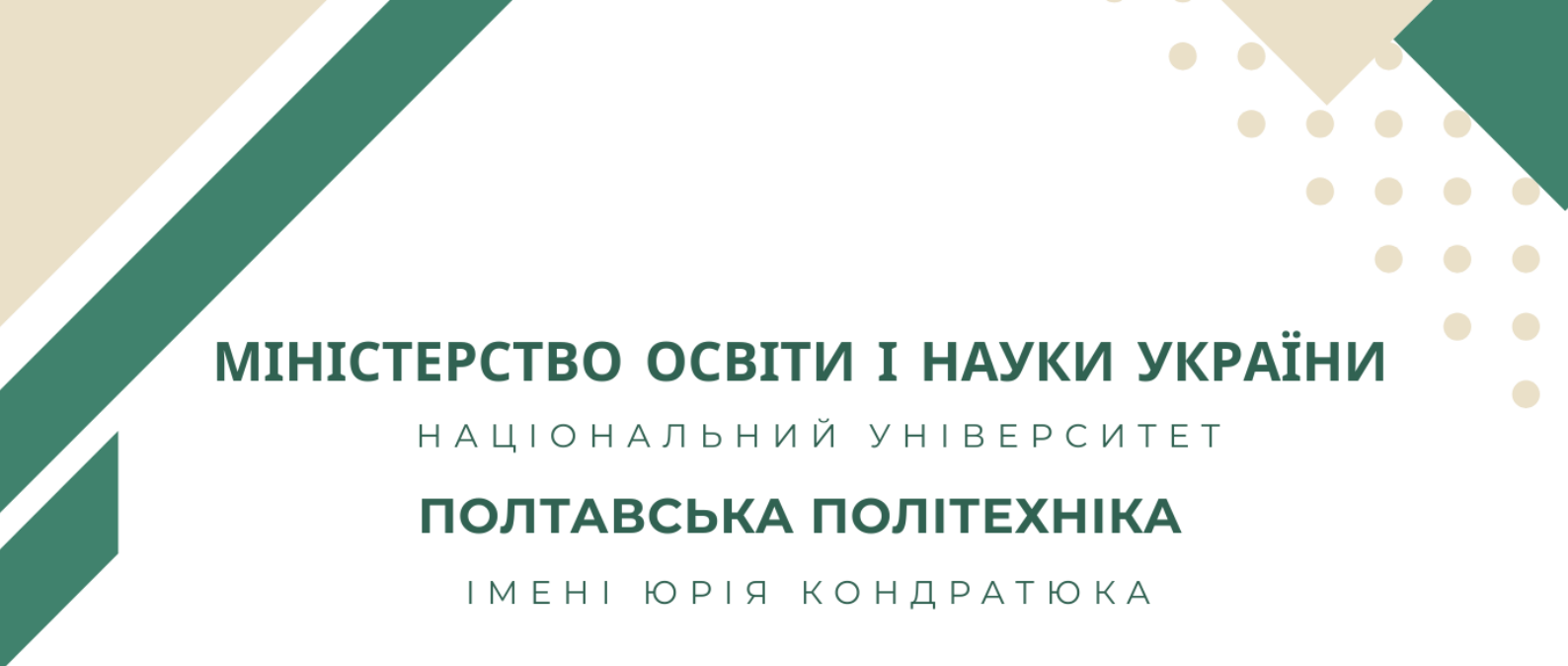




МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ

ПОЛТАВСЬКА ПОЛІТЕХНІКА

ІМЕНІ ЮРІЯ КОНДРАТЮКА

**РЕАЛІЗАЦІЯ ЦІЛЕЙ СТАЛОГО РОЗВИТКУ
В УМОВАХ УКРАЇНСЬКИХ РЕАЛІЙ:
ЕКОНОМІЧНІ, ОРГАНІЗАЦІЙНІ ТА
СТРАТЕГІЧНІ АСПЕКТИ**

МОНОГРАФІЯ



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"GREEN SOLUTIONS" IN THE BUSINESS ACTIVITIES OF AN AGRICULTURAL ENTERPRISE

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In today's world, faced with the challenges of climate change, environmental pollution, and the depletion of natural resources, there is an urgent need to implement new approaches to business operations. One such approach is the adoption of so-called "green solutions," aimed at achieving sustainable development and minimizing the negative impact of business activities on the environment.

The concept of "green solutions" has gained significant traction in modern scientific and practical contexts as a response to global environmental challenges. Its emergence and development are linked to the evolution of sustainable development ideas, which began to take shape in the second half of the 20th century.

The notion of "green solutions" originates from the concept of sustainable development, which was first officially introduced in the Brundtland Commission's report to the United Nations in 1987. This report proposed a development model that meets present needs without compromising the ability of future generations to meet theirs. Gradually, the ideas of sustainable development found more concrete expression in the practices of "green business," aimed at minimizing environmental impact and ensuring the rational use of resources [73].

In the 1990s, the terminology became more structured. For instance, in the works of foreign researchers like Michael Porter, emphasis was placed on integrating environmental innovations into business strategies. In the early 2000s, the approach to "green solutions" expanded through the development of international environmental standards such as ISO 14001, which solidified environmental management concepts within the corporate sector [80].

Today, "green solutions" have become an integral part of international strategies and programs. In the European Union, they form the foundation of the Green Deal policy, which aims to achieve climate neutrality by 2050. Globally, the concept is evolving through the implementation of artificial intelligence technologies, process automation, and green logistics [77].

Let's present the scientific approaches to the interpretation of the key concept of the study in Table 1.

Table 3.1.1 - Approaches to the Interpretation of the Concept of "Green Solutions"

Author/Researcher	Approach to definition	Key aspects
N.V. Stukalo [1, p. 90]	Implementing innovative environmental practices in business to reduce negative environmental impact.	Biodegradable packaging, reducing CO2 emissions, promoting environmental responsibility.
V. M. Rublyk [59, p.75]	Using green economy approaches for sustainable enterprise development.	Supporting green startups, promoting the green economy, integrating environmental technologies into business.
UN, the concept of "green economy" [78]	An economic model that increases human well-being while reducing environmental risks and degradation.	Use of renewable energy sources, circular economy, sustainable development.
Porter & Kramer (2011), the concept of "creating shared value" [80]	Environmental solutions as a business strategy to create economic and social benefits simultaneously.	Integrating environmental responsibility into company strategy
European Commission (Green Deal, 2019) [79]	Political and economic strategy to achieve climate neutrality by 2050 through eco-innovation.	Implementation of technologies to reduce emissions, development of sustainable energy, support for environmental startups.

According to Table 1, the history of the development of the concept of "green solutions" demonstrates how environmental ideas have been integrated into scientific and practical contexts. Today, this concept encompasses a wide range of innovations, strategies, and practices aimed at sustainable development. Its synonyms and related terms emphasize the multifaceted and complex nature of the environmental challenges faced by modern society. In the future, the significance of "green solutions" will only continue to grow, reflecting the need for harmony between economic development and environmental preservation.

In the scientific community, the concept of "green solutions" is formed from certain components (Fig. 1).

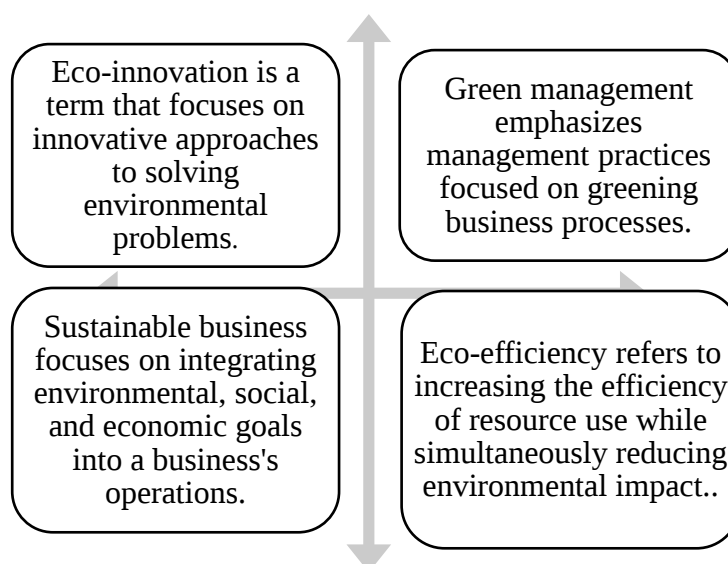


Figure 1.1.1 - Components of the concept of "green solutions" [57, p.88]

Each of the terms presented in Figure 1 describes different aspects of implementing environmental practices in business and society as a whole, and they complement or expand the

concept of "green solutions." Environmental innovations focus on new approaches and technologies that allow solving environmental problems; however, they are part of the broader concept of "green solutions" since they can be applied in various fields, from manufacturing to energy.

Green management encompasses management practices oriented toward environmental goals. It represents a specific approach to organizing the company's activities, taking into account environmental responsibility, which is an important element of "green solutions" [34].

Eco-efficiency focuses on improving resource utilization efficiency while simultaneously reducing environmental impact, which is one of the key principles of "green solutions" [19, p.345].

With the development of the concept of "green solutions," new terms have emerged in scientific literature that detail specific aspects of this phenomenon. For example, the circular economy (or closed-loop economy) involves creating a closed cycle of resource use, where the waste from one process becomes a resource for another. This includes recycling, reuse, waste minimization, and resource optimization [16, p.10].

The circular economy is a practical approach to implementing "green solutions" since it ensures economic efficiency with minimal environmental impact. For example, companies that implement circular production models develop eco-friendly products, reduce waste, and create new business opportunities based on secondary raw materials.

Green energy involves the use of renewable energy sources such as solar, wind, hydro, and bioenergy. It aims to reduce dependence on fossil fuels, cut greenhouse gas emissions, and mitigate climate change. Green energy is one of the key components of "green solutions" as it provides energy sustainability and promotes environmental balance. Its implementation in business processes and public initiatives helps reduce the ecological footprint of companies and create "green" business models [9].

Green urbanism is an approach to urban planning and management that takes ecological sustainability into account. It includes the design of "green" buildings, creation of urban parks, development of ecological transportation, energy-efficient construction, and waste management [8, p.80].

Thus, the above concepts are interconnected elements that together form the concept of "green solutions." They not only complement but also clarify the essence of "green solutions," giving them a practical focus. The integration of these concepts into entrepreneurial and societal activities contributes to achieving the ecological, social, and economic sustainability necessary for the modern world.

According to the researchers V. Yu. Strelts, B. V. Harashchenko, and V. R. Sokolovsky, green solutions imply a systematic approach to managing an enterprise that covers all stages of its activities—from product design and material selection to waste disposal [62, p.80]. The main principles of green solutions are presented in Figure 2.

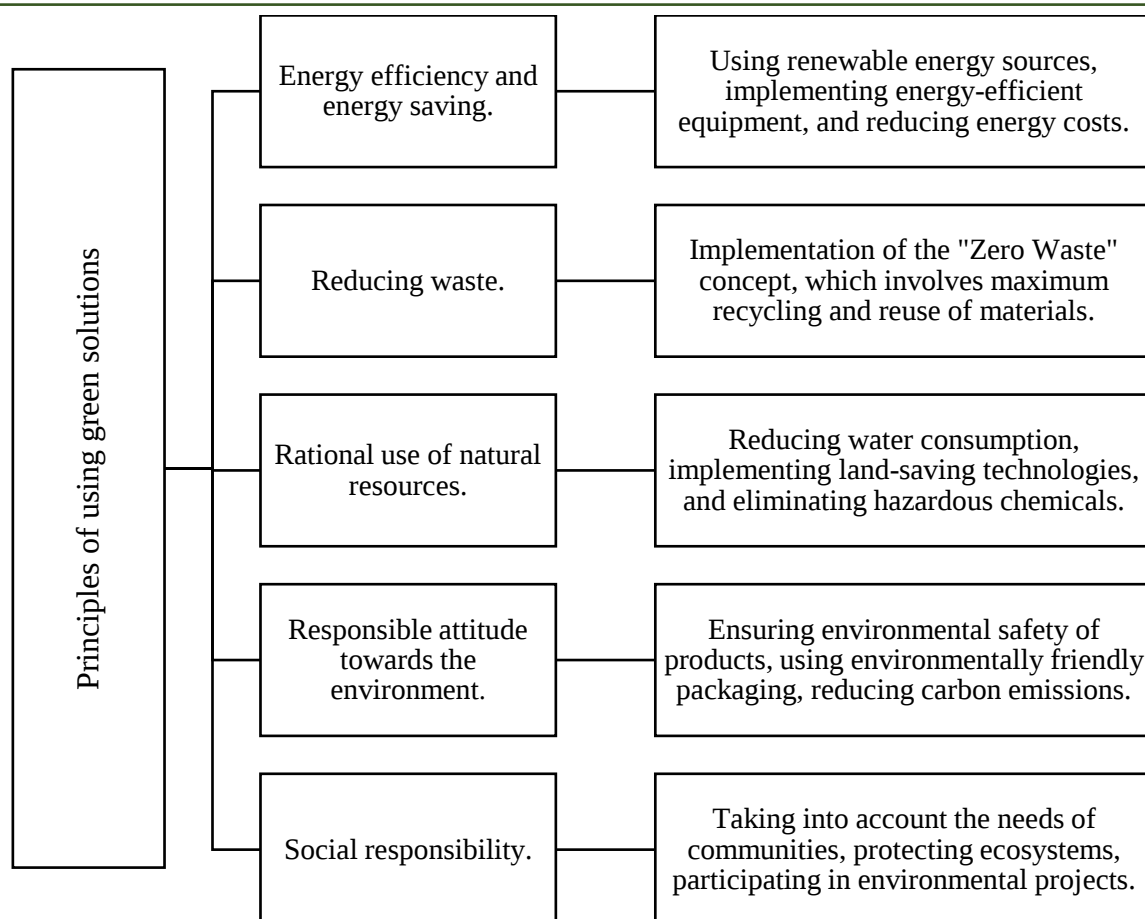


Figure 3.1.2 - Principles of using "green solutions" [62, p. 81]

The application of green solutions in business activities has both ecological and economic effects. Firstly, it contributes to enhancing the reputation of the business, which is especially important in a world where consumers increasingly choose environmentally responsible brands. Secondly, green solutions help reduce costs related to energy resources and waste disposal. Finally, it opens access to new markets and financing, such as grants or loans for environmental innovations.

The adoption of green solutions in enterprises depends on a complex of external, internal, technological, and economic factors. Legislation, market demand, financial capabilities, and innovations create conditions for the ecological transformation of business. The successful implementation of such solutions requires a harmonious combination of these factors with the strategic goals and environmental culture of the enterprise. Green solutions are not only a challenge but also an opportunity for business development in a world that increasingly values sustainability and responsibility toward nature.

The mechanism for implementing "green solutions" at the agricultural enterprise POSP "Vidrodzhennya" is based on a well-organized structure, which includes the following stages (Table 2).

Table 3.1.2 - The main stages of implementing the "green solutions" program of the "Renaissance" POSP [summarized by the author]

The development of green business is an important step towards sustainable

Stage	Task	Responsible persons	Volume of resources for implementation (thousands of UAH)
1. Preparatory stage	- Formation of the project team. - Assessment of initial conditions. - Development of a detailed action plan.	Project Manager, Consultants, Planning Department	50,0
2. Implementation of measures	Energy efficiency: - Installation of solar panels. - Switching to LED lighting.	Energy Conservation Department, Engineers	400 (solar panels), 50 (LED lighting)
	Waste management: - Organization of sorting and processing of organic waste into biogas.	Ecology Department, Equipment Suppliers	300,0
	Organic farming: - Implementation of a composting system. - Growing green manure.	Agronomists, Agronomy Department	150.0 (composting), 100.0 (green manure)
	Water-saving technologies: - Installation of drip irrigation systems. - Collection of rainwater for irrigation.	Water Resources Department, Suppliers	350.0 (drip irrigation), 170.0 (tanks)
	Diversification of activities: - Expansion of organic production.	Marketing department, agronomists, management	400.0 (new plantings)
	Digitalization of processes: - Implementation of a monitoring and resource management system.	IT department, consultants	150.0 (software)
3. Monitoring and evaluation	- Evaluation of the effectiveness of the implemented measures. - Adjustment of the strategy based on the results.	Management, monitoring department	30,0

development at POSP "Vidrodzhennya." The implementation of energy-efficient technologies, organic farming, water-saving practices, and waste management not only reduces the negative impact on the environment but also increases the economic efficiency of the enterprise. The mechanism for implementing these directions requires clear organization, strategic planning, and monitoring, which ensures the success of implementing "green solutions" and contributes to the sustainable development of POSP "Vidrodzhennya."

The Responsibility Assignment Matrix (RACI) is a tool for clearly organizing roles and responsibilities of project participants. In this case, it will help define who is responsible for completing specific tasks, who advises, who provides information, and who controls the execution (Table 3), where: A (Accountable) is the person ultimately responsible for task completion; R (Responsible) is the person who actually performs the task; C (Consulted) is the person who provides advice, recommendations, and necessary information; I (Informed) is the person who is kept informed of task progress.

The division of duties and responsibilities presented in the matrix demonstrates a clear structure and organization for the successful implementation of the "green solutions" program. The project manager serves as the primary person responsible for all stages of the program's implementation (marked "A"), ensuring a comprehensive approach and control over all processes. This also creates a unified management point and promotes efficient project management. The technical director plays a defined role in tasks such as installing solar panels and transitioning to LED lighting, which are important components of the enterprise's energy efficiency. His role in the development and implementation of energy-efficient measures is critical to achieving sustainable results. The financial director handles key aspects related to the procurement of materials necessary for project implementation and is also responsible for economic monitoring. This ensures effective financial planning and resource allocation. The environmental specialist is actively involved in tasks related to sustainable agriculture, waste sorting, and composting, emphasizing the importance of ensuring ecological responsibility at every stage of the project.

Table 3.1.3 - *Responsibility matrix for the implementation of the "green solutions" program at the enterprise POSP "Vidrodzhennia" [summarized by the author]*

Tasks	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation	Project team formation
Project Manager	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Technical Director	C	C	C	C	A	C	C	A	A	C	C	C	C	C	C
CFO	C	C	C	A	C	C	C	C	C	C	C	C	C	C	C
Energy Efficiency Engineer	C	C	C	C	A	A	C	C	C	C	C	C	C	C	
Environmentalist	C	A	C	C	C	C	A	A	C	C	A	C	C	C	
Production Manager	C	C	C	C	C	C	C	A	A	A	A	C	C	A	
Organic Farming Workers	C	C	C	C	C	C	C	C	A	A	C	C	C	C	
IT Specialist	C	C	C	C	C	C	C	C	C	C	A	A	C	C	

Overall, the distribution of duties and responsibilities within the "green solutions" program is balanced and clearly structured, allowing each team member to contribute to the successful implementation of the enterprise's sustainable development strategy.

The implementation of the developed "green solutions" will improve the sustainable development indicators of the agricultural enterprise in the future (Table 4).

According to the forecast, the area dedicated to organic farming has significantly increased by 80%, from 260.75 hectares to 469.35 hectares. The share of organic farming has also increased by 5.6%, indicating a substantial expansion in the production of organic products. Total revenue has increased by 22%, while revenue from organic products has doubled, rising by 100%. The share of revenue from organic products has also increased by 7.03%, confirming the successful growth in the sales volume of organic products.

Table 3.1.4 - "Forecast of enterprise performance based on the results of implementing the 'green solutions' program [summarized by the author]"

Indicator	2024	Forecast	Projection deviation until 2024	
			(+/-)	%
Total land area, ha	3725	3725	0,00	0,0
Area of land allocated for organic farming (ha)	260,75	469,35	208,60	80,0
Share of area for organic farming,%	7	13	5,60	80,0
Revenue from sales, UAH thousand	45240	55193	9952,80	22,0
Revenue from sales of organic products, UAH thousand	4976,4	9952,8	4976,40	100,0
Share of revenue from sales of organic products, %	11	18	7,03	63,9
Number of certified organic products (units)	17	20	3,00	17,6
Production costs, UAH thousand	65 434	65 434	0,00	0,0
Organic farming costs (UAH thousand)	17012,84	3402,56	-13610,27	-80,0
Share of organic farming costs, %	26%	20%	-0,06	-23,1
Total costs for the "green solutions" program	34 970	37 120	2150,00	6,1
Depreciation	335	401,7	66,95	20,0
Energy efficiency cost return, %	0,87	1,49	0,61	70,2

The total production costs remained unchanged, but costs for organic farming were significantly reduced by 80%, reflecting the effectiveness of resource savings as a result of implementing the "green solutions." The share of costs for organic farming decreased by 23.1%, indicating more efficient resource use. Total expenses for the program increased by 6.1%, which is moderate growth; however, given the increase in revenue from organic products, these costs are justified.

The profitability of energy efficiency expenses increased by 70.2%, indicating the effectiveness of measures aimed at reducing energy consumption and improving energy efficiency. The number of certified organic products increased by 17.6%, demonstrating the development and improvement in product quality.

Overall, the "green solutions" program demonstrates significant progress in expanding the area for organic farming and revenue from organic products, while simultaneously reducing production costs for organic products and improving energy efficiency.

CONCLUSIONS

1. The conducted research examined the concept of "green solutions" in the context of business activity, their essence, and the conditions that influence their adoption. Green solutions, as a component of sustainable development strategy, aim to achieve environmental, economic, and social goals. It was found that for their effective implementation, not only legislative and market factors are important, but also internal conditions of the enterprise, including organizational culture, availability of financial resources, and technological capabilities.

2. The development of a "green solutions" implementation program in an enterprise is an important step towards ensuring sustainable development and enhancing the organization's environmental responsibility. The program is focused on reducing the environmental impact of the enterprise through the implementation of effective measures in the areas of energy efficiency, organic farming, water-saving technologies, and waste management. The main stages of program implementation include forming the project team, assessing initial conditions, developing an action plan, purchasing materials and equipment, as well as implementing specific measures such as installing solar panels, transitioning to LED lighting, introducing composting systems, and organic farming. Expanding organic product production and applying digital technologies also play an important role in achieving the program's goals.

3. The study of the mechanism for implementing "green solutions" at the agricultural enterprise "Vidrizhenya" shows that the introduction of energy-efficient technologies, organic farming, water-saving practices, and waste management are important steps toward sustainable development. The "green solutions" program includes carefully considered stages, clearly defined tasks, and distribution of responsibilities among project participants, ensuring the effective completion of each stage.

The distribution of responsibilities, indicated in the RACI responsibility matrix, provides a clear structure and organization of work processes, as well as defines specific roles for each team member. This helps to avoid duplication of efforts and reduces the likelihood of errors, ensuring control over the project implementation at all stages.

The forecast of the enterprise's performance confirms the effectiveness of implementing "green solutions." The increase in the area for organic farming by 80%, as well as the doubling of revenue from organic products, are visible results of the strategy implementation. Additionally, the increase in the share of organic products in total revenue by 7.03% indicates successful production diversification and an increase in demand for eco-friendly products.

In general, the project has high potential for improving the economic efficiency of the enterprise while simultaneously reducing the negative environmental impact. Thus, "green solutions" at "Vidrizhenya" are strategically important for the sustainable development of the enterprise and for promoting eco-friendly business.

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