

Understanding animal welfare by students and graduates of different studies

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Abstract. Animal welfare is one of the key elements of contemporary approach to animal production. Social consciousness of animal welfare concerns first of all persons responsible for practical implementation of individual solutions for animal welfare improvement. But what about other group of peoples and their relation to animal welfare? The aim of the paper was to analyze some aspects of animal welfare assessment including opinions given by young Polish citizens. The idea of the paper was to investigate, how kind of higher education represented by citizens show effect on understanding of animal welfare problems. The scope of the paper included survey, where 165 graduates of different studies (humanities, polytechnic, medical, economic, art and life sciences studies) had the possibility to present and assess their knowledge on animal welfare. In one of the questions, interpreting an ideal farm with animal production, most respondents, regardless of the field of study, pointed to the key role of maintaining the highest standards determining the welfare and comfort of livestock.

Key words: assessment, cattle, graduate, respondent, survey, welfare.

INTRODUCTION

The pursuit of profit maximization did not bypass farms associated with the production of livestock. The term maximizing profits for many people has negative associations, such as animal suffering, ruthless exploitation and poor living conditions. To measure the quality of livestock life, the term ‘animal welfare’ was introduced. According to the OIE (World Organization for Animal Health) definition given in introduction to the recommendations for animal welfare, animal welfare means the physical and mental state of an animal in relation to the conditions in which it lives and dies (Terrestrial Animal Health Code, 2010). Animal welfare includes a number of requirements that breeders should meet. Maintaining welfare at a high level translates into measurable benefits in the form of larger and more qualitative production as well as ensuring peace and safety in the herd.

Contemporary trends in scientific research in the area of animal production are moving in many directions, among which a special place is occupied by the pursuit of an increasingly better understanding of animal welfare problems, including livestock. Animal welfare thus becomes a key element in the sustainable development of agricultural production and its individual sectors (von Keyserlingk et al., 2009). In the

sustainable development of dairy farms, along with animal health, welfare will be the main factor in increasing cow productivity and milk production efficiency over the next few decades (Britt et al., 2018).

In the context of the quality of the broadly understood food production chain, the issue of animal welfare generates an approach considered from various points of view, including the level of farm production as well as consumers (Blokhus et al., 2003). Each approach to the concept of animal welfare is distinguished by specific features, among which a special place is occupied by the environment and the surrounding conditions included in many definitions regarding animal welfare.

According to Hughes (1976), welfare is defined as a state of physical and mental health in which animals are in full harmony with the environment in which they live and at the same time develop. The considerations made by Broom (1993) confirming the importance of linking animals with the surrounding environment have indicated the interdisciplinary nature of research in the field of welfare, taking into account animal sciences and ethics in farm production. Jensen & Sandøe (1997) emphasized that welfare can also refer to satisfying animal preferences with the increasing level of animal welfare.

In practice, animal welfare is considered at farm level. And it is fully justified. On the farm, the conditions that determine the comfort and well-being of animals are shaped. However, consumers' awareness of animal welfare also seems important. Consumers are recipients of agricultural products, hence they can decide on shaping the food market through their conscious preferences resulting indirectly from knowledge about animal maintenance and welfare (Gołębiewska et al., 2018).

The aim of the investigation was to compare the knowledge of students or graduates representing various kind of study in the field of animal welfare and dairy production. The undertaken aim of the study can be considered in line with the trend of linking education and educational programs with the implementation of broadly understood progress in dairy production (Chase et al., 2006).

MATERIALS AND METHODS

Conducting detailed research in the field of animal welfare knowledge required the appropriate design of research activities. In general, research design takes into account the selection of a specific approach from qualitative, quantitative and mixed methods (Creswell, 2013), which facilitates later interpretation of the results, and in the case of own research considered – results obtained on the basis of a survey. Consumer surveys are among the more and more common methods of assessing the links between the agricultural production area and the recipients on the market of plant and animal products.

Detailed information on the methodical approach to the undertaken research is as follows:

- An electronic survey was used. The respondent completed the questionnaire on his/her own after entering the appropriate link to the website in the advertisement.
- The survey was anonymous and contained 20 questions.
- 165 students or university graduates took part in the survey. Most of them, i.e. 140 respondents, were young people (18–25 years old).

- Users posted on social networks voluntarily responded, provided that only university students or graduates respond.

- Data taken into account in the study were collected from 12/04/2019 to 11/05/2019.

Group of 165 people (most were women) took part in the survey. Among the respondents, six groups representing the following fields of study were distinguished:

- Humanities studies – 16 people (9.70%),
- Polytechnic studies – 18 people (10.91%),
- Medical studies – 15 people (9.09%),
- Economic studies – 22 people (13.33%),
- Art studies – 5 people (3.03%),
- Life sciences studies – 89 people (53.94%).

The most popular field of study among the respondents were life sciences studies with the following specializations: Agronomy and Agribusiness, Animal Behavior, Food Safety, Animal Bioengineering, Biology, Biotechnology, Biotechnology in breeding and animal health protection, Agricultural chemistry, Ecology, Breeding and protection of accompanying and wild animals, Ecological Engineering, Production Engineering, Forestry, Microbiology, Environmental Protection, Horticulture, Agriculture, Food Technology, Technologies in Environmental Protection, Commodity Science in the Bioeconomy, Veterinary Medicine, Zootechnics, Human Nutrition and Food Evaluation.

The age diversity of the respondents was as follows:

- 18–25 years – 140 people (84.85%),
- 26–35 years – 25 people (15.15%).

The two most numerous (out of four distinguished) groups of people participating in the survey lived in the countryside and in cities of over 100,000 residents.

Participants were recruited online from Poland. The survey was conducted on a group of young people living in the Masovian region. Data were collected via an online platform. Participants, before answering the study question, were first asked several multiple-choice demographic questions. The survey was completely anonymous.

The survey completed by respondents included in total 20 questions directly or indirectly related to the welfare of livestock, mainly dairy cattle. For individual questions, the survey included response options to choose from, in order to facilitate not only answering, but also in the next stage to develop research results. Depending on the detailed scope of the questions formulated, several groups of answers were distinguished. One group included ‘yes’, ‘no’ and ‘I have no opinion / I don’t know’ answers. Another group of answers included the following gradation of ‘yes’, ‘rather yes’, ‘rather not’ and ‘no’. For some questions, the answers proposed included more specific response options, as appropriate. Of the total of 20 questions, only a part of the questions and the results – the answers are presented in this article.

The condition of proceeding to complete the survey was confirmation by the potential respondent that he / she had or has contact with a farm, in particular keeping dairy cattle. This information was taken into account at the preparation stage for completing the survey. People who had not previously visited the farm or farms did not participate in the survey.

The proposed approach to surveys was an alternative solution to the research presented in the literature within the research group. In studies conducted by Cardoso

(2016), people who had never been associated with the dairy industry before were selected for the survey on some aspects of dairy production.

Survey results have been developed using descriptive statistics. The differences between the research results for the considered groups of students / graduates for individual questions were analyzed by ANOVA. Results – answers within individual questions have been properly prepared for ANOVA analysis. The Statistica v.13 software (StatSoft Polska, Cracow, Poland) was used for the analysis. Significance was declared at $\alpha = 0.05$.

RESULTS AND DISCUSSION

The first question concerned general knowledge about welfare was worded as follows: ‘What do you think animal welfare is about?’ For this question, four answer options were considered: ‘On the satisfaction of the biological needs of animals’, ‘On the satisfaction of the emotional needs of animals’, ‘On the satisfaction of the biological and emotional needs of animals’ and ‘I do not know’. Only one answer could be chosen. Only one person (representing polytechnic studies) replied that he did not know what animal welfare is. Most, i.e. 92.7% of respondents answered that animal welfare is about meeting the biological and emotional needs of animals. No respondent indicated that animal welfare is about meeting their emotional needs. Comparison of the number of responses indicated by the respondents in the case of the four considered answer options showed their significant statistical differentiation (at $F = 4.3795$ the p value was 0.0159).

In a more detailed question, respondents were asked to assess their own knowledge of animal welfare, taking into account four response options, ranging from specialist knowledge to the statement ‘I have never heard of animal welfare’. Among graduates or people studying at life sciences universities, answers confirming possession of specialist and good knowledge about animal welfare dominated (66.3%). In the group of people from other types of universities, the majority of respondents (from 60 to 94% for individual types of universities) indicated an average level of their own knowledge about the welfare of farm animals. The results of this survey show the current state of knowledge about animal welfare. The results of the one-way analysis of variance did not show a significant differentiation (with $F = 1.8749$, the p -value was 0.1664) between the response options regarding the assessment of the respondents’ own knowledge about livestock welfare. Even more interesting, however, is how this knowledge changes. In the studies of Ventura et al. (2016) an approach consisting in assessing the change in respondents’ knowledge about dairy production before and after the visit to the dairy farm was presented. This knowledge was assessed on the basis of answers to questions about various activities undertaken in the barn.

Then it was asked whether, in the respondents’ opinion, the required level of animal welfare in Poland was maintained. In the groups of respondents from polytechnic and life sciences universities, the distribution of answers was similar. Most people (around 90%) were not fully resolved and answered ‘rather yes’ and ‘rather not’ as to whether the required level of animal welfare in Poland was maintained. More pessimistic opinions on the presented issue were expressed by students and graduates of humanities and medical universities. The number of ‘rather not’ and ‘no’ answers covered 63–73% of all answers from these universities. On the other hand, people associated with economic and artistic studies spoke most negatively about maintaining the required level

of animal welfare in Poland. In this case, the answers ‘rather not’ and ‘no’ constituted 90% and 100% respectively. Only 5 respondents from art universities took part in the study, therefore the obtained test result (100% negative answers) would require verification on a larger population of people with artistic education. The results of one-way analysis of variance did not show a significant differentiation (with $F = 2.2124$, the p -value was 0.1182) between response options regarding the assessment - in the respondents’ opinion - of maintaining the required level of animal welfare in Poland.

In the next question, respondents generally agreed that the law should extend strict regulations on the welfare of livestock. The results of the survey presented in Fig. 1 indicate a rigorous approach of the respondents to the systematic extension of regulations regarding the welfare of livestock. In the case of each group of students / graduates of the included fields of study, the acceptance for extending the assessed regulations was about 80%, and in the case of artistic studies even 100%.

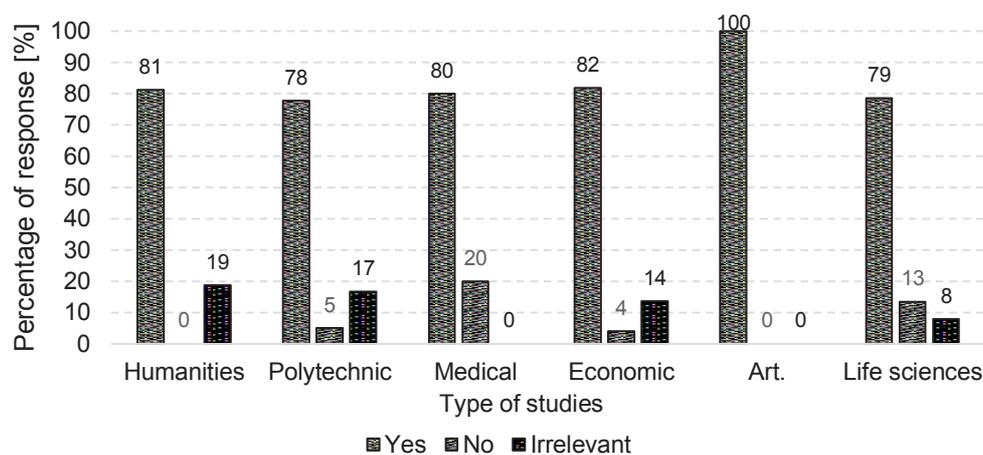


Figure 1. Percentage distribution of answers to the question: Should the law extend strict regulations regarding the welfare of livestock?

The questionnaire also asked respondents the following question: What in your opinion can contribute to improving the welfare of farm animals? This question included the possibility of providing several answers (maximum three answers) from the following suggestions:

- higher qualifications / training of owners of farms with animal production,
- additional subsidies from the European Union,
- introduce stricter animal protection rules,
- increased controls on state inspections and animal recipients.

The distribution of answers to the question ‘What in your opinion can contribute to improving the welfare of farm animals?’ is presented in Table 1.

The calculated average values of the percentage share of the considered response options (Table 1) indicated that respondents assessed the significance of three factors that could improve the welfare of livestock animals to a similar percentage. In the respondents’ opinion, additional subsidies from the European Union may have the least impact on the improvement of animal welfare. On the other hand, analysis of variance

did not show a significant differentiation ($p > 0.05$) between the number of responses given by individual respondents to the given issues.

Table 1. Percentage share of each option to answer the question: What in your opinion can contribute to improving the welfare of farm animals?

Answer option	Studies						Av
	Huma- nities	Poly- technic	Medical	Econo- mic	Art	Life sciences	
Higher qualifications / training of owners of farms with animal production	20.9	32.6	23.3	28.3	25.0	30.6	26.8
Additional subsidies from the European Union	18.6	14.0	14.0	20.8	18.8	16.4	17.1
Introduce stricter animal protection rules	27.9	23.2	30.1	26.4	31.2	24.6	27.2
Increased controls on state inspections and animal recipients	32.6	30.2	32.6	24.5	25.0	28.4	28.9

Abbreviation: Av – Average value.

Taking into account the consumer aspect in the survey, respondents were asked whether, in their opinion, the state of health and comfort of cattle have an impact on the quality of animal products, including milk and meat. In all fields of study, answers dominating that the state of health and comfort of cattle are of key importance for the quality of animal products. The average percentage share of answers confirming the assessed issue for the full population of respondents was 71%, the most in the group of people from artistic studies (80%) and the least from polytechnic and medical studies (67%). Only three persons out of 165 persons participating in the study stated that the health and comfort of cattle are not important for the quality of milk, meat and other animal products. The one-way analysis of variance did not show a significant differentiation (for $F = 2.9392$ the p -value was 0.0837) between the number of responses ‘are of key importance’, ‘have some impact’ and ‘it does not matter’.

One of the questions concerned the issue of modernity in animal production and animal welfare. It was asked whether, according to respondents, the use of modern technology on a farm may affect the welfare of livestock. A significant proportion of respondents (on average 83% of the entire respondent population) confirmed that the level of mechanization in animal production can affect animal welfare. On average, 5% of respondents said that mechanization is not important when assessing animal welfare. The remaining respondents, most in the group of people associated with humanities and medical studies, had no opinion on the issue under consideration. A one-way analysis of variance did not show a significant differentiation (for $F = 3.2372$, p value was 0.0678) between the number of responses confirming and denying the impact of mechanization on animal welfare. Modernization of agriculture and the associated introduction of increasingly higher mechanization of technological processes, including those related to dairy production is a response to the processes of urbanization and globalization (Britt et al., 2018). It therefore seems justified to raise the problem of how the introduction of more modern animal production technologies and their automation affect animal welfare. This is even more important because at the same time the importance of technical and technological modernization of dairy farms and its impact on the possible

reduction of costs of obtaining dairy products for the needs of consumers in urban areas is emphasized (Nicholson et al., 2011).

The purpose of one of the questions in the survey was to assess the sensitivity of respondents to the problems of animals kept on the farm. The following question was raised: In your opinion, is it acceptable for cows or calves to suffer prolonged pain and suffering in the milk production process on the farm? The percentage distribution of answers to this question is presented in Fig. 2.

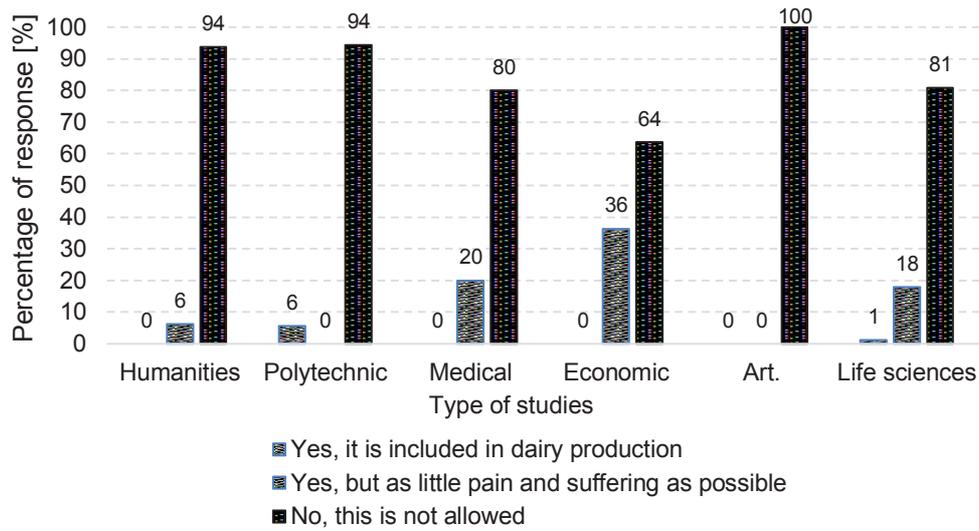


Figure 2. Percentage distribution of answers to the question: In your opinion, is it acceptable for cows or calves to suffer prolonged pain and suffering in the milk production process on the farm?

The percentage distribution of responses shows (Fig. 2) that among respondents representing individual fields of study, opinions prevailed that animals were not allowed to experience pain and suffering. Depending on the field of study, between 64 and 100% of respondents showed sensitivity to the pain and suffering of livestock, considering them unacceptable. The most sensitive to the pain and suffering of farm animals were those associated with artistic studies. The survey was completed by only 5 people from artistic studies, which is why this part of observation would certainly require confirmation in additional research. At the same time, it is worth paying attention to a similar distribution of answers in the case of respondents from medical and life sciences. Definitely the most opinions (36%) authorizing even minimal pain and suffering of cattle were expressed by people associated with economic studies (Fig. 2). One-way analysis of variance showed a significant differentiation (for $F = 3.8505$ p value was 0.0447) between the number of responses to the highlighted issues related to the nature of animal pain and suffering in dairy production. Questions about the pain and suffering of livestock are often associated with stress, which is one of the determinants of welfare assessment (von Keyserlingk & Weary, 2017). Therefore, in future surveys, it will be worthwhile to address the issues of stress and factors affecting animal stress.

The next question in the survey referred to the previously discussed issue of animal pain and suffering. The question addressed to the respondents was: Do you think that

interference with the animal's body (e.g. putting on an ear tag, chip under the skin, etc.) reduces its welfare? In the case of such a question, the following answer options were considered: 'Yes, always', 'Yes, but not always, depends on the nature of the interference', 'Does not reduce', 'It's difficult to say'.

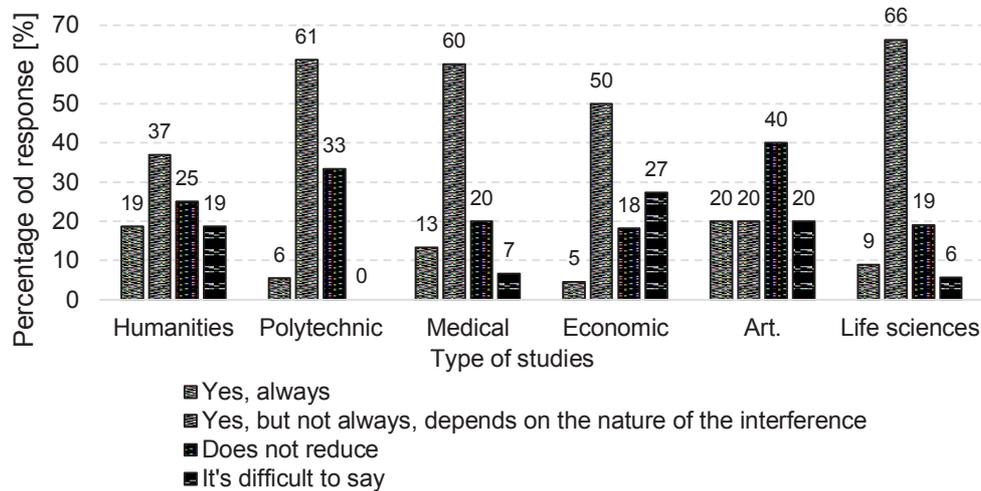


Figure 3. Percentage distribution of answers to the question: Do you think that interference with the animal's body (e.g. putting on an ear tag, chip under the skin, etc.) reduces its welfare?

Comparison of the percentage distribution of answers presented in Fig. 3 shows that the respondents are dominated by the opinion (on average 49% for the total population) that it is not always possible, but according to the specificity of production needs, to interfere with the animal's body. One-way analysis of variance showed no significant differentiation (for $F = 1.9654$ the p -value was 0.1517) between the number of responses to individual issues – opinions on interference with the animal's body. Questions about pain, suffering and interference in the animal's body become particularly important in the situation of improving dairy cattle production technology, especially when the animals are exposed to many different sources of stress (Herbut et al., 2019). In many discussions, animal pain and suffering are confronted with solutions that can benefit the farmer. Exemplary studies in large herds of dairy cattle did not give an unequivocal answer as to whether docking tails guarantees the expected benefits, i.e. greater cleanliness of cows and less udder health problems (Schreiner & Ruegg, 2002). On the other hand, the issue of the impact of tail docking on the welfare of dairy cattle is raised (von Keyserlingk et al., 2009), and in particular the possibility of chronic pain in animals undergoing tail docking (Eicher et al., 2006). The problem of pain and suffering is also raised in the case of dehorning of calves and related methods of dealing with varying degrees of pain perception by young animals (Stafford & Mellor, 2005). Examples of activities that lead dairy cattle to animal pain and suffering point to the need to develop a public debate on animal welfare. The conclusions of this debate, taking into account the results of surveys and consumer opinions, could contribute to a balanced approach to improving animal production technology.

The interference in the animal body raises issues of ethics in animal production. This problem was addressed in the next question in the survey, which was worded as follows: Does ethics apply to dairy production and keeping dairy cows on the farm?

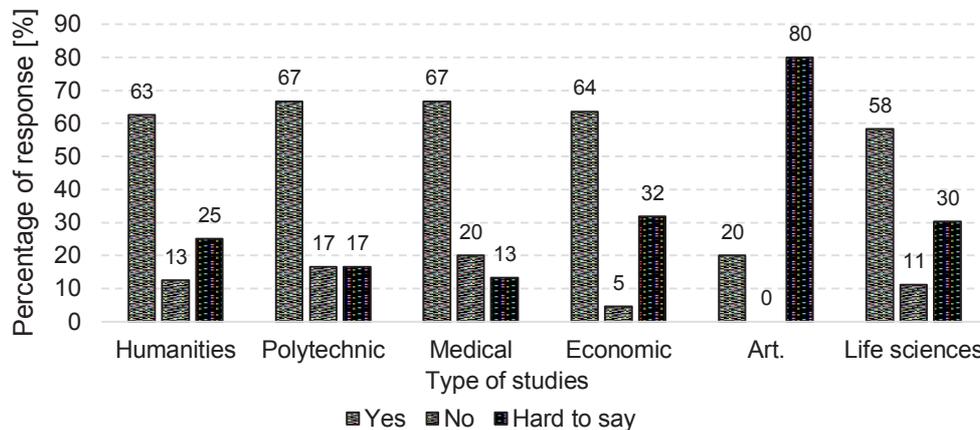


Figure 4. Percentage distribution of answers to the question: Does ethics apply to dairy production and keeping dairy cows on the farm?

Students and graduates of almost all fields of study predominantly indicated that the principles of ethics apply to dairy production on the farm. Only respondents representing art studies did not have a clear opinion on the issue in question (Fig. 4). In studies carried out by Cardoso et al. (2016), respondents, considering the importance of ethical aspects related to animal handling, indicated that acceptance of milk production in ethical terms is possible when animals are properly treated. According to Gaworski (2006), ethics refers to the entire food chain and its transformations, hence the survey questions on ethics can be extended to other stages related to food production.

The last of the presented issues was formulated in the survey as follows: ‘An ideal farm with animal production’ is in your opinion a farm that puts priority as following ... The possible answers suggested in this case included such options as:

- maximizing production income,
- minimizing financial outlays and labour outlays on production,
- maintaining the highest standards of comfort and welfare of livestock,
- protection of the natural environment related to the use of animal wastes.

The results of the survey covering the opinion of respondents on the ideal farm with animal production indicate the key importance attached to maintaining the highest standards of comfort and animal welfare. On average, in the entire population of people completing the survey, 82% of respondents indicated this approach (Table 2), taking into account the range from 67% (people associated with polytechnic studies) to 100% (people associated with medical studies). Other options for answering the image and interpretation of an ideal farm with animal production have received relatively little confirmation of significance among the respondents participating in the survey. One-way analysis of variance showed a significant differentiation (for $F = 4.1862$ p value was 0.0188) between the number of responses under individual options related to the interpretation of the concept of an ideal farm with animal production.

Table 2. Percentage share of each option to answer the problem: ‘An ideal farm with animal production’ is in your opinion a farm that puts priority as following ...

Answer Option	Studies						Av
	Huma- nities	Poly- technic	Medical	Econo- mic	Art	Life sciences	
Maximizing production income	12.5	11.1	0.0	0.0	0.0	3.4	4.6
Minimizing financial outlays and labour outlays on production	0.0	5.5	0.0	9.1	20.0	3.4	6.3
Maintaining the highest standards of comfort and welfare of livestock	87.5	66.7	100.0	81.8	80.0	78.6	82.4
Protection of the natural environment related to the use of animal waste	0.0	16.7	0.0	9.1	0.0	14.6	6.7

Abbreviation: Av – Average value.

In the survey conducted by Cardoso et al. (2016), the respondents were asked to freely express their opinion on the ideal farm, which allowed to obtain descriptive information subject to discussion and comparison with the opinions presented in other papers. However, our approach to interpreting the concept of ‘ideal farm’ was slightly different from the approach presented in the literature. First of all, the term ‘ideal farm’ has been narrowed down to the term ‘ideal farm with animal production’. This, in our opinion, facilitated the approach to gathering the respondents’ opinions based on the selection from the suggested answers.

The method and scope of formulated response options constitute an individual proposal within the given research. However, it seems to be more important that respondents’ preferences for specific responses can be compared numerically or by percentage. Such a numerical (percentage) comparison of the results of own research among the available response options showed the leading importance of maintaining the highest standards of comfort and animal welfare in the context of the interpretation of ‘ideal farm with animal production’. Such indications of respondents are consistent with the results of surveys obtained by Cardoso et al. (2016), in which the majority of respondents (90%) pointed to animals and their needs as the dominant elements in the interpretation of the concept of an ideal dairy farm. Quality of treatment given to animals was a priority concern for people completing the survey. The role of sustainable development and the needs of animals in shaping the future model of farms was also indicated by the respondents in the survey conducted by Boogaard et al. (2008).

The question about ‘an ideal farm with animal production’ is a premise to develop a wide spectrum of research. The term ‘ideal’ can be applied to many farm activities. For example, on a dairy farm it would be a precise selection of a milking installation for the size of a dairy cow herd (Gaworski et al., 2018), creation of ideal working conditions in a milking parlour (Papez & Kic, 2015), selection of ideal bedding materials in the lying area of the barn (Leso et al., 2019) as well as use of litter that has always played a fundamental role on the physical wellbeing of the animals (Bambi et al. 2018). Opinions on the ideal dairy farm can be gathered both among external respondents and farmers

themselves. A comparison of these opinions could be a valuable contribution to the discussion on the farm development vision.

CONCLUSIONS

The survey showed that the majority of young respondents, regardless of the type of study, interpret animal welfare as meeting their biological and emotional needs. In this way, respondents demonstrated a mature approach to assessing the needs of livestock, which is not only about providing feed needs, but also about the ability to express natural behaviour and comfort.

Answering the question about the factors that could increase the welfare of livestock, young respondents primarily pointed to the knowledge, training and qualifications of farm owners, as well as the control of animal herds by the relevant inspection services. Thus, students and graduates of universities confirmed the importance of acquiring knowledge and its practical application, as well as the role of an efficient system for controlling agricultural activity, which translates into food production safety.

Students and graduates of all fields of study unanimously confirm the opinion regarding the interpretation of an ideal farm with animal production. They pointed to the key role of maintaining the comfort and welfare of animals, which in their opinion are more important than economic and labour-related aspects.

ACKNOWLEDGEMENTS. We would like to give our thanks all persons, who decided to take part in the survey investigation.

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