behaviour (%)

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean (StDev)
AES Dairy						
It is important for me to manage a farm without damaging the environment and to make a profit	5.0	0.0	5.0	35.0	55.0	4.35 (0.99)
It is important for me that soil quality has not deteriorated	5.0	0.0	5.0	15.0	75.0	4.55 (1.00)
Non AES Dairy						
It is important for me to manage a farm without damaging the environment and to make a profit	4.5	4.5	0.0	4.5	86.4	4.73 (0.86)
It is important for me that soil quality has not deteriorated	9.1	9.1	4.5	68.2	9.1	4.64 (1.02)

Source: authors' calculations based on the survey

Conclusions

1. The study increased our understanding of dairy farmers' environmental awareness and how these views may be related to changes in agricultural practices.

2. All surveyed farmers were characterized by high environmental awareness. This may result from the selection of a target sample based on the FADN database. It is assumed that the farmers, who participate in this system, have greater knowledge about agricultural production. Moreover, dairy farmers represent the most progressive producers within Polish agriculture.
3. There were no major differences between AES and non-AES respondents in the perception of environmental risks. The obtained results do not confirm the generally established view that farmers participating in AES are more aware of environmental threats because they complied with AES regulations.
4. This study indicates that above 80 % of the surveyed farmers from both groups are increasingly interested in raising their ecological awareness in order to improve the state of environment.
5. Strengthening the ecological culture among farmers is one of the necessary conditions for building sustainable rural development. The role of the AES schemes in nature conservation will grow along with the inputs for their realization, therefore, their implementation has key importance for social reasons.
6. The research presented in this paper makes a contribution to the existing literature on the development of AES schemes

Acknowledgements

The studies have been supported by the project “New Strategies on Bioeconomy in Poland”, which has received funding from the European Union programme HORIZON 2020, call: H2020 WIDESPREAD-2014-2, topic: WIDESPREAD-2014-2 ERA Chairs under grant agreement No 669062.

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