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Application of Environmental Audit in Agriculture Production in Vietnam: Current Situation and Solutions

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ABSTRACT

This article aims to introduce the basic knowledge of environmental auditing (EA) - a proactive, preventive environmental management tool that has been applied in many countries worldwide across various fields, including agricultural production. This article summarizes lessons learned from applying EA to agricultural production in countries around the world, and analyzes the current status of EA application in Vietnam's agricultural production. On that basis, propose appropriate solutions and recommendations to contribute to promoting EA activities in agricultural production in particular and in other fields in general. Thereby contributing to the development of Vietnamese agriculture in an ecological and sustainable direction, increasing added value.

KEYWORDS

Agricultural production; Environmental protection; Environmental audit; Solution; status

INTRODUCTION

Vietnamese agriculture is entering a new era - an era of development, integration, and international reach. With available advantages and potentials, Vietnamese agriculture has made remarkable progress in recent years, contributing greatly to the country's development and truly becoming a solid foundation for the economy. According to the statistics of the Ministry of Finance of Vietnam [1], the Vietnamese Agriculture and Environment Sector is facing a great opportunity to achieve the growth target of 4% in 2025, while aiming for an export turnover of agricultural, forestry, and fishery products of 65 billion USD, even reaching the milestone of 70 billion USD. In addition, the report of the Ministry of

Agriculture and Environment of Vietnam [2] said that the export turnover of agricultural, forestry, and fishery products in June 2025 is estimated at 5.93 billion USD, an increase of 5.3% compared to June 2024. However, besides the achievements, Vietnamese agriculture is facing a series of difficulties and major challenges such as: climate change and natural disasters are increasingly complex; the transformation of agricultural production thinking to agricultural economics is still slow; strict requirements for traceability and food safety; weak infrastructure and logistics; small-scale production, fragmented linkages; lack of data and modern management technology; weak human resources and farmers' knowledge, etc [3]. In particular, environmental protection, pollution control, and greenhouse gas emission reduction in agricultural production are key tasks to orient agriculture towards ecological and sustainable development, increasing added value. To ensure sustainable agricultural development, improve economic efficiency, and protect the environment, new approaches are needed in waste management and environmental protection. EA is an environmental management tool with a proactive approach to reduce waste generation at the source, save production costs, increase resource efficiency, and improve product quality. Therefore, EA has been widely applied by many countries in the world in many different industries and fields, bringing practical results. In the agricultural sector, EA is applied to help farms and farmers control environmental issues and improve the quality of agricultural products in agricultural production in many advanced countries in the world, typically: the US, Canada, the European Union, the UK, and Australia [4-8]. In Vietnam, EA has only been known in recent decades and has been applied in a number of industries and fields, including agricultural production [9]. In the context of increasingly strict environmental protection regulations, the requirements for emission reduction and agricultural product quality assurance of the world's leading consumer markets are causing great difficulties for Vietnamese agriculture to develop and reach international standards. Applying AE in agricultural production can be the key to helping Vietnamese farmers solve the above difficulties. This review is conducted to analyze and evaluate the current status of the EA application in agricultural production in the world and Vietnam. From there, we propose solutions to promote the implementation and application of EA in agricultural production in Vietnam in the near future.

MATERIALS AND METHODS

In this study, we use the method of document review from the publications of scholars on the application of EA in the agricultural sector in the world and in Vietnam. From there, provide an analysis and assessment of the current situation, difficulties, and solutions to promote EA application in Vietnam.

RESULTS AND DISCUSSIONS

Environmental auditing applications in the world

Globally, environmental auditing is widely recognized as an optimal tool and has been extensively applied across numerous countries to assess compliance with environmental regulations [4]. In the United States, as early as 1970, within the framework of the national environmental protection action program, the government affirmed that environmental auditing is an effective instrument for supporting the management and utilization of natural resources. Initially, environmental audits (EA) were conducted primarily on a voluntary basis at production facilities. However, it

soon became evident to policymakers and experts that this tool held significant value, leading to the formal development of auditing procedures across various sectors, including multiple types of agricultural production. Other leading countries in this field include Australia, the United Kingdom, member states of the European Union, New Zealand, and Canada.

EA can be conducted in various forms, including both voluntary and mandatory approaches, as well as internal and independent audits [5]. The content and standards of audits—particularly voluntary or internal audits—can be flexibly designed to suit the specific objectives and needs of individual enterprises or farms. Most audit programs are typically based on legal regulations, environmental norms, or other standards such as Global GAP and ISO 14001. In the agricultural sector, audit programs are often tailored to specific types of production and have been implemented in various countries. Prominent examples of large-scale environmental management programs that incorporate auditing tools include: the Ontario Farm Environmental Plan (EFP) in Canada; the UK Linking Environment and Farming program (LEAF); the program of the National Association of Sustainable Agriculture Australia (NASAA); and the Eco-Management Audit Scheme (EMAS) in Europe.

The Ontario Farm Environmental Plan (EFP) in Canada focuses on analyzing environmental impacts and addressing the challenges faced by farms in meeting environmental protection requirements [6]. This program was initiated by farmers themselves when they encountered difficulties in complying with environmental regulations. Collaborating with environmental experts and policymakers, farmers developed an internal environmental auditing program aimed at improving farm-level environmental management systems. To support the implementation of this initiative, the Canadian government mobilized substantial human, material, and financial resources to scale the program nationwide. A wide range of farms, including livestock operations, participated in the program. Its success in helping farms resolve environmental issues led to its expansion across multiple provinces and its recognition as a national program, which has since been adopted as a model by other countries. Participation in the EFP typically involves several key steps: training workshops, review of farm development and action plans, formulation of new action plans, stakeholder consultations, peer review and evaluation, and implementation. Two major strengths of the EFP are its voluntary nature and its assurance of confidentiality. The program enables producers to self-assess risks related to resource and farm management and to adopt appropriate mitigation strategies. Moreover, the EFP serves as a successful example of raising public awareness, improving environmental quality, and addressing legacy environmental issues. A critical factor contributing to the program's success lies in three key government interventions: stringent environmental regulations, technical support, and financial assistance. Additionally, the program's criteria closely align with the ISO 14000 standards, making it easier for farms to obtain ISO 14000 certification upon completion of the EFP. This alignment has served as a strong incentive for farmers to actively engage in the program. Currently, the EFP is implemented across nearly all regions of Canada and is considered a meaningful approach that supports the Canadian agricultural sector in achieving sustainable development goals.

Similar to the Ontario Farm Environmental Plan (EFP), the Linking Environment and Farming (LEAF) program, launched in the United Kingdom in 1991 [7], is a prominent example of applying environmental auditing tools to support environmental management in agricultural operations. Unlike EFP, the standards and content of LEAF's environmental audits closely align with those of GlobalGAP. The program promotes integrated farm management, aiming to balance the economic development needs of farms with ecological considerations. One of the core activities undertaken annually by nearly all LEAF members is conducting internal environmental audits of their farm management practices. These audits have helped farmers reconcile economic benefits with environmental responsibilities and, in many cases, have transformed their perceptions regarding waste management on farms [10]. Evaluations of the program indicate that LEAF enables farmers to significantly reduce costs by implementing measures recommended through the auditing process, such as optimizing fertilizer use, improving energy and irrigation efficiency, reusing waste, and enhancing livestock health and product quality. More importantly, LEAF participants often secure contracts with major distributors or gain consumer trust due to the improved quality and sustainability of their products [10]. As of now, the principles and practices of LEAF have been adopted in approximately 50 countries across Europe, the Americas, and Australia [7].

In Australia, the National Association for Sustainable Agriculture Australia (NASAA) has adopted EA as a core tool to achieve its objectives in agricultural environmental protection. The primary goal of NASAA is to develop and implement a set of standards for managing the quality of organic agricultural products, ensuring both nutritional value and environmental sustainability [8]. Alongside the establishment of these criteria, environmental auditing has been utilized by NASAA as a mechanism to ensure quality assurance and to certify participants who meet NASAA standards. Since 1997, the Australian Organic Industry Advisory Council has developed a national standard that can be integrated with the existing NASAA standards. This integration further strengthens the regulatory framework for organic production and enhances the role of environmental auditing in certifying and improving sustainable agricultural practices.

In addition to EA programs developed based on local or national management standards, the world has witnessed the success of initiatives grounded in regionally or globally established norms. Two prominent examples of this trend are the Eco-Management and Audit Scheme (EMAS) and the ISO 14001 Environmental Management System. EMAS is a comprehensive environmental auditing program widely implemented across the European Union and several other countries, spanning various sectors including agriculture, industry, and services. The program involves multiple stages aimed at enhancing environmental management practices. EMAS is built upon the environmental protection policies of the European Union while simultaneously safeguarding market interests for producers. Beyond its environmental significance, EMAS certification—achieved through rigorous auditing—has become a competitive advantage for agricultural products seeking access to the European market [11]. Sharing a similar objective of improving agricultural environmental management systems, ISO 14001 is an international standard for environmental management systems applicable to organizations across diverse sectors, including agriculture [12]. This standard aims to establish a globally recognized framework for environmental management, with EA serving as a mandatory component to review and

evaluate compliance with system requirements. Alongside EMAS, ISO 14001 is among the most widely adopted and recognized systems worldwide.

EA has been widely adopted by countries around the world in the agricultural sector to generate positive environmental impacts—such as reducing ecological footprints and limiting pollution—while simultaneously enhancing the value of agricultural products. Moreover, product certifications obtained upon completion of auditing processes often provide significant competitive advantages in the marketplace, particularly in regions with stringent requirements for food safety and environmental protection. These successful case studies serve as valuable lessons and practical evidence of the necessity of implementing environmental auditing activities in agricultural production. They demonstrate that environmental auditing is not only essential for meeting environmental protection goals but also for increasing the market value and credibility of agricultural products.

Environmental auditing in agriculture in Vietnam

In Vietnam, the concept of environmental auditing (EA) was introduced relatively late, emerging in the late 1990s alongside the trends of industrialization and globalization. Since then, EA has gained increasing attention and application. The tool was first formally mentioned in environmental legislation in the 2014 Law on Environmental Protection, and later reaffirmed in the 2020 revision, which recognized EA as an effective management instrument and encouraged its adoption by agencies and organizations to monitor and protect the environment. Currently, EA is primarily applied in Vietnam in areas such as waste control (waste auditing) and energy consumption (energy auditing). These applications help organizations reduce input material costs, minimize energy consumption and waste, and mitigate environmental pollution. However, the regulatory framework for EA remains unclear, and there is a lack of large-scale, nationally coordinated EA programs. As a result, the full potential and value of EA have yet to be realized. In the agricultural sector, EA has not been widely adopted and is mostly limited to small-scale studies or pilot programs in specific regions. Notable among these are studies on waste auditing in pig and cattle farming [13], which focus on analyzing livestock production processes to identify and quantify waste types, assess weaknesses in waste management, and propose mitigation measures. Between 2019 and 2021, the Ministry of Agriculture and Rural Development implemented the project “Application of Waste Auditing Techniques and Proposal of Waste Reduction Solutions in Pig Farming” across several pig farms in Vietnam. The project produced a handbook on waste auditing for pig farming and proposed specific waste reduction strategies for farms in Thai Binh, Ha Tinh, and Dong Nai provinces [14]. Additionally, EA has been applied in other agricultural areas, such as greenhouse gas emission inventories from livestock, crop production, and aquaculture; assessments of environmental compliance in livestock and seafood processing facilities; and evaluations of farming practices against standards such as ISO 14000, VietGAP, GlobalGAP, and organic standards [9]. However, these applications remain limited in scope and scale, and are largely fragmented.

To effectively meet environmental protection requirements, reduce greenhouse gas emissions, and comply with increasingly stringent quality standards in international markets, agricultural production facilities and farms in Vietnam need a reliable tool for self-assessment and environmental control. Environmental auditing presents a promising solution

to this challenge. It is essential to develop a comprehensive and practical auditing framework tailored to the agricultural sector. Such a framework would serve as a guideline for farm owners, production facilities, and farmers, enabling them to implement and apply environmental auditing in an accessible and effective manner.

Barriers to environmental auditing application in Vietnamese agriculture

From the analysis and evaluation of the current status of EA application in the field of agricultural production in the world and Vietnam, it can be seen that the main difficulties and obstacles leading to the EA tool being rarely applied in practice, specifically including:

Firstly, the understanding and knowledge of EA in Vietnam is not really complete. State management agencies see EA as a tool to encourage implementation, while production and business organizations see it as a tool of the State. In fact, EA is a multi-disciplinary tool that can be used flexibly by both state management agencies and production and business organizations; it can be used in both mandatory and voluntary forms. More importantly, it is necessary to clearly understand the nature of the EA tool as a support tool for organizations to self-assess and perform well their environmental management activities well, thereby minimizing environmental control pressures for State agencies. Therefore, EA not only contributes to environmental protection but also brings economic benefits and improves production efficiency. Only when the State, organizations, and farmers have a full and comprehensive understanding of EA can this tool be deployed and applied widely and effectively in our country, as it has been applied in advanced countries in the world.

Second, agricultural production in Vietnam is mainly at the household level, small-scale production, with limited production management skills, especially in waste management and environmental protection. The mindset of haphazard production, lack of sustainability, and fear of change are major barriers that make farmers not interested in implementing and applying new techniques in production, including the application of EA to control waste and protect the environment.

Third, the Vietnamese Government does not have any national or regional programs or plans to encourage the application of KTMT in practice. Therefore, farmers and production and business organizations in the agricultural sector have not seen the benefits and role of EA.

Fourth, limitations in technical level, especially techniques on waste reduction and control; consulting system to support the implementation of EA; experts with practical experience in environmental economics; and strong enough incentive mechanisms from the State have caused environmental economics to not be widely implemented in our country in recent times.

Fifth, EA activities in Vietnam have not been designed to be suitable for agricultural production activities and regulations of national and international assessment standards on good agricultural practices, such as organic agricultural production standards, VietGAP, GlobalGAP, sustainable and circular agricultural standards, etc. As a result, EA does not fully play its role in assessing and supporting farmers' agricultural production activities.

Proposing solutions to promote the application of EA in agricultural production

To overcome the above difficulties and challenges, some recommended solutions for State management agencies to promote the application of EA in agricultural production in Vietnam are as follows:

Firstly, it is necessary to build a clear legal framework to create a mechanism to encourage the application of EA in agricultural production. This mechanism will encourage farmers, production, and business organizations in the agricultural sector to pay attention to and implement EA.

Second, the Ministry of Agriculture and Environment of Vietnam should develop and implement a large-scale program that applies EA nationwide or for each agricultural production area. On that basis, it will demonstrate the role and practical effectiveness of EA in protecting the environment and improving production efficiency.

Third, promote training activities to raise awareness of EA for managers and farmers. In addition, the State needs to focus on training highly specialized personnel in implementing EA to create technical human resources and a team of consulting experts to meet the requirements of practical implementation.

Finally, develop EA processes for each specific field of the agricultural sector (for each crop and livestock), with flexibility and in accordance with national and international regulations and standards on agricultural production. From there, develop EA into a powerful support tool for farmers, agricultural extension officers, and environmental officers in evaluating production processes and environmental management systems.

CONCLUSION

The application of EA will help farmers, production and business organizations in the agricultural sector to better manage environmental issues, reduce pollution, protect natural ecosystems, and improve the quality of agricultural products. This contributes to sustainable development, enhancing competitiveness and accessing large consumer markets in the world for Vietnamese agricultural products. To promote activities in agricultural production in the coming time, Vietnam needs to have clear policy mechanisms in applying EA; to develop and implement national programs; to train human resources and improve understanding of EA for stakeholders; and design and implement EA in accordance with national and international assessment standards on agricultural production practices in practice.

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