Review

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Review

Ethical Dilemmas of the Relationship Between Sustainable Agriculture and the Environment: Challenges and Solutions—Review

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Abstract

Home Agriculture, a key pillar of human existence, faces fundamental ethical challenges. The authors of this article thought about these dilemmas and set a research goal - to examine the current state and possible solutions, with the goal of estimating the possible future development of agricultural ethics. Authors, after conducting research and qualitative analysis of expert sources relevant to the topic, reflect on the links between our decisions, agriculture and the state of the environment. The qualitative analysis conducted shows that the anthropocentric strand focuses on human needs and places them at the center of ethical considerations and that this approach can be perceived as outdated from an ethical perspective today. Science, on the other hand, can also provide knowledge to improve agricultural production and provide food for the growing human population. Environmental protection must be seen as a moral obligation for humans.

Keywords: agricultural ethics; sustainable development; ecology; biodiversity; environmental education; environmental law

1. Introduction

Humanity today faces a difficult dilemma. On the one hand, there is the necessity to feed the ever-growing human population, on the other hand, there is the necessity and moral obligation to preserve sufficient resources and a quality environment for future generations (Miftari, 2020). Today, there is also no doubt that a number of serious environmental global problems are the result of negative human activity (Basheer et al., 2024). Some authors even refer to this situation as an environmental and ecological crisis (de Campos Mello, 2000). This is not just a confusion of these concepts, which are largely intertwined in the works of some authors, but precisely phenomena such as the loss of biodiversity, which are a clear sign of the ecological crisis (Hamblin, 2022). As can already be seen from the above, this issue is associated with several ethical dilemmas, which, when understood and accepted, can lead to a significant shift in the relationship between humanity and nature, while maintaining the necessary level of agricultural production. The history of ethical dilemmas goes back to ancient times, when humans began to grow crops and raise animals (Thompson, 1988). Agriculture served as a key means of livelihood and cooperation in communities (Ikerd, 2016). With the development of modern society, new issues of fair distribution of resources and environmental protection have emerged. And this relationship and the ethical issues associated with it evolve and change over time (Croydon, 2022). The authors of this paper thought about the ethical problems in the relationship between agriculture and the environment and set the following research goal: *To identify the main ethical dilemmas in the relationship between humans, agriculture and the environment*. Since this is a purely theoretical topic, qualitative analysis of professional texts from the respected Web of Science, Scopus and Open Access databases was chosen as the main research method, where an extensive search of relevant sources was carried out (Jabbour et al., 2013). To

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achieve the research objective, the authors asked themselves the following research questions: *1. What is the impact of globalization on agricultural ethics? 2. What are the ethical specifics associated with the introduction of technologies into agriculture? 3. What are the ethical challenges associated with biotechnologies and genetic modification? 4. What environmental impacts can agricultural production have? 5. What are the ethical dilemmas associated with the status of animals? 6. What is the possible impact of environmental education?* Based on the research conducted, the qualitative analysis conducted and the answers to the research questions, the research goal was achieved, and the authors mapped the main ethical dilemmas associated with the relationship between humans, agriculture and the environment. For a clear and logical presentation of the achieved results, the theoretical part of the manuscript is divided into basic theoretical blocks, some of which contain several additional thematic subsections.

2. Materials and Methods

The basic scientific method of this thesis is theoretical research and qualitative analysis of theoretical sources (Harman, 2018). This research and subsequent qualitative analysis involve searching for relevant sources in representative databases such as Web of Science, Scopus and Open Access, studying them, then comparing, selecting and applying the ideas studied (Bailey and Shingruf, 2024). Considering the theoretical ethical-philosophical focus of the publication, the authors of the thesis chose an outline divided into logical chapters and subchapters. This style of presentation is appropriate in the philosophical disciplines of Environmental Philosophy and Environmental Ethics (Lang, 1988). This theoretical literary form allows for the presentation of the author's subjective thoughts, unlike in the sciences.

3. Results

This chapter presents the results of a qualitative analysis of relevant scientific sources and is divided into individual subchapters, according to the researched topic.

3.1.. History of Ethical Dilemmas in Agriculture

The history of ethical dilemmas goes back to ancient times, when humans began to grow crops and raise animals (Rolph, 1998). Agriculture served as a key means of livelihood and cooperation in communities. With the development of modern society, new issues of fair distribution of resources and environmental protection have emerged. In the 20th century, agricultural production experienced significant industrialization, leading to higher food production. But this process has also brought new ethical challenges, such as the use of pesticides and artificial fertilizers, or the impact on biodiversity (Finger et al., 2024). Industrialization has also raised debates about the working conditions of farm workers. In recent decades, new dilemmas have emerged related to genetic modification and biotechnology (Byalebeka and Serugo, 2024). These technologies offer new opportunities but also raise questions about natural principles and food safety. History suggests that every technological advance brings new ethical challenges that require careful consideration and debate.

3.2. The Current State of Agriculture and Ethical Challenges

Today's agriculture faces many ethical challenges linked to the growing demand for food. Farmers seeking to maximize yields face pressure to use land and water sustainably (Zhang and Li, 2024). This is essential for the long-term survival of human populations. This pressure leads to increased questions about sustainability and efficiency, which requires new strategies and technologies. At the same time, there are significant concerns about unethical practices in livestock production. Intensive farming emphasizes profit at the expense of animal welfare (Rosset, 1997). Ethical issues include animal transport, housing and slaughter practices. The public debate on these issues is growing, requiring greater transparency and changes in the approach to animal husbandry. Farmers also face financial pressures that can lead to unsustainable practices (Pirmoradi and Rostami,

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1922). Small farms often find it difficult to compete with large agricultural corporations, which raise issues of fair access to resources. Support for small farmers is key to sustainable agriculture and requires a comprehensive approach with ethical considerations and innovative solutions.

3.3. The Impact of Globalization on Agricultural Ethics

Globalization is having a significant impact on agriculture, raising new ethical questions. Globalization has increased the ability to export and import agricultural products to world markets (Sannsika et al., 2023). This may improve food availability, but it also threatens local farmers who cannot compete with cheaper foreign products. Economic flows caused by globalization often lead to downward pressure on costs, which have negative effects on working conditions. Agricultural workers in developing countries can be subjected to low wages and unsafe conditions (Azaz, 2018). Ethical issues in this context concern justice, human rights and the protection of labor standards. Globalization is also contributing to the spread of intensive agricultural practices around the world. This can lead to environmental problems such as deforestation and biodiversity loss. These problems require global cooperation and ethical assessment of agricultural practices to ensure sustainability and equity in agriculture at a global level (Vartak and Somwanshi, 2024).

3.4. The Use of Technology in Agriculture: Ethical Issues

Technology brings many benefits to modern agriculture, but it also raises ethical questions. Automation and precision farming can make production more efficient and reduce costs. However, the transition to technologically advanced methods may lead to further job losses in the agricultural sector. The use of technology has implications for data privacy and security. Collecting data on agricultural processes, land and yields can be very sensitive. It is important to consider who has access to this information and how it is used (Dara and Kaur, 2022). Ethical issues relate to privacy and transparency in the management of this data. Technology also affects access to information and knowledge. Rapid technological advances can lead to a divide between farmers with access to modern tools and those without (Dons, 2013). This gap can exacerbate inequalities in the agricultural sector. It is therefore essential to promote training and access to technology for all farmers to maintain equity.

3.5. Biotechnology and Genetic Modification

Biotechnology and genetic modification open up new possibilities for agricultural production (Cano Estrada, 2017). Genetically modified organisms (GMOs) can increase crop yields and resistance to pests and diseases (Swaminathan, 1999). However, with these technologies come ethical issues that require careful consideration. One of the main concerns is the impact of GMOs on the environment and biodiversity. Critics argue that GM crops can threaten natural ecosystems and lead to a decline in species diversity. Careful testing and monitoring of the impact of these technologies on nature is essential. Ethical issues include property rights in genetically modified organisms. Some corporations patent genetic modifications, which may limit access to these technologies for smaller farmers. The debate focuses on fair distribution of benefits and access to genetic innovations to avoid monopolization in favor of large companies (Susanti, 2025).

3.6. Environmental Impacts of Agriculture

Biodiversity is a key aspect of a healthy ecosystem, but agriculture can threaten it (Kumar, 2024). Monoculture cultivation and intensive use of pesticides reduce species diversity, upsetting the natural balance. This leads to several ecological problems that require our attention. To protect biodiversity, it is essential to implement sustainable agricultural practices (Kreisberg, 2006). This includes crop rotation, integrated pest management and the promotion of landscape features such as borders and coppice. These approaches create an environment where different species can coexist and thrive without threat. Consumers can have a positive impact on biodiversity conservation by

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choosing products from sustainable sources (Scarpa et al., 2003). Buying organic food that uses sustainable farming methods supports farmers seeking to minimize ecological damage.

Sustainable soil management is key to maintaining soil fertility and health (Dosso et al., 2024). Intensive agricultural practices, such as the overuse of chemical fertilizers and pesticides, lead to soil degradation. In this way, its ability to support life and food production is lost. A shift to sustainable farming methods is necessary to ensure long-term soil fertility (Debie, 2024). These include organic farming, which favors natural fertilizers, crop rotation and cover crops. These methods help to improve soil structure, increase water retention capacity and promote biological activity (Lípa et al., 2024). In this context, the role of consumers, who could choose products from sustainable sources, is also important. Supporting local farmers using sustainable farming techniques can help to protect the soil. (Pilar, 2024).

3.7. Working Conditions in Agriculture

Fair Trade is an initiative aimed at improving the working conditions of farmers in developing countries (Canning, 2023). Through this certification, farmers receive fair remuneration for their work, which promotes decent working conditions and sustainable agricultural practices. This ensures that farmers can exist in an environment that respects their rights and contributes to their development. Choosing Fair Trade certified products has a direct impact on the livelihoods of farmers and their communities. With the income from these products, farmers can invest in education, healthcare and infrastructure, improving their overall quality of life. The system also contributes to environmental protection through the environmentally friendly farming practices that are encouraged under Fair Trade (Ngcwangu, 2021). It is important for you as a consumer to be aware of how your purchasing decisions are influenced by global markets. By supporting Fair Trade products, you are helping to create a fairer and more sustainable agricultural system (Murray and Raynolds, 2006). Every purchase is a step towards change that can have far-reaching positive consequences for farmers and their families around the world.

3.8. Animal Rights in Agriculture

Intensive animal husbandry focuses on maximizing production at the lowest cost, often leading to crowded conditions. Limited space and lack of exercise have negative impacts on the health and well-being of the animals. This approach raises important ethical issues concerning animal rights (Kruk, 2021). Ethical animal husbandry emphasizes the well-being of animals and respect for their natural needs. Animals have more space, access to grazing and a good diet. This type of farming leads to higher quality products, although usually at a higher price, which may reflect the higher costs of care and respect for animal rights. It is crucial for you as a consumer to consider the ethical implications of your decisions. By supporting farmers who respect animal rights, it can help to change current practices (Gimelli, 2001).

3.9. Consumer Choices and Their Impacts

Consumer choices have far-reaching impacts on the agricultural sector and the environment (Mungkung et al., 2024). Every purchase is a vote to support or reject certain agricultural practices. Deciding what you buy is a powerful tool for change, allowing you to influence the future of agriculture. Your choices can support sustainable and ethical agriculture. Buying local and seasonal produce reduces carbon footprint and supports local economies (Fujino et al., 2018). At the same time, choosing organic and Fair-Trade certified products helps to protect the environment and improve working conditions for farmers. Education and awareness are key to informed shopping. Citizens could contribute to positive changes in agriculture through our purchasing decisions. These choices can shape a more just and sustainable agricultural system (Monica, 2020).

3.10. The Role of Governments and Politics in Addressing Ethical Issues

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Governments play a key role in addressing ethical issues in agriculture, particularly through legislation (Alsaho et al., 2022). The way they set rules on the use of pesticides or genetically modified organisms can have a significant impact not only on agricultural practices but also on consumer and environmental protection. This approach allows governments to manage the development of the agricultural sector in a sustainable way (Graham and Edwards, 2018). Promoting organic farming and sustainable practices is another important task for political institutions. Providing subsidies or tax breaks can motivate farmers to switch to sustainable practices. This increases biodiversity and protects natural resources. In this way, governments set priorities for agricultural development and steer it towards sustainability. Transparency in the decision-making process is essential to gain public trust. It is important to involve citizens in discussions on ethical issues, for example through public consultations in the development of new agricultural policy. Such openness helps to increase confidence in the measures taken and strengthen cooperation between government and citizens. However, they face pressure from various interest groups that can influence the legislative process in favor of corporations. This influence can exacerbate ethical dilemmas and there is a need for governments to act independently and in the interests of the public good. It is essential to put in place control mechanisms to ensure that decisions truly reflect the needs of wider society.

3.11. Education and Awareness-Raising in the Field of Agricultural Ethics

Education in agricultural ethics is essential for informed decision-making. Schools and universities should integrate ethics into their agricultural courses. This will ensure that students gain a solid foundation in the principles of ethical agriculture (Wilkins-Bittain et al., 2022). Learning should be based on practical examples and case studies. Education is also important for the wider public. Campaigns and workshops can raise awareness of ethical issues. Everyone should be able to understand the implications of their purchasing decisions, for example how choosing local food contributes to sustainability. In this way, consumers can be motivated to make more responsible choices. Cooperation between academic institutions and farmers is crucial. Together they can develop innovative solutions to ethical dilemmas. Research brings new methods that are both effective and environmentally friendly. This contributes to the development of sustainable agriculture and strengthens cooperation (Jones and Edwards, 2019). It is important for governments and NGOs to get involved in education initiatives. They should support programs that raise awareness of ethical issues. By funding educational projects or providing grants, they will contribute to creating an informed and responsible society.

3.12. Examples of Successful Ethical Initiatives

There are a number of successful ethical initiatives that are making a positive difference in agriculture. One example is organic farming in the Czech Republic. Organic farms minimize chemical inputs, which protects the soil and improves food quality (Stojanová et al., 2018). Community gardens connect urban dwellers with nature and agriculture. Here, people learn about food growing and organic practices, raising awareness of the importance of sustainability and ethical choices. Fair Trade initiatives improve conditions for small farmers (Seo, 2012). They ensure fair prices and fair working conditions, promoting ethical production. This enables farmers to invest in their communities and improve living conditions. Innovative technologies play an important role in modern agriculture. For example, the use of drones to monitor crops helps reduce chemical inputs. These initiatives promote precision farming and resource efficiency.

4. Discussion

The future of agricultural ethics brings new challenges and opportunities. A growing population increases the demand for food, forcing the search for new ways of efficient and sustainable production. It is important that these methods comply with ethical principles. Technological advances offer solutions, but they also raise questions. Genetic modification of crops is a controversial

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topic that brings opportunities for increased yields, but also ethical dilemmas regarding safety and impact on ecosystems. Discussions on use must be transparent and inclusive. Another key concern is the integration of digital technologies. Precision agriculture can optimize resource use and reduce the ecological footprint. However, questions arise about data collection and farmer privacy. How can we ensure that technology is both beneficial and ethically acceptable? Climate change poses a major challenge to agriculture. We need to prepare for extreme weather events and their impacts. Adaptation to these changes must comply with ethical standards. It is important to seek solutions that protect both food security and the environment.

5. Conclusions

With the development of environmental and agricultural ethics, humanity faces fundamental ethical challenges. With the ever-growing human population, it is increasingly difficult to secure enough food resources. However, this dilemma raises new ethical challenges. The basic question is how to ensure, in an environmentally friendly way, enough agricultural products for the growing human population and at the same time preserve favorable living conditions for future generations. Understanding the ethical challenges of nature and agriculture requires a holistic approach that involves collaboration between different sectors of society. Educational institutions, states and their associations must work together to provide effective solutions. Each of these elements plays an important role and contributes to efforts to achieve sustainable development. The importance of ethical issues should be mentioned in public debates, where discussions about ethics in nature conservation in relation to agriculture can change the attitudes and actions of individuals. Informing society about the impact of human actions on the environment strengthens commitment and responsibility. It is essential that individuals and organizations take responsibility for their actions towards nature. While these challenges are difficult, they also offer the possibility of positive change. By applying ethical principles, a balance can be achieved between economic development, agriculture and nature conservation. Conservation of natural and food resources for future generations is a goal to be achieved. The authors of this contribution set themselves as a research goal – to identify the main ethical dilemmas in the relationship between man, agriculture and the environment. Qualitative analysis of professional texts was chosen as the basic scientific method. To achieve the research objective, the authors asked themselves the following research questions: 1. What is the impact of globalization on agricultural ethics? 2. What are the ethical specifics associated with the introduction of technologies into agriculture? 3. What are the ethical challenges associated with biotechnologies and genetic modification? 4. What environmental impacts can agricultural production have? 5. What are the ethical dilemmas associated with the status of animals? 6. What is the possible impact of environmental education? Based on the qualitative analysis, it can be concluded that the impact of globalization on agriculture is significant and brings new ethical challenges. With the opening of world markets, farmers must face cheap foreign competition in countries where environmental restrictions are not as strict and are thus at an economic disadvantage. Globalization also creates increased pressure on agricultural production even in places where the agricultural fund is expanding at the expense of natural biotopes and biodiversity is threatened. The introduction of new technologies is a logical way to increase agricultural production, but it also brings ethical questions of reducing the number and protection of jobs in agriculture, the question of fair access to technology and, finally, the question of human responsibility for technical progress towards nature and future generations (Jonas, 1987). The introduction of genetically modified organisms is the current way to increase agricultural production by increasing yields by growing resistant and more fruitful plants. However, this is linked to the issue of threats to biodiversity, issues of property rights and ethical issues of unequal access to technology and know-how. Agriculture threatens the environment, especially by endangering biodiversity, and the only solution is to maintain sustainable agricultural practices so that agricultural land is not depleted and contaminated and biodiversity is endangered. Another part of the ethical questions in this issue relates to ensuring good working and living conditions for farmers, on a global scale. In the issue of animal rights and good breeding

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conditions comes the dilemma of maximizing production and ethical breeding. With pressure on agricultural production, end consumers can turn this dilemma on the side of ethical farming, preferring products from ethical farming. The importance of environmental education of residents is also growing here. And it is environmental education that fulfills a key role in environmental protection, which is also an important task of governments and international organizations. It is education that brings the necessary information in this area to make important decisions. And all this within the framework of properly constructed legislative frameworks and ethical rules. Environmental education on the ethical relationship between man and nature is a necessary and effective social tool for environmental protection. The topic of environmental and agricultural ethics is already well represented in the Web of Science and Scopus databases, but these are often general and retrospective works. However, this work is particularly original in the way it explores specific ethical aspects. It can of course be assumed that the ethical aspects of the relationship between people, nature and agriculture will continue to evolve as history shows. However, the ethical appeal of the philosopher Hans Jonas about the obligation of humanity to accept responsibility for the state of the environment is permanently valid.

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