

POTENTIAL CONTRIBUTION OF ENVIRONMENTAL ACCOUNTING TO MODERN BEEKEEPING AS A PART OF THE AGRICULTURAL SECTOR

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Abstract. *Defining a business strategy to ensure compliance with economic and environmental principles should contribute to long-term economic and environmental goals, while the introduction of environmental accounting into a company will bring a better connection between the company's strategy and the environment. This paper deals with the potential contribution of environmental accounting to modern beekeeping as a part of the agricultural sector and considers the comprehensive approach of environmental accounting to company operations and the enormous impact of beekeeping on agricultural production. We also highlight the temporal indefiniteness of environmental costs, which are viewed as future (potential) costs. We see that the impact of the agricultural sector on the quality of natural capital can be both positive and negative. We also focus on a more detailed examination of the impact of the agricultural sector on habitats and natural species.*

Key words: *environmental accounting, agricultural policy, pollution, beekeeping*

JEL Classification: M4, Q10, Q15

1. INTRODUCTION

Increasingly pronounced environmental problems reflected in deforestation, land drying, large floods or droughts, and the disappearance of certain plant and animal species have necessitated a change in the way the entire social community treats the environment. Therefore, in dynamic business conditions, companies should be aware of their impact on natural capital and its global importance. Business operations and environmental protection have different goals, but these are outdated views. Long-term sustainable development requires goal harmonization. That means that companies need to operate considering not only their own needs, but also the needs of nature. In other words, a long-term partnership

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between the company and environmental protection is a prerequisite for achieving sustainable development goals.

The first part of the paper deals with the potential of environmental accounting to consider all costs arising from operations. The goal is to acquaint the readers with modern trends in the field of management accounting and its contribution to the preservation of natural capital. The second part of the paper examines the importance of beekeeping for humans and the environment, as well as factors that make it difficult to engage in beekeeping. We also show how beekeeping production, as a part of agricultural production, can be disrupted due to a collision between the operations of agricultural companies and environmental protection. In doing so, we view bees and their habitats as part of all natural habitats and natural species included in the analysis.

2. ENVIRONMENTAL ACCOUNTING

Numerous environmental problems around the world caused by people's negligence in carrying out their activities (regardless of their type), along with all the negative effects they cause, also have their positive sides. Without the devastating consequences of these negative effects, people would not understand the impact of their activities on nature. Only when thinking about this topic begins can we expect that conscience will emerge and that people will reconsider their behavior. In this regard, "the spread of awareness about the quality of the environment should not be sought only in the application of eco-technologies, but also in environmental ethics, because without it there is no survival of man and preservation of the environment" (Antić et al., 2021, 53). The issue of environmental protection, or the companies' impact on the environment, is becoming one of the dominant factors of possible business risk in all areas of human activity due to the constant deterioration of the environment and the strengthening of responsibility for the resulting environmental damage (Jovanović & Ljubisavljević, 2017, 522).

Various factors have influenced the significant change in people's and companies' attitude towards the environment (Črnjar & Črnjar, 2009, 244-245): the development of international and national environmental protection policies, consumers' environmental awareness such as when they are willing to pay a higher price for environmentally friendly products, the introduction of environmental labeling of products, the creation of the so-called environmental image of the company, fear of costs arising from environmental damage, savings resulting from reduced resource use and changes in the management and employees' awareness. In an effort to prevent or minimize the negative consequences of company operations on the environment, both at the local, regional and global levels, companies are increasingly introducing corporate self-regulation. This means that environmental management has been gaining importance in the last three decades (Jovanović & Ljubisavljević, 2017, 521).

Reducing the negative impact of company operations on the quality of the environment cannot be achieved if the company does not have information about its impacts. The accounting information system should provide a framework for the preparation of environmental information. This information can be used for the successful management of negative environmental impacts and to improve environmental performance, because "the company actions, or rather its management actions, to prevent pollution must be measurable and obvious" (Shen, 1995, 185). A young accounting discipline, environmental

accounting, can serve as information support and a significant management tool for company management.

Environmental accounting, as defined by the American Institute of Certified Public Accountants, is an accounting subsystem that deals with the identification, measurement and allocation of environmental costs, the integration of these costs into business decisions and the subsequent reporting of these costs (Škarić-Jovanović, 2013, 91). The International Federation of Accountants defines it as “the management of environmental and economic performance through the development and implementation of appropriate environmentally-related accounting systems and practices” (IFAC, 1998, paragraph I). In other words, environmental accounting is an environmental management tool to get a clear picture of the costs associated with external and internal negative impacts company operations have on the environment.

From an environmental perspective, the environment has a value independent of people. In this regard, impacts on nature must be considered regardless of whether there is an impact on people. Therefore, the accounting system should reflect all direct and indirect results of a company’s operations on nature. As Figure 1 shows, generally speaking, companies are subsystems of the economy, the economy is a subsystem of society, and society is a subsystem of the environment (Schaltegger & Burritt, 2000, 96).

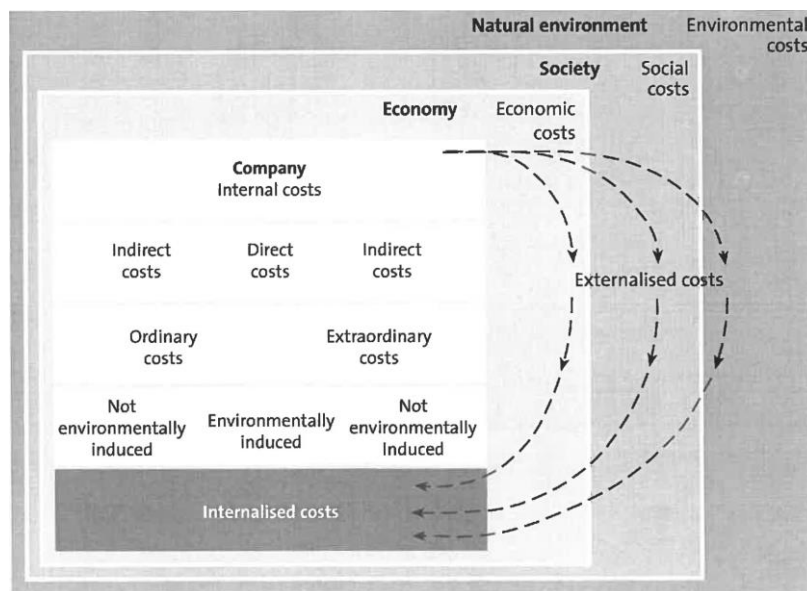


Fig. 1 Environmental comprehensiveness and its costs
 Source: Schaltegger & Burritt, 2000, p. 96.

In this regard, environmental accounting should cover all possible costs, i.e. all economic, social, and environmental costs of a company’s operations. Any use of natural resources can be viewed as the use of products and services and expressed as an environmental cost. Environmentally induced costs can be defined as the sum of all costs that are directly or indirectly related to the use of materials and energy and their impact on the natural environment.

Society also faces costs that are not environmentally induced, for example due to social injustice (Schaltegger & Burritt, 2000, 96).

From a business perspective, it is important to distinguish between external and internal environmental costs. External environmental costs, or environmental externalities, affect the environment and society by reducing the overall efficiency of the economy through their impact on environmental pollution and the procurement of inputs for the production process (in terms of increasing the prices for purchasing inputs). Internal environmental costs, or private environmental costs, are environmental protection costs that arise in the course of a company's operations, such as sewage, waste and wastewater treatment in factories, and the like (Schaltegger & Burritt, 2000, 98-99). It should be noted that delay in internalization of environmental costs brings environmental costs in the future. That means that environmental costs are conditioned by the passage of time (future environmental costs, such as the costs of future landfill remediation). This is a situation when, years after a specific event, companies face negative financial consequences that had nothing to do with the operations that caused that event. In doing so, it should be borne in mind that external costs become economically relevant for the company if and when they are internalized (Panayotou, 1996).

Figure 1 shows the types of internal environmental costs (Schaltegger & Burritt, 2000, 97-100). Operating costs (ordinary costs) represent ordinary environmental costs that occur in the course of company's operations (such as the operating costs of cleaning facilities). Unexpected business situations result in extraordinary environmental costs (for example, clean-up costs resulting from an unexpected explosion). Direct environmental costs are costs directly related to the production process and to the prevention of environmental pollution. The costs of administering environmental regulations are indirect environmental costs that should be allocated to cost centers and cost objects.

Internal costs in a company can be distinguished according to their measurability and inclusion in traditional accounting. As we move away from business costs through indirect and intangible to contingent and environmental costs, it is more difficult to measure costs. This is when it becomes necessary to assess them and select an adequate assessment method.

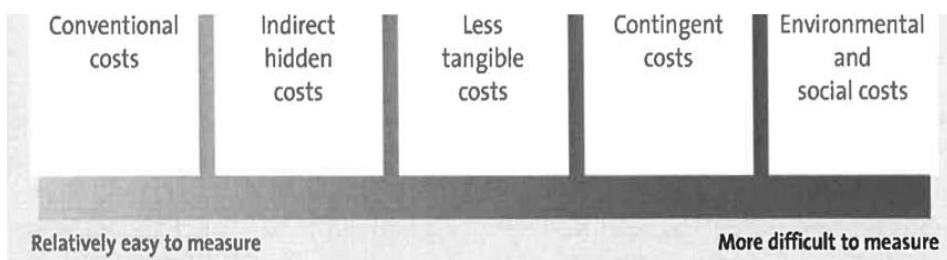


Fig. 2 Possibility of measuring environmental costs

Source: Schaltegger & Burritt, 2000, p. 102.

For the effective management of environmental impacts, i.e. environmental externalities, reliable information on company performance is of crucial importance. In other words, there is a need for a reliable accounting system with the help of which the company will keep records of natural resources consumed, i.e. damage caused, in relation to the profit achieved (Črnjar & Črnjar, 2009, 284). This is where environmental accounting comes into play,

because “managers, based on the information they receive from environmental accounting, more effectively assess the economic aspects of the environmental impacts of a company’s operations on its performance” (Jovanović & Ljubisavljević, 2017, 521).

3. BEEKEEPING AS A SEGMENT OF AGRICULTURAL PRODUCTION

Beekeeping, as the activity of raising honey bees with the aim of harvesting the yield (honey, wax, propolis, royal jelly and other bee products), is part of agricultural production. “Honey is considered an environmentally friendly food product that provides the human body with many beneficial vitamins and minerals” (Skvortsova et al., 2021, 2). It should be noted that only natural honey, i.e. honey made by bees, has these characteristics. That’s why there is a particular interest in organic honey (Nikolić et al., 2022). However, the greatest contribution (90%) of keeping honey bees, or beekeeping, to the survival and health of the human community lies in the pollination capacity, while only 10% in bee products (Vrabцова & Hajek, 2020). In other words, the most important function of beekeeping, giving it a large indirect role in agricultural production, is pollination.

Due to the negative effects of climate change, pesticide poisoning, various bee diseases and other challenges, bees cannot survive on their own. Therefore, it is important, on the one hand, to encourage the development of beekeeping as an important part of agricultural production. Beekeeping is essential to society and, indirectly, the amount of food in the world depends on it to a large extent. More precisely, pollination directly affects the quality and quantity of agricultural production (Breeze et al., 2011). But, on the other hand, we need to look at the impact of the agricultural sector on the quality of habitats and natural species (including bees) and thus show how agricultural company operations can have positive and negative impacts on the environment.

3.1. The importance of beekeeping for the environment and its impact on the quantity and quality of agricultural production

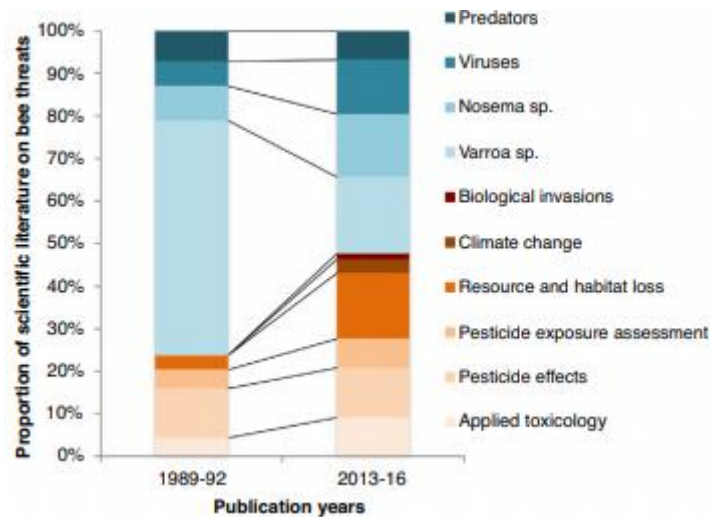
The last 30 years have been a period full of challenges for both beekeepers and bees themselves. As a result, human interest in understanding the role that bees play in the ecosystem has increased (Althaus et al., 2021). There are many species of bees. When we use the term “bee” in this paper, unless otherwise indicated, we mean the honey bee (lat. *Apis mellifera*). Honeybees are protected by legal regulations and are of particular interest due to their significant role as pollinators in the agricultural sector and in ensuring the normal functioning of the entire planet’s biosphere (Skvortsova et al., 2021, 1). It should be noted that factors affecting the reduction of the pollination effect affect numerous species of bees and other natural pollinators in the same way as honeybees (Maderson, 2023, 2). However, it is difficult to provide an adequate protection policy for lesser-known natural pollinator species, which is consistent with the view that it is difficult to express the value of a fly, because it does not make honey. In other words, numerous species of wild pollinators must “attach” to honeybees, in terms of regulation, in order to ensure their survival (Maderson, 2023, 9).

When we talk about beekeeping as a productive activity, it is necessary to distinguish between professional and non-professional beekeepers, i.e. between people who are engaged in beekeeping as part of their jobs and others who see it as a hobby. For example, in Italy, which is the fourth country in the EU in terms of the number of hives, as many as

71% of beekeepers do this as a hobby (Sarvia et al., 2023, 1). However, the positive role of non-professional beekeepers is linked to the role of pollinators that their bees play in agriculture. Bees are the main pollinators of plants, without which the productivity of about 80% of the largest food crops would be seriously endangered (Klein et al, 2007). It is important to note that not all plants reproduce with the help of bees (for example, the vast majority of cereals are pollinated by the wind). Some plants that have the ability to self-fertilize or are pollinated by the wind form larger and juicier fruits if additionally pollinated with the help of pollinators (WWF Adria, 2021, 26). One bee colony contributes 566 euros to surrounding farmers through increased yield and quality of fruits, a higher share of first-class fruits in the crop and therefore higher prices (Biznis.rs, 2024, 61).

The decline in the number of bee colonies and the decline in the number of other natural pollinators raises serious concerns about its implications for biodiversity (Brown and Paxton, 2009) and food security (Aizen et al., 2009). “Today, beekeeping is profitable only in areas and places where there are enough honey bees and where other conditions for honey collection are favorable” (Todorović & Todorović, 1990, 59). Honey is one of the most commonly counterfeited products in the world, so it is no wonder that more and more beekeepers are giving up this production. However, many other factors influence the decrease in the number of beekeeping societies. All the reasons that affect the health of honey bee colonies can be divided into five categories: exposure to chemicals, diseases and biological aggressors, land use changes and landscape fragmentation, climate change and variability of beekeeping practices (Gilioli et al. 2018, 144). Modern agricultural practices are considered a major challenge for natural pollinators due to the widespread use of chemicals in agriculture, the production of monocultures on large-scale areas and the loss of their habitats (Sanchez-Bayo & Wyckhuys, 2019). “The use of pesticides during the flowering period of plants conflicts with the rhythm of life of bee communities, which, through pollination, promote the production cost-effectiveness, as do pesticides” (Živadinović, 1999).

Long-term changes in weather conditions, i.e. changes in the climate of an area, have a significant impact on all living things, including bees. Namely, climate change can significantly affect the phenology of the living world (periodicity of the life cycle). Differences in the reactions of individual natural species to changes can lead to a mismatch between the phenology of plants and their pollinators, more precisely, the mismatch between the flowering period and the period of bee activity, which is especially important in the case of highly specialized plants that only certain species of bees can successfully pollinate (WWF Adria, 2021, 18-19). Understanding how climate change will affect the global food market is considered a crucial condition for solving future challenges in the field of food security (Blanco et al., 2017). “In the US, fruit growers pay beekeepers to move their bees into their orchards, up to \$250 per hive, which is a significant increase from the previous \$30-60, because there are not enough bees now” (Živadinović, 1999). In this regard, research in the field of beekeeping increasingly focuses on global changes (climate change, use of natural resources, changes in agricultural practices, biological invasions), not only on long-term established research on bioaggressors (Decourtye et al., 2019). Graph 1 shows the predominant research topics on threats to beekeeping. These include natural predators, viruses, *Nosema* microspores, *Varroa* mites, biological aggressors, climate change, habitat loss, pesticide exposure, effects of pesticide use (which include bee survival and behavior), and applied toxicology (which includes monitoring, methodologies, and chemical analysis technologies).



Graph 1 Most popular research topics in the beekeeping literature

Source: Decourtye et al., 2019, p. 124.

It is evident that over the years, research on the impact of climate change and habitat loss on bee health has increased. We also see that researchers' interest in the impact of pesticide use on beekeeping is not decreasing, because this problem is still not sufficiently regulated. "The use of chemicals (pesticides) very often causes bee poisoning. Beekeeping suffers greatly from this form of destruction, and even more so fruit and arable crops, because without bees there is no complete pollination of plants, and therefore no high yields" (Todorović & Todorović, 1990, p. 400). The recent and significant decline in honeybee colonies, which threatens sustainable beekeeping, in many regions of the world is largely the result of new diseases, pollution and food shortages (Goulson et al., 2015). In some parts of the world, it is not unusual to have more than 30% mortality of bee colonies per year (Neumann & Carreck, 2010).

The results of a recent study (Espen et al., 2023) on the impact of climate change on beekeeping have shown significant differences in the understanding of the effects of climate change across regions. Namely, beekeepers from southern European countries report more negative impacts, while beekeepers from northern European countries have a positive experience. The analysis shows that beekeepers from the south are significantly affected by climate change. They report lower average honey yields, higher rates of colony losses during the winter, and emphasize the strong contribution of honey bees to pollination and biodiversity. In other words, beekeepers from the south primarily emphasize the harmful effects of climate change on the beekeeping sector. In contrast, beekeepers from the north achieve significantly higher honey yields because the nectar collection season is longer due to the increase in temperature. In this regard, they report positive effects of climate change on beekeeping.

According to the 2022 data, approximately 286,000 tonnes of honey were produced in the EU, making it the second largest honey producer in the world (with China in the first place). However, the EU produces about 63% of its honey demand, making honey imports necessary to meet demand. The largest honey import comes from Ukraine (2024 data), while in previous years most imports came from China (European Commission, 2024). In

Europe, there are not enough honeybees to ensure maximum yields in pollinator-dependent crops, while wild pollinator populations are not large enough to ensure adequate pollination levels (Breeze et al., 2014). Therefore, since 2009, the European Food Safety Authority has launched a series of initiatives to support the scientific assessment of factors affecting the health of bee colonies. This agency recognizes the importance of a holistic approach to assessing the health of bee colonies and in 2015 launched the “MUST-B” project, which aims to investigate the impact of different factors on bee health (Gilioli et al. 2018, p. 144). For the period 2019-2022, the European Commission increased its support for the beekeeping sector by 10% compared to the period 2017-2019. The EU’s Common Agricultural Policy, which provides strong support for this sector, has foreseen national beekeeping programmes designed to improve conditions for the beekeeping sector and improve the marketing of their products. Measures include, for example, education for beekeepers, support for starting a beekeeping business, combating parasites that damage hives, and research or measures to improve the quality of honey (European Commission, 2019).

Biodiversity is considered the basis of the state’s environmental policy, which ensures the security of biological resources and guarantees sustainable economic development. In this sense, the regulation of beekeeping is an important area of institutional development of the green economy (Skvortsova et al., 2021, p. 2). Beekeeping is covered by a set of management strategies that are applied at different decision-making levels: from the implementation of beekeeping strategies at the level of individual beekeepers to the development of policies that support beekeeping activities at the national and EU levels (Gilioli et al., 2018, p. 144). The basic idea of the new reform of the Common Agricultural Policy is the “greening” of the EU’s agricultural policy, i.e. a radical shift towards environmental goals (Arsenjević et al., 2024, p. 376), because it is precisely the dominant agricultural practices seen as the one of the factors that have led to a serious decline in the number of honey bees and other pollinators. “Intensive agricultural production that causes deforestation and plowing of meadows leads to a decrease in uniform, permanent and rich bee pasture, which is reflected in the honey yield, but also in the survival of bee colonies” (Todorović & Todorović, 1990, p. 59). The challenge of balancing food production with biodiversity and ecological sustainability led to the development of agro-ecological schemes central to the CAP reforms (Tyllianakis & Martin-Ortega, 2021). Agri-environmental schemes are voluntary and represent a contractual relationship between producers and the state that encourages changes in production practices and contributes to the reduction of negative externalities (Bonnieux et al., 1998).

However, the empirical evidence collected (Maderson, 2023) indicates the existence of significant obstacles to the implementation of agricultural policies that ensure the well-being of pollinators. Namely, policymakers usually dismiss the experience of beekeepers as irrelevant knowledge, i.e. knowledge that is not scientifically validated. Also, the political and economic dynamics within the agricultural policy-making process can be frustrating for beekeepers (because they are unfamiliar with it), who would otherwise be willing and able to contribute to its development, implementation and monitoring (Maderson, 2023, p. 9). That is why the European Beekeeping Association was founded in Belgrade in February 2024. This alliance brings together 27 beekeeping organizations from 20 European countries and covers more than 277,000 beekeepers (Biznis.rs, 2024, p. 60). The goals of this alliance are to stop the mass abandonment of beekeeping due to the inadequate fight against counterfeit honey (the survival of beekeeping), to fight against the improper use of pesticides and to fight for the introduction of special subsidies per hive based on pollination

contributions, in order to recognize and value the pollinating role of bees. Only an adequate “embracing of the full range of beekeepers’ knowledge, including their critiques of pollinator protection and agricultural policies, and a consideration of the true value of the environment can contribute to the transformation of modern food production systems into sustainable systems that ensure simultaneous food production and environmental protection” (Maderson, 2023, p. 9). In that sense, improving the organization of management accounting in beekeeping will allow to attribute to maintenance of bee colonies and high-quality of beekeeping products (Burko, 2022).

3.2. The potential contribution of environmental accounting to the survival and development of beekeeping by considering the impact of the agricultural sector on beekeeping

Given that there is currently no tool available to ensure the sustainability of current and future honey bee colonies (Kouchner et al., 2019), it is useful to address the impact that individual accounting tools may have on the valuation of the environment and its factors. This part of the paper is linked to the results of the *Green Accounting for Agriculture* research (Buckwell, 2005) on the impact of the agricultural sector on the environment. The results of this research have already been addressed in the paper *Green accounting in the function of the new agricultural policy of the European Union* (Arsenijević et al., 2024) in which we looked at conclusions about the significant impact of the agricultural sector on the quality of natural capital. We have seen that the impact of the agricultural sector on the quality of natural capital can be both positive and negative, with certain variations in the individual components of individual studies. To sum up, the largest negative effects are reflected in air and water, while the largest positive effects are in habitats, natural species and landscape. Here we will not repeat these conclusions, but will focus on one significant part of Table 1 that deserves detailed consideration. Namely, it is the impact of agricultural company operations on natural habitats and natural species. We will address this for the purpose of considering the potential contribution of environmental accounting to the survival and development of natural habitats and species, with special reference to beekeeping and its importance for humans, the environment and the agricultural sector.

The aforementioned study (Buckwell, 2005) analyzed various studies conducted in the United Kingdom of Great Britain and Northern Ireland and compared their results. As Table 1 shows, the impact of the agricultural sector on water, air, soil, landscapes, habitats and species, on the amount of waste and on potential limitations in the further restoration and development of natural resources was examined. All data is expressed in millions of pounds according to various theorists.

The impact of the agricultural sector on habitats and species can be negative and positive, as Table 1 shows. The negative impact of the agricultural sector on habitats and species is the result of three of the five studies presented in the table. What is evident is that the magnitude of this negative impact is viewed differently. Namely, the first study by Whitby and Adger (1991) establishes the greatest negative impact of the agricultural sector on this item, as much as five times greater than the impact on water quality. In addition, the amount of 65.8 million pounds (rounded to 66 million in the table) relates to the maintenance of sites of special scientific interest. In contrast to this study, Pretty et al. (2018) and Hartridge and Pearce (2001) establish almost half the negative impact on habitats and natural species. However, these two studies establish significantly greater

negative effects of the agricultural sector on water and air, and to a certain extent on soil, compared to natural habitats and species. In other words, according to their research, habitats and natural species are not threatened by the agricultural sector in the same way as air, water, soil and landscape.

Table 1 Calculations of the effects of the agricultural sector on the environment

£million	Whitby and Adger (1988 data at 1998 prices)	Pretty <i>et al.</i> (1990–1996 at 1996 prices)	Hartridge and Pearce (1998 data at 1998 prices)	Environment Agency (2000 data at 2000 prices)	eftec/IEEP (2003 data at 2003 prices)
<i>Depreciation of natural capital</i>					
Water	12	231	428	203	470
Air		1113	585	760	956
Soil	n/e	96	21	264	9
Landscape	n/e	99		n/e	
Habitat and species	66	27	38	n/e	
Waste	n/e	n/e	n/e	n/e	15
Nuisance	n/e	n/e	n/e	n/e	n/e
Total	78	1566	1072	1227	1450
<i>Appreciation of natural capital</i>					
Water		n/e		n/e	
Air	150	n/e		n/e	
Soil	n/e	n/e		n/e	
Landscape	1008	n/e	225	n/e	488
Habitat and Species		n/e	370	n/e	740
Waste	n/e	n/e	n/e	n/e	
Nuisance	n/e	n/e	n/e	n/e	n/e
Total	1158	n/e	595	n/e	1228
Net economic adjustment	+1080	-1566	-477	-1227	-222

Source: Buckwell, 2005, p. 189.

In their analysis, Pretty *et al.* (2018) find that the negative impact of the agricultural sector on biodiversity and wildlife losses, i.e. on habitats and natural species, amounts to £25 million, while the remaining £2 million relates to losses to bee colonies. By specifically establishing the amount of losses from bee mortality in his analysis, Pretty *et al.* (2018) directly highlight how important bees are to the environment.

In their research, Hartridge and Pearce (2001) find that, in addition to the negative, there is also a positive impact of the agricultural sector on habitats and natural species, amounting to a third of the total negative effects produced by the agricultural sector in their research. However, these positive effects relate to the contribution to the conservation of environmentally sensitive areas (£187.6 million) and sites of special scientific interest (£182.10 million). They point out that data on the damage caused to biodiversity by the agricultural sector and forestry is difficult to find and that there are numerous explanations for the decline in populations of individual natural species, and that they are usually mutually dependent, since the decline in the population of one species affects all other species in the food chain (Hartridge & Pearce, 2001, p. 17).

While the fourth study, carried out by the Environment Agency, does not establish any positive or negative impact on habitats and species or considers it impossible to estimate this impact, the latest comprehensive study by the Institute for European Environmental Policy finds a significant positive impact on habitats and species. When we examined the latest research in more detail, we found gaps in the geographical coverage of the data. The positive impact of the agricultural sector on habitats was found in England, and not for the other three countries within the United Kingdom. Namely, when we look at the accounting adjustments for the benefits achieved by society by country (England, Wales, Scotland, Northern Ireland) we see that there are unreported effects for individual countries. Of the 740 million pounds of positive impact on the environment and species, 433 million relates to habitats and 307 million to species. These values refer to the value of habitat and species protection services provided by the agricultural sector in exchange for current land use. When accounting for the benefits generated by other sectors is considered, there is no assessment of whether the value of species and habitats increased or decreased (for example, in the case of tourism). Although the calculation of the positive impact of the agricultural sector on the landscape, habitats and species creates very high values, this is a result of the very small number of parameters studied, as well as the small percentage of agricultural land covered, which may be a very important omission from the overall economic adjustment.

The analysis in the previous table is based on information produced by green accounting, which “distinguishes or tends to distinguish cash flows, changes in the price and number of shares of a company, effects originating from the agricultural sector versus those originating from other sectors, and effects of the agricultural sector on overall economic well-being versus effects from other sectors” (Buckwell, 2005, p. 190). However, great caution should be exercised when using this data. Namely, Hartridge and Pearce (2001) find positive and negative impacts with great uncertainty, while the authors of the latter study refuse to summarize their results and draw conclusions based on them. By comparing the determined values, we wanted to highlight the situation with natural capital items considered in individual studies. In other words, the overall impact of the agricultural sector on the environment is, in four out of five cases, negative, but it does not have an equally negative impact on all items of natural capital. However, it should be taken into account that these results refer to different periods and were established under different accounting conditions (policies). Therefore, it is more useful to compare the data within the same study. It is also important to emphasize what the analysis in Table 1 does not show. This analysis does not show either the stocks of the various categories of natural capital at the end of the year, nor the changes in the stocks of natural capital over a long period. It aims to show the net increase or decrease in the stocks of natural capital over the period to which the data refers. Therefore, it comes as a surprise to see the positive effects found for habitats and natural species in the latest survey for all those who expected a large decrease in natural capital. For example, there has been a known decline in the agricultural bird index since 1970 (Buckwell, 2005, p. 195).

Finally, it should be noted that this is data from one of the first studies on the impact of the agricultural sector on habitats and native species. Although different results have been found regarding this impact, the impact certainly exists and should be studied in more detail (for example, which native species are most positively affected and which are negatively affected). In this paper, we have looked at beekeeping and discussed the factors that have a negative impact on it (the agricultural sector, among other factors). This means that the new research topics in the field of beekeeping (presented in Figure 1) should certainly

include the impact of the agricultural sector on the beekeeping sector, which is in line with the view that the effects of various agricultural policy measures can show their true character years after their implementation, and therefore “the debates surrounding the CAP for more than two decades can be interpreted as different views on the magnitude of certain market indicators, especially market failures” (Buckwell, 2005, 187). Considering the practical problems faced by accountants of beekeeping enterprises, there is a need to systematize the accounting of business operations and processes, distinguish the types of beekeeping products and production costs, and improve the calculation of the cost of beekeeping products (Shulhan, 2024). Also, future research should deepen the analysis of natural species affected by intensive agricultural production (we also mentioned birds), which highlights the multidisciplinary nature of economic science and its research potential in the field of natural sciences (for example, biology). Environmental accounting can significantly contribute to research activities on the aforementioned topics.

4. CONCLUSION

In a complex business environment subject to dynamic changes, management needs to examine all conditions in detail and consider many alternative solutions before making decisions in order to successfully run the company. Therefore, the actions of the company, or rather its management, must be measurable and obvious. This does not only relate to generating income, but also to preventing the pollution of nature. Defining a business strategy that will ensure compliance with economic and environmental principles should contribute to the long-term economic and environmental goals. It is precisely such a strategy that environmental accounting is for, not only at the enterprise, but also at its environmental level. That is, this new type of accounting includes both internal and external business costs.

The information produced by environmental accounting represents the basis for efficient management of the environmental aspects of company operations, i.e. for environmental protection management. The research studies whose results we have presented include the positive and negative impacts of agricultural company operations on habitats and natural species. Upon summarizing these effects, we can say that the results show a greater positive than negative contribution to natural habitats and species. However, the results should be taken with caution because they relate to different periods and were established under different accounting conditions (policies).

In this paper, we have highlighted the special contribution of beekeeping to the preservation of the quality of the environment and the production of higher-quality food by companies in the agricultural sector. Scientific research on the role of beekeeping in the agricultural sector highlights the impact of climate change, landscape changes, intensification of agricultural production and invasive (attacking) species as reasons that will have a major impact on beekeeping in the future. Higher investment in applied research in this area will contribute to the development of agricultural systems that emphasize the need for the growth and development of beekeeping and the strengthening of its pollination role as a necessary condition for increasing the quantity and quality of agricultural production. Environmental management, or ecological management, involves the protection, management and restoration of the environment and ecosystems. Moreover, environmental accounting is expected to achieve the best results in terms of increasing meaningful information about the impact of enterprises on the environment and developing their social responsibility.

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POTENCIJALNI DOPRINOS EKOLOŠKOG RAČUNOVODSTVA SAVREMENOM PČELARSTVU KAO DELU AGRARNOG SEKTORA

Definisanje poslovne strategije koja će obezbediti poštovanje ekonomskih i ekoloških principa treba da doprinese dugoročnom ostvarivanju ciljeva ekonomske i ekološke prirode, a uvođenje ekološkog računovodstva u preduzeće utičaće na bolje povezivanje strategije preduzeća i životne sredine. U radu ćemo se baviti potencijalnim doprinosima ekološkog računovodstva savremenom pčelarstvu kao delu agrarnog sektora kroz sagledavanje sveobuhvatnog pristupa ekološkog računovodstva poslovanju preduzeća i ogromnog uticaja pčelarstva na agrarnu proizvodnju. Takođe, istaknućemo vremensku neodređenost pojave ekoloških troškova koji se posmatraju kao budući (nepredviđeni ili potencijalni) troškovi. Videćemo da uticaj agrarnog sektora na kvalitet prirodnog kapitala može biti pozitivan i negativan, pri čemu ćemo se zadržati na detaljnijem sagledavanju uticaja agrosektora na životna staništa i prirodne vrste.

Ključne reči: *ekološko računovodstvo, agrarna politika, zagađenost, pčelarstvo*