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International Economic Relations and Project Management Department

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ENVIRONMENTAL PROJECTS MANAGEMENT (ON THE EXAMPLE OF THE "GREEN OASIS" URBAN GARDEN PROJECT)

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ABSTRACT

Yu Aihua. Environmental Projects Management (on the Example of the “Green Oasis” Urban Garden Project)

Master’s Thesis for an Education Degree “Master” in Specialty 073 “Management”. Lesia Ukrainka Volyn National University. Lutsk, 2024.

This master’s thesis is dedicated to the management of environmental projects using the example of the creation of the “Green Oasis” urban garden. The first chapter examines the theoretical and methodological foundations of project management in the environmental sphere, including the essence and types of environmental projects, current trends in the management and implementation of such projects, and methodological aspects of management. The second chapter analyzes the provision of the implementation of the environmental project for the creation of the “Green Oasis” urban garden, including problem analysis and project idea development, formulation of the project’s goals and objectives, and risk management. The third chapter develops the project planning system, including the summary and strategy development of the project, budget planning, evaluation of effectiveness, and project scaling. The work concludes with findings on the effectiveness of environmental project management and recommendations for further implementation of similar initiatives. The significance of such projects as “Green Oasis” lies in their impact on the urban environment and community. They contribute to improving the quality of life for city residents by creating new recreational areas, raising environmental awareness, and fostering a healthier and more comfortable urban environment. Additionally, such projects can be an essential element of a city’s sustainable development strategy, attract investments, support the local economy, and serve as a model for similar initiatives in other cities and regions.

Keywords: environmental projects, urban garden, project management, budget planning, risk management.

АНОТАЦІЯ

Юй Айхуа. Управління екологічними проектами (на прикладі проекту створення міського саду “Зелений Оазис”)

Магістерська робота на здобуття ступеня “магістр” за спеціальністю 073 “Менеджмент”. Волинський національний університет імені Лесі Українки. Луцьк, 2024.

Магістерська робота присвячена управлінню екологічними проектами на прикладі створення міського саду “Зелений Оазис”. У першому розділі розглянуто теоретико-методичні основи управління проектами в екологічній сфері, зокрема сутність і види екологічних проектів, сучасні тенденції управління та реалізації таких проектів, а також методологічні аспекти управління. У другому розділі проведено аналіз забезпечення реалізації екологічного проекту створення міського саду “Зелений Оазис”, включаючи аналіз проблеми та розробку ідеї проекту, формулювання мети, цілей та завдань проекту, а також управління ризиками. У третьому розділі розроблено систему планування проекту, включаючи резюме і розробку стратегії проекту, планування бюджету, оцінку ефективності та масштабування проекту. Робота містить висновки щодо ефективності управління екологічними проектами та рекомендації для подальшої реалізації подібних ініціатив. Значення таких проектів, як “Зелений Оазис”, полягає в їхньому впливі на міське середовище та громаду. Вони сприяють покращенню якості життя городян, створюючи нові рекреаційні зони, підвищуючи екологічну обізнаність та формуючи більш здорове та комфортне міське середовище. Крім того, такі проекти можуть стати важливим елементом у стратегії сталого розвитку міста, сприяти залученню інвестицій та підтримці місцевої економіки, а також служити прикладом для впровадження подібних ініціатив в інших містах та регіонах.

Ключові слова: екологічні проекти, міський сад, управління проектами, планування бюджету, управління ризиками.

CONTENT

INTRODUCTION

The relevance of the research. Environmental problems in the modern world are becoming more and more acute, therefore the management of environmental projects is gaining more and more importance. Urbanization leads to an increase in the burden on the urban environment, which makes it necessary to develop and implement projects aimed at improving the ecological condition of urban areas. The creation of urban gardens is one such initiative that contributes to greening the urban space, improving air quality and raising the standard of living of residents. The Green Oasis project is an example of an environmental project that demonstrates how natural resources and urban planning can be effectively combined. Studying the process of managing such a project allows you to understand the key aspects of environmental management, to develop effective methods and tools for the implementation of such initiatives.

Environmental project management research was carried out by such scientists and economists as: Basu P., Birkin L., Cao S., Chen Z., Ely A., Goulson D., Liu P., Liu Q., Liu T., Nicholls E., Nie L., Niu J., Shen Z., Song M., Sun F., Sun H., Sun W., Svenning J. C., Vredenburg H., Wang K., Wang S., Xie Q., Xu J., Yan Y., Yang C., Yang X., Yu M., Zeng W., Zhang G., Zhang Q., Zhang T., Zhang X.

The purpose of the master's thesis is to research and analyze effective methods of managing environmental projects using the example of a project to create an urban garden.

To achieve the goal, the following *tasks* have been defined:

- to investigate the essence and types of environmental projects;
- to analyze modern trends in the management and implementation of environmental projects;
- to investigate methodological aspects of project management in the environmental field;

- to analyze the problem and develop the idea of an ecological project of creating a urban garden;
- to formulate the purpose, goals and tasks of the project of creating a urban garden;
- to analyze project risk management methods;
- to analyze the procedure and features of developing a resume and project development strategy;
- to investigate the project budget planning process;
- to investigate ways of evaluating the effectiveness and scaling of the project.

The object of research is environmental projects aimed at improving the urban environment.

The subject of the study is project management methods used in the implementation of environmental initiatives, such as the creation of an urban garden.

The theoretical basis for writing the master's thesis was scientific articles and publications that considered the issue of project management in the environmental sphere, data from official websites of international organizations, etc.

Research methods include the analysis of scientific literature on project management and environmental management, study of practical cases, project SWOT analysis, methods of system analysis and synthesis, forecasting, observation, logical-structural and comparative methods.

The practical significance is that individual recommendations and conclusions formulated in the master's research can be directly used in the educational process when studying and teaching the disciplines of the relevant direction.

Structure of work. The master's thesis consists of an introduction, three chapters, conclusions, and a list of used sources.

CHAPTER 1.
THEORETICAL AND METHODOLOGICAL BASIS OF PROJECT MANAGEMENT IN THE ENVIRONMENTAL SPHERE

1.1. The essence and types of environmental projects

Environmental projects play an important role in today's world, where issues of environmental protection are becoming more and more urgent. In view of the growing environmental challenges such as climate change, environmental pollution and loss of biodiversity, the need to implement effective environmental projects becomes urgent. These projects aim not only to reduce the negative impact of humans on nature, but also contribute to the sustainable development of society. They can cover a wide range of initiatives, from restoring ecosystems and preserving natural resources to developing environmentally friendly technologies and increasing environmental awareness. Understanding the essence and types of environmental projects is key to their effective management and achievement of the set goals.

A project is a set of interrelated activities aimed at achieving a specific goal or solving a specific problem within the limits of defined resources and time. It is characterized by uniqueness, limited time and resources, as well as the presence of clearly defined results.

The ecological project is an initiative aimed at preserving and improving the state of the environment, reducing the negative impact of human activity on nature, as well as supporting sustainable development. Such projects may include measures to restore ecosystems, protect biodiversity, implement clean technologies, improve energy efficiency, reduce emissions of harmful substances, and other environmentally oriented actions [39].

Ecological projects differ from other types of projects in their focus on preserving and improving the state of the environment. They have a specific goal, which is to reduce the negative impact on ecosystems, preserve natural resources and ensure sustainable development. Unlike traditional projects, which may have

economic, social or technological objectives, ecological projects focus on environmental aspects. Their results are often long-term and aimed at future generations. In addition, environmental projects often require an integrated approach that includes interdisciplinary cooperation, consideration of natural, social, and economic factors, as well as public involvement [34].

Environmental projects are an important part of the modern world, as they are aimed at preserving the environment, improving the ecological situation and ensuring sustainable development (Figure 1.1).

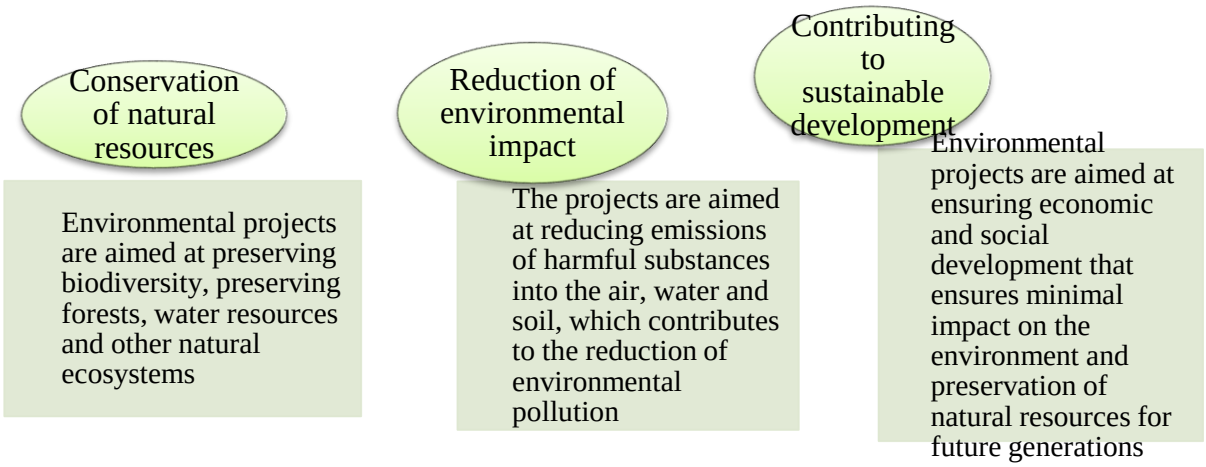

Fig. 1.1. Features of ecological projects*

*According to [37]

Typical environmental projects cover a wide range of initiatives aimed at preserving the environment and reducing the negative impact of humans on nature. One of the directions is the development of green technologies, which have a smaller carbon footprint and reduce the use of resources. This includes renewable energy, energy efficiency and green building. Another important aspect is infrastructure renewal, which involves improving urban infrastructure to reduce air, water and soil pollution. Examples of such projects are the creation of green roofs, bicycle paths and efficient waste disposal. Conservation of nature and biodiversity is also a critical area, which includes the preservation of natural areas, the restoration of ecosystems, and the protection of species and their habitats. Environmental education and raising public awareness of environmental issues is another key area. These projects are

aimed at raising citizens' awareness, encouraging resource conservation and responsible consumption [3].

Table 1.1

Classification of environmental projects *

Criterion	Category	Description	Examples
By field of activity	*Nature protection*	Aimed at the conservation of natural resources and biodiversity	Nature reserves, national parks, rare species conservation programs
	Energy savings and renewable energy	Contribute to the reduction of energy consumption and the use of renewable energy sources	Solar and wind power plants, energy-efficient buildings
	Waste and recycling	Related to waste reduction and recycling	Garbage sorting programs, waste processing plants
	Water and water resources	Aimed at conservation and rational use of water resources	Water purification, water resources management, wetland conservation
By geographic scale	*Local*	Implemented at the level of separate communities or cities	City gardens, local landscaping programs
	Regional	Cover several cities or a whole region	Regional forest restoration programs, regional energy initiatives
	National	Projects implemented at the level of the country	National biodiversity conservation programs, state energy efficiency initiatives
	International	They involve several countries or are implemented in international cooperation	UN environmental protection programs, international climate agreements
By type of financing	*State*	Funded from the state budget	State environmental programs, grants for scientific research
	Private	Funded by private companies or investors	Private ecological initiatives, investments in green technologies
	Public	Funded by public organizations and volunteers	Volunteer ecological projects, public greening initiatives
	Mixed	Funded from several sources: state, private and public	Environmental partner projects, grants and subsidies from various sources
By target audience	*Educational*	Aimed at increasing environmental awareness and education of the population	Educational programs, ecology courses, eco-education campaigns
	Scientific	Provide scientific research and development of environmental technologies	Climate change research, development of new waste processing technologies
	Practical	Projects that directly implement specific environmental measures	Planting trees, cleaning rivers, building energy-efficient buildings

*According to [59]

Environmental projects can be classified according to various criteria depending on their goals, objects of influence and directions of activity (table 1.1).

Environmental projects are diverse and include a wide range of activities aimed at preserving natural resources, reducing the impact on the environment, and improving people's quality of life. The choice of a specific type of project depends on the specifics of the problem to be solved and the goal to be achieved.

Emission reduction projects, also known as carbon footprint reduction projects, aim to reduce emissions of greenhouse gases and other harmful substances into the air, water or soil. Energy efficiency projects are aimed at reducing energy consumption and improving the energy efficiency of both industrial and residential facilities. Water conservation involves optimizing the use of water resources, reducing water losses and improving its quality. Soil protection is aimed at preventing erosion, restoring fertility and reducing chemical pollution. Biodiversity conservation includes the protection of species and their natural habitats.

Green technologies, such as renewable energy sources and secondary use of resources, have a lower impact on the environment. Green construction includes the construction and reconstruction of buildings with a minimal ecological footprint, using ecological materials and technologies. Waste recycling is aimed at the reduction, secondary use and recycling of waste. Urban ecology is aimed at improving the quality of life in urban conditions, including the development of green areas and the use of ecological vehicles [50].

In industrial projects, clean technologies and environmental standards are implemented to reduce negative impact on the environment. Agricultural projects are aimed at sustainable farming, conservation of soils, water resources and biodiversity. Tourism initiatives support the preservation of natural and cultural heritage, the development of ecotourism and the creation of a sustainable tourism environment.

Environmental projects also require greater attention to the assessment of environmental risks and impacts, and their performance is often measured not only by economic indicators, but also by environmental and social benefits (Figure 1.2).

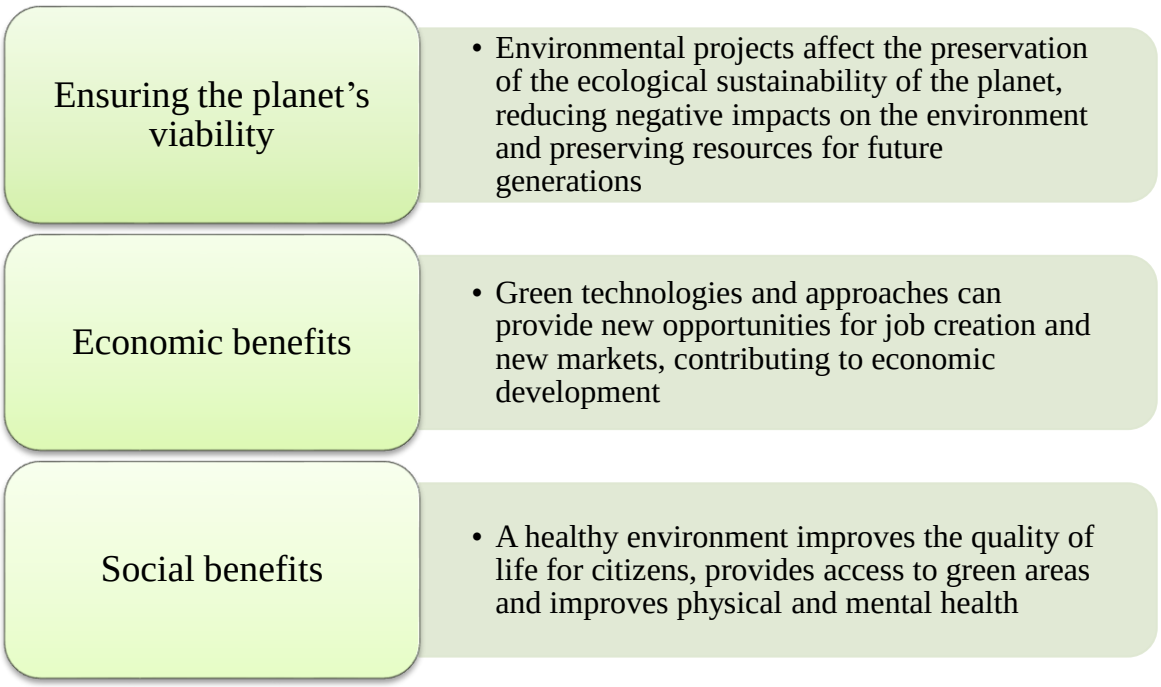

Fig. 1.2. Benefits of environmental projects *

* According to [10]

Environmental projects are extremely important for *ensuring sustainable development and conservation of natural resources*. They contribute to the *preservation of the planet's viability*, helping to maintain environmental sustainability.

Ecological sustainability is the ability of an ecological system (for example, an ecosystem or a community) to maintain its structure and functions under the influence of external factors without irreversible changes or harmful consequences. The main aspects of ecological sustainability are the preservation of biodiversity, regulation of populations, restoration of resources and the ability to adapt to changes in the environment. Ecological resilience means that an ecosystem can adapt to external changes, such as climate change or human intervention, without major loss of the functions and services it provides. This is important for ensuring the long-term preservation of natural resources and ensuring the ecological well-being of people [60].

Sustainable development is a concept of development that takes into account the needs of the present generation without jeopardizing the ability of future

generations to meet their own needs. This means ensuring balanced economic growth, social well-being and environmental protection, preserving natural resources for future generations and reducing the negative impact on the environment.

The Global Sustainable Development Goals (SDGs) are a set of 17 goals adopted by UN members as part of the "Next Generation Action Plan" to ensure sustainable development on the planet by 2030. These goals include tasks such as fighting poverty and hunger, ensuring access to education and health, gender equality, protecting the climate and oceans, ensuring a peaceful and just society, and more. Each goal has specific sub-goals and indicators that help measure progress toward those goals.

By reducing negative impacts on the environment, environmental projects preserve natural resources for future generations, which is a key aspect of sustainable development. Reducing emissions of harmful substances, restoring ecosystems and preserving biodiversity contribute to a healthy and balanced natural environment that supports all forms of life on Earth.

The importance of environmental projects to ensure sustainable development is manifested in many directions:

- conservation and recovery of natural resources;
- prevention of environmental disasters;
- contribute to the support and restoration of ecosystem services;
- ensuring social stability and well-being;
- stimulation of innovations and technological development
- activation of international cooperation;
- stimulating the implementation of environmental norms and standards.

Environmental projects are aimed at preserving and restoring natural resources such as water, soil, air and biodiversity. They help to minimize resource depletion and ensure their rational use, which is the basis for long-term sustainable development. For example, water conservation projects optimize the use of water resources, reduce water losses and improve water quality.

Initiatives to reduce greenhouse gas emissions, reduce air and water pollution, and manage waste help prevent environmental catastrophes such as climate change, acid rain, and ocean pollution. This is important not only for the preservation of ecosystems, but also for ensuring the health and well-being of people. Environmental projects help maintain and restore ecosystem services such as plant pollination, climate regulation, water purification, and food provision. These services are vital for human existence and ensuring stable economic development. A healthy environment contributes to the improvement of people's quality of life. Environmental projects help to create and maintain green areas that provide places for rest and recreation, improve the physical and mental health of citizens. They also contribute to increasing environmental awareness and involving the public in environmental initiatives, which forms a responsible attitude towards nature [12].

Environmental projects stimulate innovation and technological development in various industries. The development and implementation of new environmentally friendly technologies help reduce the negative impact on the environment and increase the efficiency of resource use. This includes the development of renewable energy sources, waste management systems, water and air purification technologies.

Sustainable development requires global cooperation and interaction between countries. Environmental projects often require a collective effort at the international level, which facilitates the exchange of knowledge, technology and resources. Such cooperation helps to develop effective solutions for global environmental problems and ensures their successful implementation. Environmental projects contribute to the development and implementation of environmental norms and standards. They influence the formation of environmental policy, contributing to the creation of legislative initiatives that stimulate environmental responsibility of businesses and citizens. This helps create legal conditions for sustainable development and ensure their compliance [63].

Environmental projects also bring significant *economic benefits*. The introduction of green technologies and environmentally friendly approaches creates new opportunities for business development, the formation of new markets and the

creation of jobs. This includes the development of renewable energy, energy-efficient technologies, green construction and waste management. Such innovations not only contribute to economic growth, but also reduce energy and resource costs, increasing the competitiveness of enterprises, stimulating investments in sustainable development and promoting economic growth.

The social benefits of environmental projects are also significant. A healthy environment directly affects people's quality of life. Improving the quality of air, water and soil, creating and preserving green areas in urban and rural areas contribute to improving the physical and mental health of the population. Access to clean water, fresh air and natural landscapes enables healthier lifestyles and contributes to the well-being of communities. Also, an important component is raising environmental awareness and public participation in environmental initiatives, which contributes to the formation of a responsible attitude to natural resources and the environment.

Environmental projects aimed at restoring and preserving natural resources reduce health risks associated with environmental pollution. For example, reducing the level of air pollution can significantly reduce the incidence of respiratory diseases, cardiovascular problems and other chronic diseases. At the same time, providing access to clean water helps reduce the spread of water-borne diseases, which is especially important for communities with limited access to health services.

Green areas in urban areas are not only the “lungs” of the city, absorbing carbon dioxide and producing oxygen, but also create space for recreation, physical activity and social interaction. Studies show that the presence of green spaces in cities helps reduce stress levels, improve mood and general mental well-being of residents. Such zones can also become a place for cultural and educational events, which strengthens social cohesion and development of local communities [61].

Increasing ecological awareness among the population is an important factor in ensuring sustainable development. Educational programs that emphasize the importance of environmental protection can change people’s behavior, encouraging them to live a more environmentally responsible lifestyle. Participating in local environmental initiatives, such as cleaning up litter, planting trees or separate waste

collection, not only improves the state of the environment, but also builds a sense of responsibility and unity among citizens.

Therefore, environmental projects play an important role in maintaining ecological, economic and social sustainability, ensuring the preservation of nature, stimulating economic development and improving the quality of life of people. Environmental projects are critical to sustainable development because they contribute to the conservation of natural resources, the maintenance of ecosystem services, the improvement of people's quality of life, economic growth and technological development. They are an important tool for overcoming global environmental challenges and ensuring a healthy and balanced future for future generations.

1.2. Modern trends in management and implementation of ecological projects

In the context of growing attention to sustainable development and environmental responsibility, the development and implementation of environmental initiatives is becoming a priority for governments, businesses and society. Modern trends in this area reflect a wide range of methodological, technological and social changes that ensure more effective and sustainable management of natural resources.

Modern trends in the introduction of ecological projects reflect the growing awareness of the need for sustainable development and the integration of ecological principles into all aspects of social life (table 1.2).

The use of the “green technologies” approach involves the use of innovative solutions to reduce the negative impact on the environment. This includes the introduction of renewable energy sources such as solar and wind power plants, the use of environmentally friendly materials in construction and the development of waste recycling systems. Examples of such projects include solar power plants in Germany, wind power plants in Denmark, green infrastructure projects in Singapore, and others.

Table 1.2

Modern trends in environmental project management*

Trend	*Onuc*	*Examples*
Green technologies	The use of innovative environmental solutions to reduce the negative impact on the environment.	Renewable energy sources, environmentally friendly building materials, waste processing systems.
Public involvement	Active participation of local communities in the process of planning and implementing environmental projects.	Public discussions, volunteer programs, partnership with local communities.
Digital technologies and data	Use of modern technologies for monitoring, analysis and management of environmental projects.	Geo-information systems (GIS), drones for surveillance, big data analysis.
Socially Responsible Investing (SRI)	Investing in projects taking into account their ecological and social impact.	Green bonds, environmental investment funds.
Circular economy	Creation of closed production and consumption cycles to minimize waste and maximize resource use.	Processing waste into resources, using secondary raw materials, composting organic waste.
Environmental responsibility of business	Implementation of the principles of sustainable development in corporate strategies and operational activities.	Environmental sustainability audits, environmental performance reporting, development of corporate environmental strategies.
Ecological Education	Integration of environmental knowledge into educational programs for training specialists in environmental issues.	Specialized courses at schools and universities, educational programs in ecology.
International cooperation	Joint efforts of countries to solve global environmental problems through the development and implementation of international strategies.	Sustainable Development Goals of the UN, international environmental agreements and initiatives.

* According to [30; 56]

Waldpolenz Solar Park (Germany) is one of the largest solar parks in the world, it covers an area of about 220 hectares. The solar park is capable of generating about 40 MW of electricity, which is enough to supply more than 10,000 households.

Beneficial results of its functioning are the reduction of dependence on fossil fuels, the reduction of greenhouse gas emissions and the promotion of the transition to renewable energy sources [53].

Wind park "Horns Rev 2" (Denmark) is located in the North Sea. It is one of the largest offshore wind farms in the world. With a capacity of 209 MW, the wind farm is capable of supplying energy to about 200,000 households. Thanks to this project, a significant reduction of CO2 emissions, support of energy independence and creation of jobs in the field of green economy are ensured [42].

The construction of the Google headquarters (Mountain View, California, USA) is an example of the use of environmentally friendly materials in the construction industry. During construction, wooden structures, energy-efficient glazing and natural ventilation systems were used. This made it possible to reduce the building's energy consumption by 30% and create a comfortable environment for employees. This is a good example of sustainable construction that can be used as a model for other companies and developers.

The waste recycling program in the city of Kamikatsu (Japan) aimed to implement a comprehensive waste sorting and recycling system that includes 34 different categories. As a result of the implementation of the program, the level of waste recycling reached more than 80 %; thus, the amount of waste going to landfills is reduced. The significance of these measures is to significantly reduce the environmental burden on the local environment, increase the environmental awareness of the population, and create a clean and healthy environment for life [25].

An example of green infrastructure in Singapore is the *Garden by the Bay project*. This is a large-scale project that combines botanical gardens, technological innovation and clean energy. Huge "supertrees" were built, which collect solar energy, accumulate rainwater and provide natural ventilation. The results of the project are to increase environmental awareness, reduce greenhouse gas emissions, and promote biodiversity in the urban environment [13].

Public involvement in the decision-making process and implementation of environmental projects is gaining popularity. This is achieved through the

organization of public discussions, the involvement of volunteers and partnerships with local communities. This approach not only increases the level of environmental awareness among the population, but also ensures the support and participation of local residents in projects, which contributes to their successful implementation.

The *Green Guerrilla Gardening project* (New York, USA) has become an initiative that involves local residents in the landscaping of abandoned urban areas. Volunteers plant flowers, trees and shrubs in wastelands, along roads and in parks. This contributes to improving the quality of the urban environment, creating new green areas, increasing biodiversity, increasing environmental awareness, strengthening the community and improving the aesthetic appearance of the city.

Plant-for-the-Planet is a global initiative. The initiative was started by a German schoolboy who called on young people around the world to plant trees to fight climate change. The project organizes educational events and engages children and youth in active participation in tree planting. The result was millions of trees planted around the world, raising awareness of climate change among young people. The project demonstrates how the involvement of the younger generation can have a great positive impact on the environmental situation and contribute to the creation of a sustainable future [41].

The Great Green Wall project in Africa is an initiative to create a green belt across the Sahel to combat desertification, including tree planting and agricultural development. The project actively involves local communities in planting and caring for plants. Planting trees improves farming conditions and reduces soil erosion. The involvement of local communities ensures the stability and success of the project, contributes to the economic development of the region and the improvement of the quality of life of the population [16].

The volunteer organization "Trash Hero" in Thailand conducts regular campaigns to clean beaches and streets, involving local residents and tourists. The result is the collection of thousands of tons of garbage, the improvement of the condition of natural areas, and an increase in the level of awareness of the problem of pollution. The active participation of the public in cleaning up the environment

contributes to the improvement of the ecological situation and the development of ecotourism [54].

The "Community-Led Total Sanitation" initiative (India) aims to improve sanitary conditions in rural communities by involving local residents in building toilets and organizing hygiene education events. Such an initiative helps to improve public health and raise the level of hygiene. Community participation in the project contributes to the sustainable development of sanitary practices, raising the standard of living and health of the population.

Thus, the involvement of the public in the process of decision-making and implementation of environmental projects is an effective approach that increases environmental awareness, promotes support for local initiatives and ensures the success of environmental measures. Active community participation can lead to significant positive changes.

Modern management of environmental projects is characterized by active *use of digital technologies and data*. Tools such as geographic information systems (GIS) for monitoring the state of the environment, the use of drones to monitor ecosystems, and the analysis of big data to predict environmental risks allow for more effective planning and management of projects, increasing their efficiency and accuracy.

The UK Space Agency uses environmental satellite data to address issues such as water pollution, carbon emissions and threats to biodiversity, and funds pioneering projects [1]:

- Earth Ltd (Bolton) – Modeling and monitoring nitrous oxide emissions in agricultural land using Earth observation and machine learning. It enables farmers to assess the impact of nitrogen on the environment.
- the EOLAS Insight Ltd project (Glasgow) offers an automated service for mapping and reporting on the climate resilience of watercourses. It helps organizations understand the impact of global temperatures on local watercourses, promoting mitigation strategies such as riparian forest projects.

- Frontierra project (London). Thanks to the cloud service, corporations and financial institutions can quickly and cost-effectively assess their impact on the climate.
- the Map Impact Ltd (Bristol) project uses a variety of data sources to illustrate climate change and pollution impacts. The project provides freshwater management for the entire basin. It helps predict events and reduce risks.
- Sparkgeo UK (Edinburgh) offers automated methane monitoring, interested parties can measure and track methane emissions in their domains. Warnings are triggered when emissions exceed acceptable levels.
- Agtelligence (London). FarmScore is a comprehensive scoring system that minimizes the impact of climate on agricultural land. Incorporating Earth observation data, ground truthing and a weighted valuation model, it measures critical environmental indicators and unlocks green finance opportunities.
- the Omanos Analytics project (Glasgow) improves planning for sustainable development, provides social context data on the demographic impact of climate change. It takes into account factors such as land use and traditional livelihoods.
- the Capterio satellite instrument (London) monitors and reduces gas flaring and methane emissions in global oil and gas supply chains.
- GeoSmart Information Ltd (Shrewsbury) automated groundwater level forecasting system uses Earth observation to improve resilience to climate change.
- the framework of Stellarsat Ltd (Bristol) uses a variety of data and artificial intelligence tools to address the risks facing critical energy infrastructure, such as electric vehicle charging stations and solar home systems, due to physical threats caused by climate change [1] .

The National Forest Monitoring System in Costa Rica uses GIS (Geographic Information Systems). The use of GIS to monitor the state of forests creates

conditions for increasing the accuracy of data on the state of forests, reducing the scale of illegal logging, and promoting the preservation of biodiversity. This increases the efficiency of forest resource management, the preservation of ecosystems and the support of sustainable development of the country. In Australia, drones are used to monitor the Great Barrier Reef. The use of drones is needed to monitor the condition of coral reefs, detect damage and assess restoration efforts. In this way, accurate data on the condition of reefs, quick identification of problem areas, and support for effective restoration measures are carried out. The positive effects are protecting one of the largest coral reefs in the world, preserving the marine ecosystem and raising awareness of reef issues. In the Netherlands, big data analysis is used to manage water resources. It is the use of big data for flood forecasting, water management and infrastructure planning. The results are an increase in the accuracy of flood forecasts, optimization of water resources management, and reduction of risks for the population and infrastructure. The Sentinel project (EU) involves the use of satellite data to monitor the state of the environment, including air quality, the state of water resources, and land cover change. The result is the provision of highly accurate information about the state of the environment in real time, supporting environmental research and policies. The Smart Cities Initiative is being implemented in India. It envisages the introduction of digital platforms for the management of urban ecosystems, including air pollution monitoring, waste and water management.

Modern technologies significantly change approaches to environmental project management, making them more efficient and accurate. The use of GIS, drones and big data analysis allows not only to better understand environmental processes, but also to respond to challenges in a timely manner, ensuring sustainable development and preservation of natural resources.

The financing of ecological projects has undergone changes. The role of socially responsible investing (SRI) is growing. Investors are increasingly paying attention to the environmental and social results of the projects in which they invest. This stimulates the development of “green” financial instruments, such as green

bonds, which contribute to the financing of projects that have a positive impact on the environment.

In 2017, France issued green bonds worth €7.5 billion to finance environmental projects in the fields of renewable energy, energy efficiency, biodiversity conservation and climate change adaptation. This has provided an opportunity to finance numerous projects, including the construction of solar and wind farms, the modernization of buildings to increase their energy efficiency, and the restoration of natural areas. AP7, Sweden's public pension fund, actively invests in companies that adhere to high environmental and social standards, and excludes from its portfolio companies that violate environmental regulations. The result is the creation of a sustainable investment portfolio with high environmental and social responsibility, reducing environmental risks and promoting the development of "green" technologies. In this way, sustainable development is supported through responsible investing, raising environmental awareness among investors and ensuring the long-term sustainability of the pension fund.

China uses green bonds to finance renewable energy. The Bank of China has issued $3 billion worth of green bonds to finance renewable energy projects, including solar, wind and hydropower. An increase in the volume of investments in renewable energy has led to an increase in the installed capacity of renewable energy sources and a decrease in CO2 emissions. It also means strengthening China's position as a world leader in renewable energy, contributing to global efforts to reduce greenhouse gas emissions, and strengthening energy security.

The investment strategy of the company "Generation Investment Management" (USA) is aimed at providing investments to companies working in the fields of renewable energy, energy efficiency and water resources management. This is one of the ways to support innovative companies that contribute to reducing the negative impact on the environment, increasing investments in sustainable technologies and growing the market of "green" technologies.

Japan's Development Bank issued $1.5 billion in green bonds to finance projects in renewable energy, energy efficiency and waste management. Funds have

been raised to develop sustainable infrastructure projects, reduce energy consumption and improve waste management. Support for environmentally friendly projects, promotion of the transition to a low-carbon economy, and ensuring Japan's sustainable development is ensured.

Investors are increasingly aware of the importance of environmental and social outcomes, which contributes to the financing of projects that ensure sustainable development and preservation of the environment.

International cooperation and partnership are of great importance for the successful implementation of environmental projects. Many environmental problems are global and require the joint efforts of countries to solve them. International organizations, governments and the private sector are joining forces to develop and implement global environmental strategies that allow for larger and longer-lasting results.

To support climate projects in developing countries, the UN introduced the international financial mechanism “Green Climate Fund” (GCF). GCF finances projects aimed at reducing greenhouse gas emissions and adapting to climate change. This allowed to attract significant investments in climate projects in more than 100 countries. This is a significant help to developing countries in the transition to sustainable energy, to increase their resistance to climate change, to reduce the global carbon footprint.

The UN initiative “REDD+” (Reducing Emissions from Deforestation and Forest Degradation) aims to reduce emissions from deforestation and forest degradation by providing financial rewards to countries that successfully reduce these emissions. The initiative is important for the preservation of forests in tropical countries, the preservation of millions of hectares of forest, and the reduction of greenhouse gas emissions.

The international organization “The Global Environment Facility” (GEF) unites governments, international institutions, public organizations and the private sector to finance environmental projects in different countries of the world. The results are the support of more than 4,500 projects in 170 countries aimed at

preserving biodiversity, reducing pollution, and sustainable management of land and water resources. This is of great importance for promoting global environmental security, increasing resilience to environmental threats, and strengthening international cooperation [51].

The Clean Seas Campaign, a global initiative from the United Nations, aims to reduce plastic pollution in the oceans through partnerships with governments, businesses and non-governmental organizations. More than 60 countries were involved in signing commitments to reduce plastic waste, numerous coastal clean-up activities were organized, and new policies regarding plastic products were introduced [9].

The International Solar Alliance (ISA) is a partnership of 121 countries dedicated to expanding the use of solar energy to combat climate change. The results are increased infrastructure for solar energy in participating countries, mobilization of financing for solar projects, increased availability of renewable energy. This contributes to reducing dependence on fossil fuels, reducing greenhouse gas emissions, and stimulates economic development in the field of renewable energy [23].

International cooperation provides more extensive and long-lasting results. The joint efforts of governments, international organizations and the private sector are the path to a sustainable future for our planet.

A significant role in modern ecological projects is played by the concept of circular economy, which aims to reduce waste and maximize the use of resources. This concept involves the creation of closed cycles of production and consumption, where waste from one process becomes resources for another. For example, organic waste can be turned into compost for agricultural needs, and industrial waste can be turned into secondary raw materials for new products.

The Ellen MacArthur Foundation develops and implements circular economy strategies in various economic sectors, including the textile and food industries. The results are the creation of closed cycles in textile production, where old clothes are recycled into new fabrics; implementation of food waste processing practices in the

food industry. In this way, a reduction in the use of primary resources, a reduction in the amount of waste, and the development of innovative solutions for recycling and reuse of materials are ensured.

Automobile manufacturer “Renault” (France) implements the principles of the circular economy in the production process, in particular through the recycling of old cars and the reuse of parts. The creation of a system of collecting and recycling old cars, where a large part of the parts are used in the production of new cars, leads to a reduction in the use of new resources, a reduction in the amount of waste, and a reduction in the environmental footprint of car production. The Loop initiative in the Netherlands aims to use organic waste from food production to create high-quality compost. Waste from restaurants and supermarkets is processed into compost, which is then used in agriculture.

The “LanzaTech” project in the USA is aimed at using innovative technology to convert industrial gas emissions into ethanol, which can be used as fuel or raw material for the chemical industry. The consequences are the transformation of carbon emissions into a useful product, the reduction of greenhouse gas emissions. This leads to a reduction in the environmental impact of industrial processes, the creation of new resources from waste, and support for the development of green technologies. The manufacturer of carpet coverings “Interface” (USA) implements the principles of the circular economy through the program of recycling old carpets into new ones. The implementation of the principles of the circular economy allows to significantly reduce the amount of waste, efficiently use resources and support sustainable development.

There is an increasingly noticeable tendency to increase requirements for *environmental responsibility of business*. Companies undertake to adhere to the principles of sustainable development, implement environmentally friendly technologies, minimize their carbon footprint and support environmental initiatives. This requires conducting an environmental sustainability audit, developing corporate strategies for sustainable development, and reporting on environmental indicators.

Project "Zero Carbon" of the company Microsoft. Microsoft has committed to becoming carbon neutral by 2030 and by 2050 to remove all the carbon it has emitted into the atmosphere since it was founded in 1975. The company invests in carbon capture technologies, uses renewable energy, conducts emissions audits and works to reduce its carbon footprint. This is a positive sign for other large corporations, demonstrating how business can effectively combat climate change and contribute to global efforts to reduce emissions.

The project "Sustainable Living Plan" of the company Unilever. It is a strategy aimed at reducing the company's impact on the environment, supporting the health and well-being of consumers, and improving living conditions for millions of people. As a result, a 65 % reduction in greenhouse gas emissions, a reduction in water and waste use, and the development of health-promoting products were achieved. This is of great importance for increasing the sustainability of the supply chain, improving the company's reputation among consumers, strengthening market positions thanks to environmental initiatives.

IKEA's *Circular Economy project* involves the implementation of programs for collecting old furniture for recycling, using renewable materials in products, and reducing waste in production. In this way, a significant reduction of the company's environmental footprint, promotion of sustainable consumer practices, and strengthening of the brand as a leader in the field of sustainable development are achieved [24].

Project "Green Power" of the company Google. Google is committed to going completely renewable for its data centers and offices. The company invests in solar and wind energy.

Amazon's Net Zero Carbon Emissions project. The "Climate Pledge" initiative, in which Amazon undertakes to achieve zero net carbon emissions by 2040. Investments are aimed at electric vehicles, the development of renewable energy, and the introduction of ecological practices throughout the supply chain.

Large companies can implement green practices and be responsible about their impact on the environment. Conducting environmental sustainability audits,

developing sustainable development strategies and reporting on environmental indicators are becoming important elements of corporate culture, which contributes not only to environmental protection, but also to strengthening the reputation of companies and their competitiveness.

In the educational sphere, attention is growing to *environmental education*, which is becoming an integral part of educational programs in schools and universities. Training of specialists in environmental issues is necessary to ensure sustainable development. Educational institutions implement specialized courses and programs in ecology, natural resource management and environmental law.

Global initiatives, such as the UN's Sustainable Development Goals, provide framework guidelines for the implementation of environmental projects at the national and international levels. They encourage countries to develop national strategies and action plans aimed at achieving environmental sustainability and improving the quality of life.

As the world becomes increasingly aware of the need for sustainable development, businesses are beginning to take notice. The tendency of companies to invest in environmental projects is growing. These projects can range from large-scale renewable energy initiatives to small community-based projects. Businesses invest in sustainability projects for a variety of reasons. Companies that apply green practices can save money on energy, water and waste disposal. They can also improve their public image and attract customers who are looking for sustainable products and services. Sustainable development projects also have a positive impact on the environment and society. They help reduce pollution, preserve natural resources and create jobs [4].

The following projects were recognized as the most sustainable projects in the world in 2023 [4]:

1. Masdar City project in Abu Dhabi. Masdar City is a place in Abu Dhabi that is designed to be completely neutral. The city uses renewable energy and uses sustainable technologies such as rainwater harvesting and solar street lighting. Masdar City is designed with high energy efficiency in mind, aiming to use 70 % less

energy than a traditional city. It is a pedestrian-friendly city with an emphasis on public transport and green spaces. It is a hub for cleantech companies aiming to become a global leader in sustainable development. Masdar City is an ambitious project, but it is also a good example of sustainable development. If it is successful, it can become a model for the implementation of environmental practices for other cities.

2. Öresund bridge between Sweden and Denmark. Öresund Bridge is a 16 mile long bridge. More than 20 million cars pass through the bridge every year. It is the longest railway and road bridge in Europe. The bridge is the main transport link between Sweden and Denmark and is also an environmentally friendly project. The bridge is powered by wind turbines and uses a number of other green technologies, such as energy-efficient lighting and recycled materials. The Öresund Bridge is a major achievement in engineering and sustainability, and is a valuable asset for both Sweden and Denmark. It is a model for other countries seeking to build a sustainable transport infrastructure.

3. Suzhou Industrial Park in China. Suzhou Industrial Park (SIP) is the largest industrial park in China. It is a joint venture between China and Singapore. It is home to more than 4,000 companies, including 86 Fortune 500 companies. The park is committed to sustainable development. The park's sustainability initiatives include energy efficiency, waste reduction and water conservation. It is a major center for high-tech industries such as information technology and biotechnology. Suzhou Industrial Park is a model for sustainable development companies. This is a successful example of how companies can work together to create a more sustainable future.

4. Certified LEED Platinum Bullitt Center in Seattle. The Bullitt Center is a LEED Platinum-certified commercial office building in Seattle, the highest level of LEED certification. The building is designed with high energy efficiency and uses solar panels and rainwater for all its water needs, including drinking water. The building is made of recycled materials of ecological origin. The Bullitt Center is a model of sustainable office buildings. This is an example of how businesses can reduce their impact on the environment and create a more sustainable future.

5. Green Mountain Power wind farm in Vermont. Green Mountain Power Wind Farm is owned and operated by the Green Mountain Power utility. The wind farm is a major source of renewable energy for Vermont and is also an environmentally friendly project. The power plant produces enough electricity to power more than 60,000 homes. A wind farm uses wind turbines that are designed to minimize noise pollution. The Green Mountain Power wind farm is an example of sustainable energy production. This is an example of how businesses can reduce their dependence on fossil fuels.

6. The Eden project in Cornwall, Great Britain. The Eden project is a botanical garden. The garden is home to a number of ecological features, such as a geodesic dome that contains a rainforest and a Mediterranean biome. The Eden Project is also a major tourist attraction (over 2 million visitors each year) and helps raise awareness of sustainability issues. The Botanical Garden uses renewable energy, including solar and wind energy. The Eden project is a model of sustainable tourism.

7. The Living Building Challenge (LBC) is a set of stringent green building standards. Buildings that comply with LBC are designed to have a positive impact on the environment and society. LBC is a leading example of sustainable companies and helps inspire other businesses and organizations to adopt sustainable practices. Buildings must be positive, i.e. produce more energy than they consume; buildings must collect and use rainwater for all their water needs; they must be constructed from recycled materials obtained from anabilized sources. LBC is a complex standard, but it is also promising [4].

Therefore, modern trends in the management and implementation of environmental projects are characterized by the integration of advanced technologies, active participation of the public, increased environmental responsibility of business, development of the circular economy, and strengthening of international cooperation. Such a comprehensive approach makes it possible to more efficiently solve environmental problems and ensure sustainable development of society.

1.3. Methodological aspects of project management in the ecological sphere

Project management in the environmental field is a complex and multi-component process that requires specialized approaches and methodologies. The success of environmental initiatives aimed at preserving natural resources, improving the environment and sustainable development of society depends on effective management. Project management in the environmental field has its own characteristics, which are determined by the specificity of environmental tasks and the need to take into account a wide range of impacts on the environment and society. Methodological aspects of managing such projects include a number of constituent elements that ensure successful planning, implementation and evaluation of environmental initiatives.

At the initial stage, it is necessary to conduct a thorough analysis of the situation. This includes assessing the environmental condition of the object or territory, identifying the main problems and defining the project's goals. For this, methods of environmental monitoring and environmental impact assessment (EIA) are used, which allow determining initial parameters and possible risks. It is also important to involve all stakeholders in the process, including local communities, businesses, non-governmental organizations and government bodies, to ensure the completeness and objectivity of the assessment. One of the first stages is defining the goals and objectives of the project. Goals should be clear, specific, measurable, achievable, relevant and time-bound (SMART). In the context of environmental projects, this may include reducing greenhouse gas emissions, increasing energy efficiency, improving water quality or preserving biodiversity. A clear formulation of goals allows you to focus efforts on specific results and evaluate progress in achieving the set goals [21].

The next stage is planning. The plan should include clearly defined milestones, timelines, resources and responsible persons. It is important to provide mechanisms for control and adjustment of the plan in case of unforeseen circumstances. One of

the tools at this stage is the development of a Logical Framework Matrix, which allows you to structure the goals, tasks, activities and expected results of the project. Planning in environmental projects must take into account various factors, including environmental, social and economic. In the process of project implementation, special attention should be paid to risk management. Environmental projects often face unforeseen challenges, such as natural disasters, legislative changes or social conflicts. Therefore, it is important to identify possible risks in advance and develop an action plan in case of their occurrence. This may involve the creation of reserve funds, the development of alternative strategies and constant monitoring of the situation. Creating a risk management plan will help prepare for potential problems and ensure their effective resolution.

An important component is monitoring and evaluation. Regular monitoring allows you to monitor the progress of the project, assess whether the obtained results correspond to the planned ones and detect deviations in time. Various tools and methods are used for this purpose, such as environmental monitoring, social research and financial audit. Project evaluation includes analysis of results and impact on the environment, society and economy. It can be both internal (performed by the project team) and external (performed by independent experts). The results of the evaluation help identify the strengths and weaknesses of the project, as well as formulate recommendations for improving future initiatives [59].

Communication and involvement of stakeholders is another important methodological aspect. Environmental projects often involve different groups of stakeholders, including local communities, government organizations, the private sector, and non-governmental organizations. Effective communication ensures transparency of processes, promotes trust and support of the project. Involvement of stakeholders at all stages of the project, from planning to implementation and evaluation, helps to take into account their interests and needs, which increases the chances of project success.

An important element of environmental project management is the use of innovative approaches and technologies. New technologies such as geographic

information systems (GIS), remote sensing, big data and analytics can significantly improve management efficiency. For example, GIS allows spatial analysis of environmental data, which is very useful for natural resource management. The use of drones and satellite images helps monitor changes in the environment in real time. Big data analytics allows forecasting environmental risks and optimizing management decisions.

Evaluation of the project results is the final stage, which allows to determine the achievement of the set goals and the efficiency of the used resources. For this, quantitative and qualitative indicators are used that reflect the environmental, social and economic impact of the project. It is also important to take into account the opinion of local communities and other interested parties, which allows to obtain an objective and comprehensive assessment of the results. To ensure the sustainability of the project results, it is necessary to provide mechanisms for the support and development of the achieved successes after the completion of the main stage. This may include the development of long-term natural resource management strategies, the implementation of educational programs to increase environmental awareness of the population, and the creation of institutional mechanisms to support environmental initiatives.

Environmental projects often use a variety of funding sources, including government grants, international donor programs, private investment, and crowdfunding. It is necessary to ensure transparency and efficiency of the use of funds, which is achieved through regular monitoring of expenses and reporting to financial donors and other interested parties.

Project management uses different methods. The most frequently used methods are analyzed below.

Waterfall. The waterfall method involves a linear and sequential approach to project implementation. The process is divided into stages such as planning, design, development, testing and implementation, which are performed in a strict sequence. This method is best suited for projects with well-defined requirements that do not change during execution, such as construction, manufacturing, or the implementation

of new systems. For example, a bridge construction project, where it is necessary to go through specific stages: research, design, construction and testing; development of a large ERP system for a company where all requirements are defined at the beginning and remain unchanged.

Agile. Agile methodology provides a flexible and iterative approach to project implementation. It consists of short cycles (sprints), during which the team performs a certain part of the work. Each cycle ends with a presentation of results, followed by a review of plans and adjustments. Agile is suitable for projects with a high degree of uncertainty and variable requirements, especially in software development and IT. For example, it is appropriate to use this approach for: creating a web application where requirements may change during the development process depending on feedback from users; conducting marketing campaigns, where the results are constantly analyzed and adjustments are made to improve efficiency. The main principles of Agile [11]:

- an iterative approach, in which the project is divided into small parts or iterations, each of which has its own goal and result;
- flexibility and the ability to change requirements and plans in the process of project implementation based on the obtained results and feedback;
- active participation of interested parties at all stages of the project to ensure their needs and expectations.

Scrum. Scrum is one of the most popular Agile frameworks that helps organize teamwork and project management. Features of the Scrum method:

- in Scrum there are three main roles – Product Owner, Scrum Master and Development Team;
- iterations (sprints) are used in management; these are short, usually two- or three-week cycles, during which the team works on specific tasks with a defined scope of work;

- management uses daily meetings (Daily Stand-ups); these are short meetings where the team discusses progress, plans for the day and possible problems;
- holding a sprint review; a meeting is held at the end of each sprint, where the team demonstrates the completed work to stakeholders and receives feedback;
- a sprint retrospective, i.e. a meeting to discuss what went well, what can be improved, and planning improvements for the next sprint.

The Kanban method. Kanban is a visual work management system that uses a board with cards representing tasks at different stages of completion. This allows teams to track progress and optimize workflows. It is used in IT, manufacturing, customer service and other areas where it is important to effectively manage the flow of tasks and quickly adapt to changes. The Kanban method is suitable for managing tasks in a software development team, where it is necessary to have a visual representation of progress and priorities. It is also possible to use this method for customer service, in particular for managing customer requests in the contact center in order to respond more quickly to requests [45].

Critical Path Method (CPM). CPM involves identifying the main project tasks that affect the total execution time. Tasks that are on the critical path are the most limited in time, and their delay will lead to a delay in the implementation of the project in general. This method is used in projects where it is necessary to optimize the execution time (construction, engineering projects, large infrastructure projects) [26].

Critical Chain Project Management, CCPM. CCPM is used to manage project resources. The method takes into account resource constraints and sets time margins for critical tasks to ensure timely completion of the project. It is used in projects with limited resources when it is necessary to allocate resources efficiently between tasks, for example between production, software development and scientific research. It is advisable to use CCPM for the development and launch of a new production line, where the optimal use of available resources is important. Also, the method can be

used for a software development project for a limited team of developers, where you need to effectively manage time and resources.

PRINCE2 (Projects IN Controlled Environments). PRINCE2 is a process-oriented project management method that provides a detailed description of the processes that must be followed to successfully manage a project. Includes clear roles and responsibilities, division of tasks and monitoring of progress. Suitable for projects in the public sector, large corporations and organizations where it is important to follow formal procedures and standards. For example, for the implementation of a national digitalization program in state institutions, the introduction of a new ERP system in an international company, where strict coordination between different departments is required [46].

Effective management of an urban garden project requires a comprehensive approach that includes a variety of management methods specific to this type of project. Project management methodology requires the creation of a detailed action plan. This means that you need to develop a clear and realistic plan that defines the tasks, goals, resources, deadlines and those responsible for the implementation of each stage of the project. To create an urban garden, such a plan may include the stages of soil preparation, planting trees and plants, installing an irrigation system, and landscaping the area.

To keep track of the project implementation process, systematic monitoring of project progress is required, and regular reports to stakeholders such as local authorities, sponsors and the community are required. Important elements of the methodology are the identification of potential project risks, such as adverse weather conditions, delays in the supply of materials or opposition from local residents. In the future, an adequate assessment of such risks and planning of measures to reduce their impact is necessary.

The quality management system includes establishing quality criteria and standards for all aspects of the project. For example, it could be a standard for the quality of the soil, the types of plants to be planted, or the materials for landscaping.

Regular inspection and control of the compliance of works with the requirements of these standards will help to improve the quality of the project.

Team management involves selecting qualified employees, defining their roles and responsibilities in the project. For example, a landscape designer will be responsible for designing a garden, an agronomist for plant selection, and an engineer for installing an irrigation system. Providing a favorable working environment, motivation and support for the project team are necessary conditions for success.

Effective communications management means developing a communications strategy. A communications strategy defines how information is shared between team members, stakeholders, and the public. These can be regular meetings, publishing reports and updating information on the project website. Identifying potential conflict situations, such as disputes over land use or plant selection, and developing strategies to avoid or resolve them is also an important part of this process.

Financial management covers the development and control of the project budget, cost management and ensuring financial sustainability. In particular, the calculation of the cost of materials, works and other resources necessary for the creation of an urban garden, as well as the search for additional funding or sponsors if necessary. It is important to regularly analyze the financial indicators of the project and make the necessary adjustments.

Proper stakeholder management is needed to ensure interaction with stakeholders (local residents, environmental organizations, local authorities, sponsors, etc.). Stakeholders should be involved from the initial stages of the project until its completion. For this purpose, it is necessary to organize public hearings, meetings and surveys. Providing an opportunity for feedback from interested parties regarding the implementation of the project allows taking into account their wishes and improving the project.

For effective management of the urban garden project, it is advisable to use a combination of project management methods aimed at achieving successful project results. Below are the benefits of popular project management methods for creating an urban garden.

Benefits of Agile for an urban garden project:

- allows you to quickly respond to changes in project requirements and conditions;
- the project is divided into short iterations (sprints), which contributes to continuous improvement and reduces the risk of unsuccessful completion;
- based on interaction and involvement of the customer, which contributes to the understanding of his needs and requirements.

Advantages of Waterfall for an urban garden project:

- suitable for projects with a clear structure and sequential execution of stages;
- requires detailed documentation of each stage, which facilitates control and assessment of progress;
- the customer determines the requirements at the beginning of the project and does not require active participation at each stage.

Benefits of Scrum for an urban garden project:

- aimed at working in a team, which allows effective use of resources and skills of each project participant;
- breakdown into short sprints with fixed deadlines helps to deliver results quickly and reduces risks;
- systematic feedback and adaptation to changes in requirements and conditions.

The choice of project management method depends on the specific needs of the project, its characteristics and features. For example, a combination of Agile and Scrum methods may be appropriate for the project of an urban garden.

The project of creating an urban garden can be divided into several iterations. For example, the first iteration might be landscape design, the second iteration might be soil preparation and tree planting, the third iteration might be setting up an irrigation system, and so on. During each iteration, the team can receive feedback from local residents and other stakeholders, make adjustments, and adapt to new requirements or conditions.

Using Scrum, the product owner (in this case, it could be a representative of a local government or a public organization) works closely with the project team and

the city’s residents, gathering their requirements and wishes. Regular sprint reviews allow stakeholders to monitor progress and provide feedback that ensures the project meets their expectations. Daily meetings of the project team allow for prompt resolution of emerging problems and coordination of work. Sprint retrospectives help to analyze the work done, find weak points and look for ways to improve them, which contributes to continuous improvement of processes and results [44].

For example, in the project to create an urban garden in Boston (USA), the team used the Agile approach to organize work. First, a series of workshops were held with local residents to gather their ideas and wishes. The project was then broken down into several iterations: design, soil preparation, planting, installation of lighting and irrigation systems. Each iteration ended with a sprint review, where the team received feedback from the community and made the necessary adjustments. In the project of creating an urban garden in Berlin (Germany), Scrum was used to organize the work of volunteers. Each sprint lasted two weeks and included the tasks of preparing beds, planting crops, installing compost pits and other activities. Weekly volunteer meetings helped coordinate efforts and quickly resolve issues.

The combination of Agile and Scrum methods in the project of creating an urban garden allows for flexibility and adaptability to changes in requirements, and also promotes active interaction with stakeholders. This approach helps to effectively plan, organize and control work, ensuring a high level of quality of execution and meeting the needs of the community.

Therefore, project management in the environmental field requires an integrated approach that takes into account the complexity of environmental problems and the need for interdisciplinary cooperation. Methodological aspects of project management in the environmental field include a comprehensive approach to planning and implementation, taking into account the specifics of environmental tasks and the need to involve a wide range of stakeholders. Important elements are clear definition of goals, detailed planning, constant monitoring and evaluation, effective communication and involvement of stakeholders, as well as the use of modern technologies. Complex management of the project of creating an urban

garden includes various management methods aimed at achieving the set goals of the project, ensuring the quality of work, managing risks and resources, as well as effective communication and cooperation with stakeholders. The implementation of such methodological approaches allows to ensure the successful implementation of environmental projects and contributes to the achievement of sustainable development.

CHAPTER 2. ANALYSIS OF PROVIDING THE IMPLEMENTATION OF THE ECOLOGICAL PROJECT OF THE CREATION OF THE URBAN GARDEN “GREEN OASIS”

2.1. Analysis of the problem and development of the idea of the ecological project of creating a urban garden

Modern cities face numerous environmental challenges, such as air pollution, shrinking green spaces, and loss of biodiversity. Analysis of these problems indicates the need to integrate natural elements into the urban environment to improve the quality of life of residents. The issue of environmental protection is gaining more and more relevance. Climate changes, environmental pollution, depletion of natural resources – all this forces society to look for new approaches to economic activity. In this context, the development and implementation of ecological projects that contribute to the preservation of nature and sustainable development of cities becomes important. One of these projects is the creation of urban gardens, which can become an important element of the ecological infrastructure of modern urban environments.

When analyzing the problem and developing the idea of an ecological project, it is appropriate to use the concept of permaculture, which offers innovative and sustainable solutions for the development of urban spaces. Permaculture is a design system based on ecological and biological principles aimed at creating sustainable and self-sufficient ecosystems. This term was first introduced by Australian ecologists Bill Mollison and David Holmgren in the 1970s and is derived from the words “permanent agriculture” or “permanent culture” [58].

In figure 2.1. the basic principles of permaculture are systematized. The application of permaculture in the urban environment can be implemented through the creation of urban gardens, public gardens, green roofs and vertical gardens. This allows not only to provide the city with fresh food, but also to increase its environmental sustainability, improve air quality and reduce the city's thermal (greenhouse) effect.

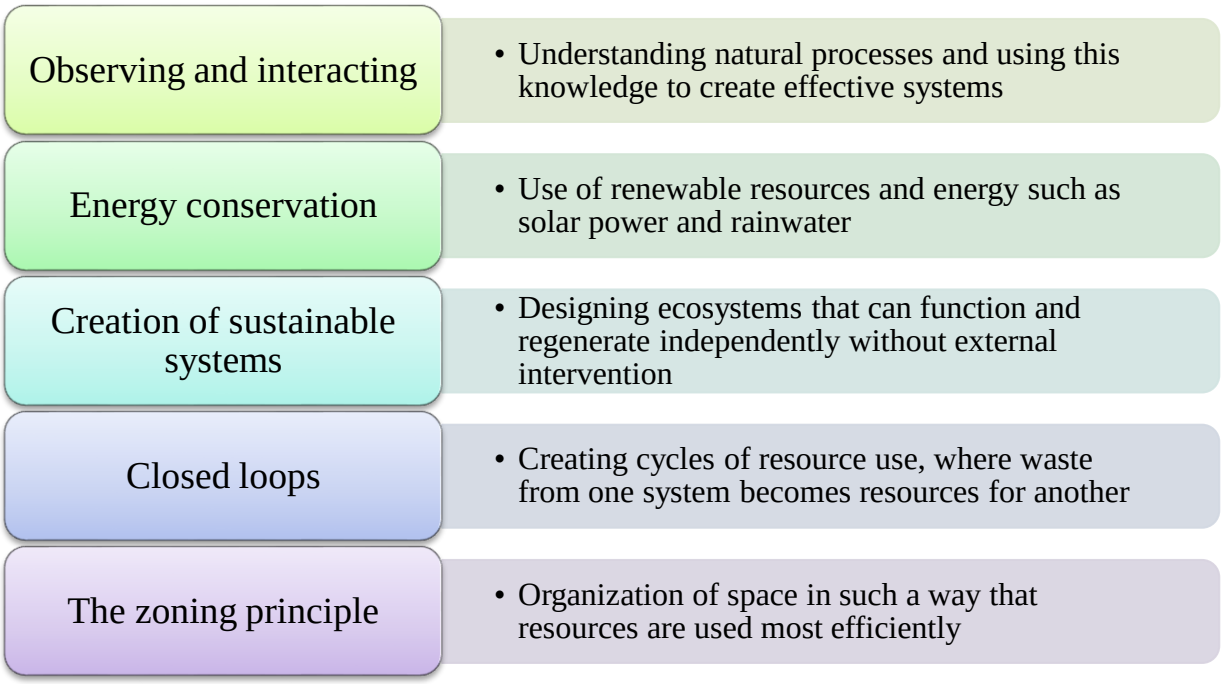

Fig. 2.1. Permaculture principles *

*According to [40]

The use of the concept of permaculture in urban environmental projects, such as the creation of urban gardens, is appropriate and justified. Urban gardens built according to the principles of permaculture can become an important element of the ecological infrastructure of the city, providing the local population with fresh, organic products, increasing biodiversity and contributing to the creation of green, attractive urban spaces. Implementation of the idea of permaculture in urban ecological projects will help to create sustainable and self-sufficient systems that benefit both people and the environment [40].

Creating an urban garden is an effective solution that can simultaneously solve several environmental problems:

- the green zone will help to reduce the level of air pollution due to the absorption of harmful substances by plants;
- the city garden will contribute to increasing the level of biodiversity, providing a habitat for various species of flora and fauna;

- such projects contribute to social integration and improvement of the population, giving residents the opportunity to relax and interact with nature.

Developing an idea for an urban garden includes planning the site, choosing plants that are adapted to the local climate, and creating infrastructure for convenient access and maintenance of the garden. The successful implementation of this project will require cooperation between the city government, environmental organizations and local communities, which will ensure sustainable development and a long-term positive impact on the city's ecosystem.

Urban gardens can have different forms and purposes. They can be created as public spaces for recreation, as educational sites for schoolchildren and students, where you can study ecology and botany in practice. Particular attention should be paid to the selection of plants for the urban garden: they should be resistant to local conditions, undemanding in care and those that contribute to the preservation of local biodiversity. Planting local plant species can significantly improve the ecological stability of the garden [33].

It is important to provide adequate infrastructure for visitors, including comfortable paths, places to rest, lighting and information stands about the plants and animals that live in the garden. Such an infrastructure will not only make the garden more accessible and attractive to visitors, but will also contribute to environmental education and awareness of environmental protection.

To implement the project, it is necessary to involve local communities in the process of planning and creating a garden. This can be done through public discussions, workshops and volunteer programs. Involvement of residents will increase their responsibility for maintaining the garden and strengthen social ties in the community.

Funding for the project can come from a variety of sources, including city budgets, grants from environmental organizations, private donations and sponsorships from local businesses. It is also important to provide a plan for sustainable management of the garden, which will include regular care, monitoring of

the condition of plants and animals, and the organization of activities to maintain community interest in the garden.

Urban gardening has a rich history that has evolved over time. The integration of vertical gardens into urban planning and architecture is becoming more common as awareness of their benefits grows. The Bosco Verticale project in Milan, Italy, demonstrates how vertical gardens can transform urban landscapes. This provides many environmental and social benefits, including better air quality and the creation of green spaces. One Central Park in Sydney (Australia) is an exemplary project that integrates vertical gardens into architectural design. This project became a milestone for sustainable urban development, demonstrating the potential of vertical gardens to improve urban aesthetics. The Pasona O2 office building in Tokyo incorporates vertical farming, demonstrating the potential of food production in an urban environment. This innovative project demonstrates how vertical gardens can contribute to sustainable urban agriculture [52].

A successful example of implementing an urban garden can become a model for other cities, demonstrating how relatively simple environmental initiatives can significantly improve the quality of the urban environment, increase environmental awareness and create a healthier and more pleasant place to live.

When developing an idea for any project, it is important to understand what main problem it can solve. All further work on the project, its goals, tasks and expected results depend on the definition of the main problem. One of the effective methods of problem analysis is the use of a “problem tree”. A problem tree is a visual tool that helps systematize and structure problems, understand their relationships and causes. The tree of problems is necessary in order to clearly see the whole picture of the situation, to identify the main causes of the problem and its consequences. This allows project developers to focus their efforts on solving the main aspects. Also, the problem tree helps determine which problems can be solved within the project, and which may require external intervention or additional resources.

To build a problem tree, first identify the main problem that needs to be solved. This problem becomes the trunk of the tree. Next, the causes of this problem are

determined – they form the roots of the tree. Each cause may have sub-causes detailing the root system. After that, the consequences of the main problem, which become the branches of the tree, are analyzed. Each consequence can have its own sub-consequences that expand the branch structure [20].

Thus, the problem tree helps to better understand the essence and structure of the problem, contributes to the systematization of information and makes it easier to make informed decisions about ways to solve it. It is a tool that provides a clear picture of the problem and its context, which is necessary for effective project planning and implementation.

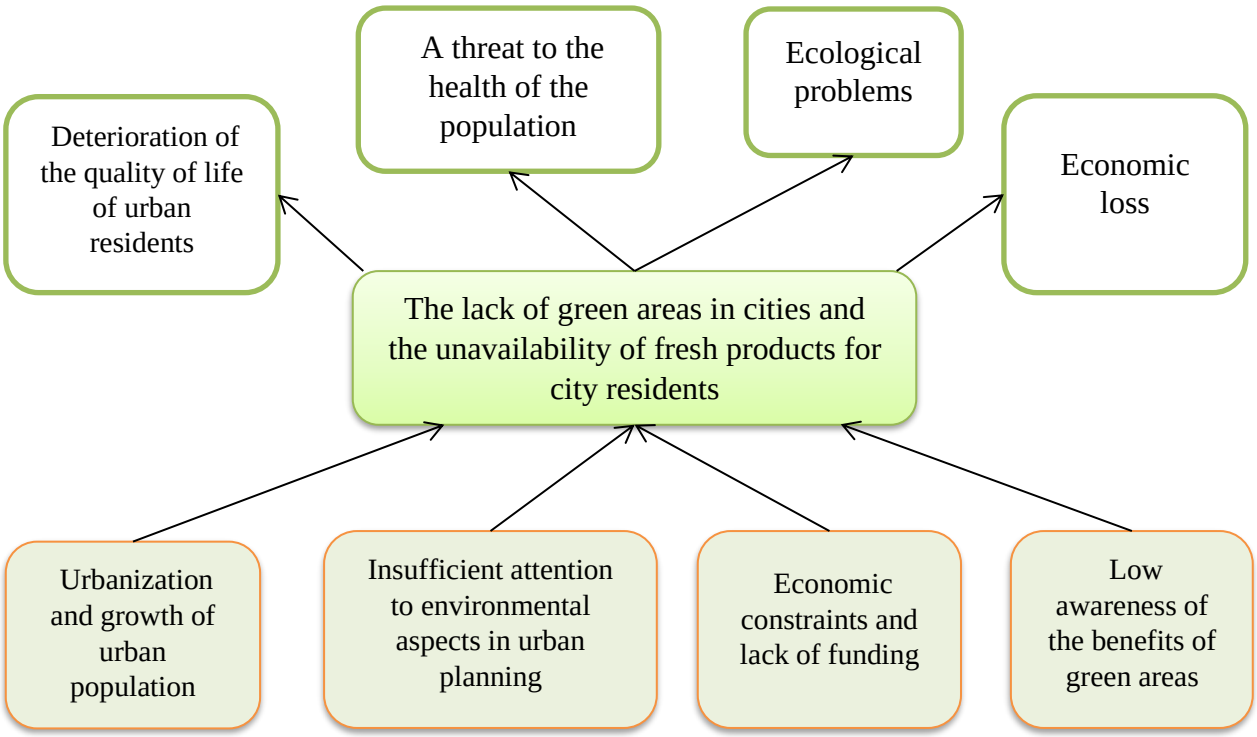

Fig. 2.2. Problem tree of the project of creating an urban garden*

*Compiled by the author

The main problem that the project aims to solve is the lack of green areas in cities and the unavailability of fresh products for city dwellers. There are various reasons leading to the problem of insufficient green areas in cities. Rapid population growth in cities leads to a decrease in green areas and an increase in the built-up area. Urban planning often does not take into account the need for green areas. Lack of

funds and limited city budgets can make it difficult to implement such projects. In urban areas, access to fresh vegetables and fruits, which is essential for a healthy lifestyle, can be limited. Low awareness of urban residents about the benefits of green areas makes it difficult to support such initiatives.

If you ignore the solution of these problems, it will lead to a number of negative consequences. A decrease in the number of green areas leads to a deterioration of air quality, an increase in the thermal effect of the city and general stress in the urban environment. Limited access to fresh food leads to malnutrition and poor health of residents, including an increased risk of heart disease and other chronic diseases. The reduction of green areas complicates the drainage of rainwater, increases the threat of floods and reduces the biodiversity of urban ecosystems. The lack of green areas can lead to a decrease in the city's attractiveness for investment, tourism and new residents, which can have a negative impact on the city's economic development.

The feasibility of implementing a project to create a city garden is confirmed by the following potential ecological, social and economic advantages [22; 47]:

- increasing green infrastructure in cities, which improves air quality and reduces CO2 emissions;
- preservation of local biodiversity;
- improving the quality of life, opportunities for active recreation, physical activity and socialization for local residents;
- public gardens can serve as educational centers where local residents can learn gardening and responsible use of natural resources;
- urban gardens can increase tourism potential by attracting visitors and promoting local business;
- providing an incentive for the development of local small businesses (coffee shops, shops selling gardening products, etc.);
- green areas in cities help to reduce stress and improve the mental health of residents;

- providing access to fresh organic products, which promotes a healthy lifestyle.

The target audience of the city garden project includes various groups of city residents who are interested in green initiatives and social projects. Local residents, such as families with children, are interested in creating a safe space for walking and active recreation. Hobby gardeners who want to start gardening but don't have enough land at home are also part of this audience. Local businesses and organizations, businesses that want to support environmental initiatives through sponsorship or volunteer work, as well as non-profit organizations, schools and churches looking for educational and community outreach opportunities may also be interested in such a project. Local authorities, municipalities, local planning departments strive to improve the quality of urban green areas and the development of ecological infrastructure. In addition, part of the target audience is tourists and visitors who are interested in new urban attractions and green areas for recreation [38].

When developing an idea for any project, it is important to understand what main problem it can solve. All further work on the project, its goals, tasks and expected results depend on the definition of the main problem. One of the effective methods of problem analysis is the use of a "problem tree". The project of creating an urban garden is important for the sustainable development of cities, improving the quality of life of residents and preserving the environment. It contributes to the ecological, social and economic sustainability of cities and ensures proper use of free urban space. This project is intended for all city residents who seek to improve their lives through the creation of natural and green areas in the urban environment. The project offers opportunities for social integration, physical activity and educational initiatives, contributing to the healthy and ecologically sustainable development of the city.

2.2. Formulation of the goal, objectives and tasks of the project of creating a urban garden

Environmental projects focus on nature conservation, rational use of resources and improving the quality of life through environmentally responsible practices, ideal for an urban garden or community garden.

The main goal of the urban garden project is to improve the environment, reduce the carbon footprint, increase environmental awareness and sustainable use of urban land for growing food.

The urban garden project has several main objectives that reveal its overall purpose. The first goal is to provide access to fresh produce. This includes growing high-quality vegetables and fruits, organizing an irrigation and garden maintenance system, and teaching local residents about gardening and responsible use of resources. The second goal is aimed at green landscaping and improving the quality of urban space, which will improve the quality of the environment. For this purpose, the planting of trees and bushes is provided, which will help reduce CO2 emissions and improve air quality, create areas for rest and recreation of residents, as well as improve the aesthetic appearance of the urban space through landscape design. The third goal is focused on raising awareness and participation of local communities in the project. This includes organizing educational events and seminars on ecology and horticulture, involving local residents in volunteer work in the garden, as well as creating mechanisms for feedback and information exchange with the community (Figure 2.3).

Let’s analyze these project goals from the SMART point of view. The first objective – providing access to fresh produce through the creation of a community garden – is specific because it clearly identifies the need for a community garden to provide access to fresh produce. It is measurable, as it is possible to estimate the number of planted plants and the yield that increases over time. The goal is achievable with adequate funding and volunteer support. It is significant because increasing access to fresh products will contribute to improving the health and quality

of life of local residents. The goal is time-limited, because a clear deadline and implementation schedule must be established for its achievement.

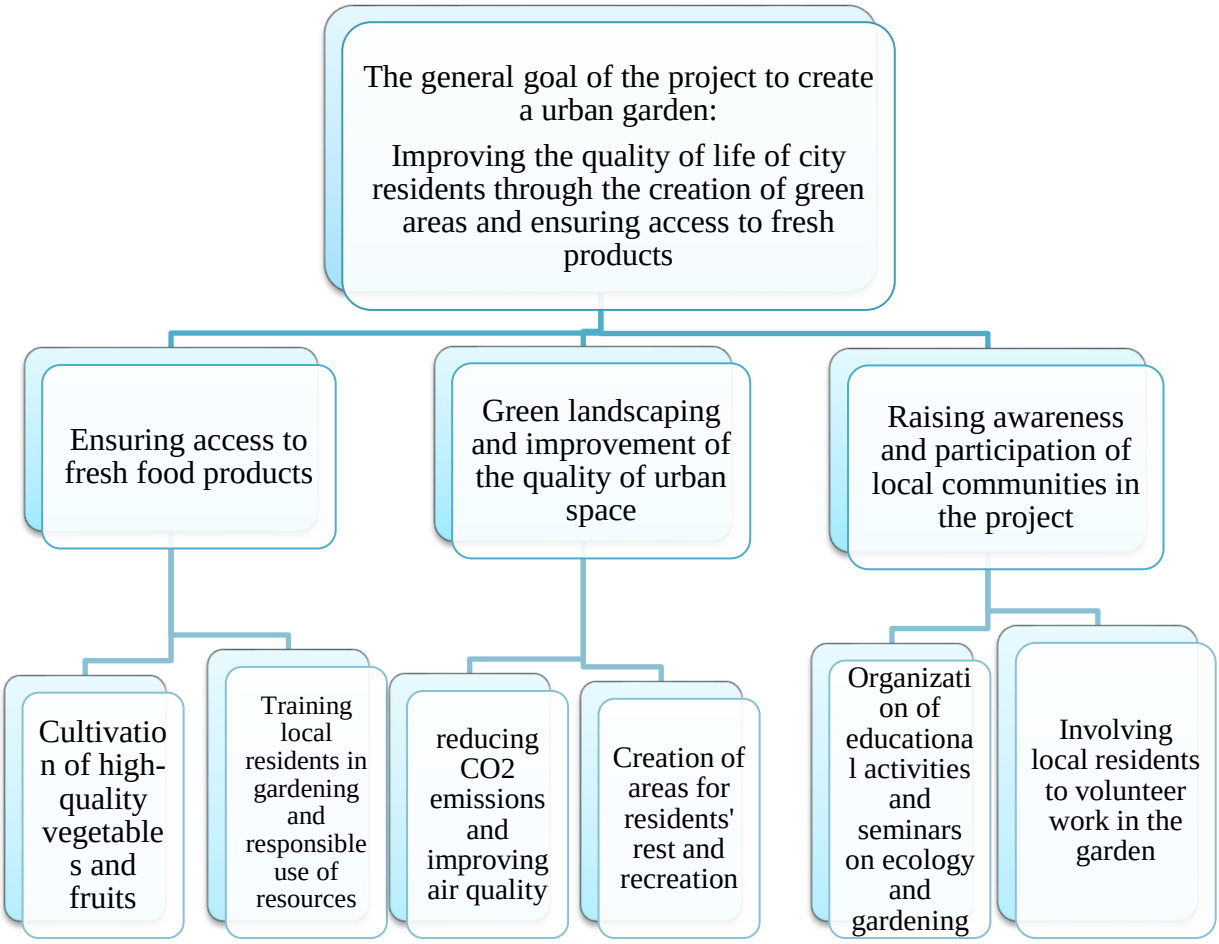

Fig. 2.3. Goal tree for the urban garden project*

*Compiled by the author

The second goal – the green improvement of urban space to improve the quality of the environment – also meets the SMART criteria. It is concrete, because it clearly defines the need to improve the quality of the environment through the green improvement of urban space. Measurable, as it is possible to assess the number of trees planted, the state of the air and the general ecological state. Achieving this goal depends on the availability of funding and support from local authorities. It is significant because improving the quality of the environment contributes to the health and well-being of local residents. The goal is also time-bound and must be achieved within a set time frame.

The third goal - raising awareness and participation of local communities in the project - is specific, as it defines the need to raise awareness and involve local communities. Measurable, because it is possible to estimate the number of participants in educational events, volunteers and the level of community involvement. Achievable, because it depends on the quality of the organization of educational events and the involvement of relevant partners. It is significant because raising awareness and community involvement will help create sustainable support for the project. The goal is time-limited, because it is necessary to determine the time frame for conducting educational activities and involving the community. Project goals meet the SMART criteria, which is important for their successful implementation.

An urban garden project has its own strengths, weaknesses, opportunities, and threats, which can be analyzed using a SWOT analysis. Among the strengths of the project, it is possible to single out a significant positive impact on the quality of life of the city's residents, promoting sustainable development and green construction, increasing environmental awareness and increasing biodiversity. The project also has the potential for social integration and cooperation in the community, an opportunity to teach horticulture and develop the skills of local residents [19].

The high costs of creating and maintaining infrastructure can become a serious obstacle. The project requires a management and maintenance system that requires constant supervision, and there is also a high dependence on volunteers and local activism. This can create additional problems for the implementation and functioning of the project.

Among the opportunities of the project, it is worth noting the growing interest of local authorities and support from local communities. There is an opportunity to expand the project and attract additional financial resources, as well as support from green and environmental organizations, which can contribute to the long-term success of the project.

However, there are also threats that can negatively affect the project. Economic difficulties and lack of funding can become a serious obstacle to its implementation.

Political and legal restrictions on land use can complicate the process of creating an urban garden. In addition, there is a risk of potential conflicts with local residents or other structures, which may affect the development of the project [49].

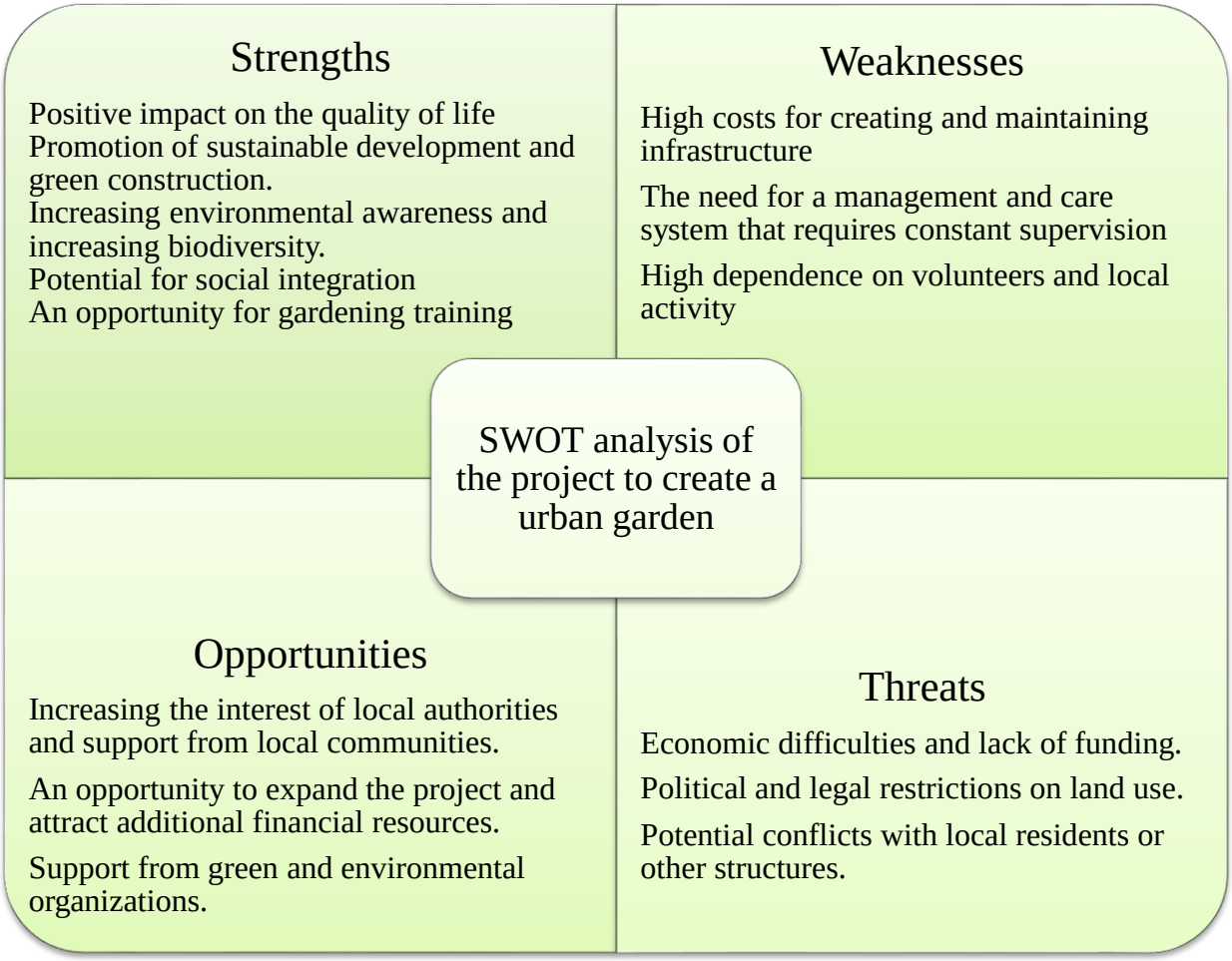

Fig. 2.4. SWOT analysis for the project *

*Compiled by the author

The project tasks can be divided into several main stages, each of which has its own characteristics.

Project planning and preparation

- Identification and analysis of possible land plots for placing a city garden. Taking into account the availability, size and ecological condition of the territory.
- Development of a project plan, which includes the work schedule, budget, necessary resources, responsible persons and implementation stages.

- Obtaining the necessary permits, interaction with local authorities to obtain all necessary legal and administrative permits for the use of the land plot and the creation of a city garden.

Project financing

- Identification of funding sources, including grants, donor programs, private investments and the local budget. Carrying out a fund-raising campaign.
- Development of a detailed budget for the project, which includes costs for the creation and maintenance of infrastructure, procurement of plants, materials and equipment, labor and other costs.

Design and infrastructure development

- Development of the design of the city garden taking into account ecological principles. Definition of zones for different types of plants, paths, recreation areas and other elements.
- Carrying out works on the preparation of the territory, including cleaning, marking, installing a fence, supplying water and electricity, creating beds and planting areas.

Purchase and planting of plants

- Determination of the types of plants that will be planted in the city garden, taking into account local climatic conditions and the needs of the community.
- Purchase of necessary plants and materials, organization of the process of planting plants with the involvement of volunteers and local residents.

Garden management and care

- Creating a garden management plan that includes regular plant care, watering, fertilizing, pest and disease control.
- Organization of training programs for volunteers and local residents on garden care, horticulture and environmental responsibility.

Communication and cooperation with stakeholders

- Creation of a communication strategy with local residents, authorities, environmental organizations and other interested parties.

- Conducting meetings, seminars and discussions with the aim of involving the public in the project, receiving feedback.

Monitoring and evaluation

- Implementation of a system of regular monitoring of all stages of the project, assessment of work performance and achievement of goals.
- Preparation of reports for interested parties, analysis of results and making necessary adjustments to the project plan.

The main goal of the urban garden project is to improve the environment, reduce the carbon footprint, increase environmental awareness and sustainable use of urban land for growing food. Goals and sub-goals specify the general goal of the project and allow defining specific tasks to achieve the ultimate goal of improving the quality of life of city residents through green areas and fresh products. SWOT analysis allows you to assess the potential of the project, as well as identify potential problems and opportunities for further development. A SWOT analysis of the urban garden project demonstrates both positive aspects and challenges that the initiative may face. Taking these factors into account will allow you to better prepare for the implementation of the project and increase the chances of its successful implementation.

2.3. Project risk management

Project risk management is the process of identifying, assessing, analyzing and responding to risks that may affect the execution of the project. A risk is defined as an uncertain event or condition that, if it occurs, has a negative impact on the project's results. The purpose of risk management is to minimize the negative impact and maximize the opportunities that may arise during the implementation of the project.

Thanks to the timely identification and analysis of risks, it is possible to develop strategies to eliminate them or reduce their impact, which increases the probability of successful project implementation. Risk management allows you to optimize the allocation of resources, directing them to solve the most critical

problems. Identifying and planning risks helps avoid additional costs and delays associated with their occurrence. Understanding risks and their consequences allows project managers to make more informed decisions.

Table 2.1

Methods of risk management *

Stages of risk management	Management methods	Examples
Identification of risks	Brainstorming, SWOT analysis, analysis of past projects, survey of experts	At the stage of planning the construction of a new facility, engineers brainstorm to identify possible technical risks
Risk assessment	Quantitative analysis (e.g. Monte Carlo method), qualitative analysis (e.g. building a probability and impact matrix)	A software development project uses a probability and impact matrix to assess the risk of product delay
Risk analysis	Scenario analysis, sensitivity analysis, tree-based decision analysis	In the project of implementing a new information system, an analysis of scenarios is carried out to assess the impact of possible failures on the company's work
Development of a risk response plan	Development of strategies for avoiding, mitigating, transferring or accepting risks	The road construction project is developing a plan to mitigate the risks associated with bad weather conditions, which includes additional time reserves
Risk monitoring and control	Regular meetings, review and update of the risk register, use of project management software	In the production modernization project, weekly meetings are held to discuss current risks and assess the effectiveness of response measures

* According to [14]

During the implementation of environmental projects, various risks may arise that may affect their success. The most common risks:

Regulatory and legal risks. Changes in environmental legislation, regulatory requirements or legal regulations may affect the project. For example, the

introduction of new standards for greenhouse gas emissions may require additional investment in technology to reduce emissions.

Financial risks. Instability of funding, budget overruns or unexpected costs can jeopardize the project.

Technological risks. The introduction of new or unproven technologies may lead to technical failures or poor performance.

Environmental risks. Unforeseen changes in natural conditions or adverse environmental events can negatively affect the project. Extreme weather conditions, such as floods or droughts, can destroy a project's infrastructure or make it impossible to complete.

Social risks. Opposition from local communities or stakeholders can delay or complicate project implementation. For example, a forest conservation project may face protests from local residents who depend on these forests for their livelihoods.

Risks of management and organization. Inadequate planning, poor resource management, or ineffective coordination lead to project disruptions, overruns, or budget overruns.

Safety and health risks. Work related to environmental projects may involve risks to the health and safety of workers. For example, a project to clean up contaminated sites can endanger the health of workers due to contact with toxic substances.

Political risks. A change in the country's political course may lead to the withdrawal of government support for an environmental project.

Supply and logistics risks. Interruptions in the supply of necessary materials or equipment can delay the implementation of the project.

An urban garden project may face various *financial risks*, such as insufficient funding and increased costs. Insufficient funding can be a barrier to purchasing the necessary materials and infrastructure to create a garden, as well as to ensure proper care and support. Underestimating the costs of care and maintenance of the garden can lead to exceeding the planned budget and increasing the financial costs of the project. *To minimize or avoid these risks*, it is necessary to make a detailed financial

plan with the calculation of all costs. This will allow you to determine the required amount of funding and prevent underfunding. It is advisable to attract funding from local businesses, organizations and residents of the city through crowdfunding or sponsorship programs. To avoid an increase in costs, you need to carefully evaluate all costs and include reserves for unforeseen costs. The use of environmentally efficient techniques and materials will also help to reduce costs on a long-term basis, as it will reduce the operating costs of maintaining the garden.

Environmental risks include deterioration of soil or water quality and the risk of disease spread. Deterioration of soil or water quality can occur due to uncontrolled application of agrochemicals or waste, which leads to pollution of the local environment. The risk of disease spreading among plants can occur due to careless maintenance. *To minimize or avoid these risks*, it is necessary to use organic gardening methods without the use of harmful chemicals, and to install drainage and filtration systems to protect water resources. To prevent the spread of disease, you should use healthy plants and take measures to prevent disease, such as proper watering and fertilization. Regular inspections and early detection of plant problems are also important measures to maintain garden health [5].

It is important to consider both *social and political factors*. *Social risks* include the possibility of low community support. There is potential for conflict between residents over access to or management of the garden, which can lead to social misunderstandings. *Political risks* include changes in local legislation that may affect the project's ability to retain land. Political instability, changes in power, can lead to a halt in funding and support for the project.

In order *to minimize or avoid social risks*, it is necessary to include local residents in the decision-making process regarding the design and management of the garden. Organizing meetings and consultations to collect feedback and make changes to the project can help increase the level of support. To prevent conflicts between residents, it is necessary to develop clear rules and policies regarding the use and management of the garden, as well as to promote mutual understanding and conflict resolution through mediation and other methods. *To reduce political risks*, it is

important to maintain regular contact with local authorities and monitor changes in legislation, ensuring compliance with all regulatory requirements and obtaining necessary permits. In case of political instability, developing partnerships with different political groups and organizations will help ensure support for the project. It is important to plan for different scenarios and provide flexibility in project management that will allow adaptation to changing political conditions.

Analyzing the risks of the project of creating an urban garden, it is necessary to take into account *technical and technological risks*. Technical risks include damage to infrastructure, which may lead to reduced yields due to failure of irrigation systems or other technical means; defects in design or construction. Technological risks are associated with the possibility of equipment failure, such as irrigation systems, which threatens crop losses. Lack of access to technical support can make it difficult to solve technical problems, which can affect the stability and productivity of the garden. *To minimize or avoid technical risks*, it is necessary to carry out regular technical inspection and scheduled maintenance of equipment, to have spare parts and backup plans for rapid recovery of damaged infrastructure. It is important to conduct mandatory training for garden management staff and to monitor their work, as well as to involve qualified technical staff to solve complex technical problems. *To minimize technological risks*, it is necessary to ensure regular technical inspection and maintenance of equipment, to conclude service contracts with certified suppliers.

Pandemic risks may affect project implementation. Epidemic measures affect delays in the execution of works, changes in consumer demand. To minimize these risks, it is necessary to develop contingency plans to ensure the safety of workers during epidemic restrictions, and to use digital technologies to organize virtual meetings and trainings when physical contact is not possible. *Effective measures* include establishing flexible delivery schedules for products and services to meet changing demand and developing marketing campaigns aimed at maintaining consumer interest during epidemics [29].

Economic risks such as economic crises and currency instability also pose a threat to the project. Economic crises can lead to reduced funding or donations to a

project, and changes in the exchange rate can affect the cost of imported garden materials and equipment. *To minimize these risks*, you can diversify funding sources from sponsorship programs and grants, develop alternative funding models, such as partnerships with local businesses or commercial organizations. Useful strategies include concluding supply contracts with foreign suppliers on a long-term basis to reduce the risk of currency fluctuations, using financial instruments to hedge currency risks, such as forward contracts or options.

Legal risks may arise due to problems with land owners or local authorities, which can significantly delay the project implementation process. To minimize or avoid legal risks, it is important to consult with legal experts to resolve potential conflicts and disputes. Making clear agreements with landowners and local authorities will help avoid many problems. It is important to ensure that all regulatory requirements are met and that necessary permits are obtained before starting the project.

Project risk management is essential to the successful execution of projects in any industry. It ensures an increase in the probability of achieving project goals, efficient use of resources, cost reduction and avoidance of delays. Using a variety of risk management methods and tools allows project teams to anticipate potential problems and take steps to prevent or mitigate them. Taking risks into account and developing strategies for their management are necessary for the successful implementation of environmental projects. Effective risk management helps reduce negative impacts, optimize resources and ensure achievement of set goals.

CHAPTER 3.
PLANNING SYSTEM OF THE URBAN GARDEN CREATION PROJECT “GREEN OASIS”

3.1. Summary and development of the project strategy

A summary is a brief overview of the main aspects of the project, including information about its purpose, objectives, key features and benefits. It is designed to quickly familiarize interested parties with the main aspects of the project and is used for presentations, applications for funding and other situations where it is necessary to convey information with a minimum expenditure of time. Developing a summary includes summarizing key data and identifying the main benefits and goals of the project.

The project strategy is a detailed plan of action to achieve the goal and objectives of the project. It includes an analysis of strengths and weaknesses, opportunities and threats, determination of necessary resources, development of an action plan and risk minimization strategies. Developing a project strategy helps ensure a systematic and organized approach to project implementation, helps manage resources and risks, as well as identify ways to achieve success.

Both of these elements are key to the successful implementation of any project, as they help to clearly define the purpose, goals, strategies and action plans. For their development, it is important to conduct a detailed analysis and take into account all aspects of the project, to involve interested parties and ensure their agreement on the strategy.

The summary and strategy of the urban garden project provide clear directions for implementation and implementation. By outlining project goals, objectives, and timelines, stakeholders can ensure that they are all working toward a common goal. Such clarity of purpose is essential for mobilizing resources, securing funding, and engaging with local communities. Without a clear strategy, urban garden projects can be implemented inefficiently, not using their full potential.

A well-developed brief and strategy for an urban garden project allows stakeholders to identify and mitigate potential risks and challenges. By conducting a thorough analysis of the project's strengths and weaknesses, opportunities and threats, stakeholders can anticipate and prepare for potential obstacles, such as local resistance, logistical problems or lack of funding. This approach allows stakeholders to develop contingency plans, minimize risks, and ensure project success [17].

A comprehensive project summary and strategy facilitates collaboration and engagement with local stakeholders. By describing the benefits of the project, stakeholders can engage with local residents, businesses, and community groups and build a coalition of support for the initiative. This collaborative approach not only ensures that the project is responsive to local needs and challenges, but also fosters a sense of ownership and responsibility among stakeholders.

By setting clear goals and objectives, stakeholders can track project progress, identify areas for improvement, and make data-driven decisions to optimize project outcomes. This evidence-based approach ensures that the project is focused on its main objectives and achieves the planned results. By outlining the project's goals, objectives, and budget, stakeholders can make a compelling case for funding and resource allocation. This gives access to the necessary resources for the successful implementation of the project.

The urban garden project strategy provides a framework for long-term sustainability. Stakeholders can ensure that the project remains viable and sustainable in the long term. A visionary approach enables stakeholders to plan the future of the project, anticipate challenges and develop strategies to address them.

Summary of the urban garden project

1. Name of the project: urban garden "Green Oasis"

2. The goal of the project: creation of a city garden where residents can grow vegetables, fruits and herbs together. This will contribute to environmental education, provision of fresh products and strengthening of the community.

3. The task of the project: to organize a common space for growing plants; provide training and support for residents on gardening and environmental education;

promote social interaction and strengthening of ties in the community; to increase environmental awareness and sustainable development of the community.

4. Brief description of the project: the project involves the creation of a city garden or public garden on a designated plot within the city. It will be an open space available to all residents of the community, where they can grow vegetables, fruits, herbs and flowers. The project will include elements of environmental education, social interaction and sustainable development.

5. Key components of the project:

- Choosing a place (determining and agreeing with the local authorities on the location of the city garden)
- Planning and design (development of a plan for the location of beds, paths, recreation areas and study areas)
- Involvement of the community (holding informational meetings for residents, involvement of volunteers and local organizations)
- Equipment and resources (purchase of necessary equipment, tools, materials for fences, irrigation systems and plant seeds)
- Educational programs (organization of master classes and seminars on gardening, composting, environmental education)
- Social events (holding joint events such as harvest festivals, open days, school tours)
- Monitoring and evaluation (monitoring the progress of the project and its impact on the community).

6. Expected results

- Improvement of the ecological condition and green infrastructure of the city.
- Increasing the level of environmental awareness and knowledge about sustainable development among residents.
- Strengthening of social ties and active participation of residents in joint events.
- Providing the community with fresh and organic products.

- Creation of a model project for other communities.

7. Duration of the project

Preparatory phase: 3 months

Implementation: 6 months

Continuous activity and development: indefinitely

8. Project budget

- Cost of equipment and materials.
- Expenses for the organization of educational events.
- Costs for advertising and community involvement.
- Current expenses for the maintenance and development of the garden.

9. Partners and involved parties

- Local government
- Educational institutions
- Environmental organizations
- Local businesses and sponsors
- Volunteers and community residents

10. Methods of evaluating project results

- Evaluation of the number of participants and activity of residents
- Measurement of volumes of grown products
- Survey of participants regarding project satisfaction
- Feedback and recommendations from the community.

Creation of urban gardens has become an urgent problem of modern cities. As the world's population is increasingly urbanized, the need for green space in cities is becoming more and more acute. Urban gardens not only provide a peaceful oasis amidst built-up areas, but also offer a range of benefits, including improved air quality, reduced noise pollution and increased biodiversity. However, creating a successful urban garden project requires careful planning and execution. An integrated approach that includes community involvement, sustainable design, and innovative financing strategies is important for creating an urban garden [18].

Community involvement is critical to creating a successful urban garden project. Urban gardens should be designed and developed in collaboration with local residents, community groups and stakeholders. This not only ensures that the garden meets the needs of the local community, but also promotes a sense of ownership and responsibility among community members. For example, the High Line in New York City is an example of a successful urban garden project developed through the collaborative efforts of the city, local residents, and community groups. The success of the project can be attributed to the fact that it was developed with the participation of the local community, resulting in a space that truly reflects the needs and aspirations of the community.

Environmental design must be taken into account when developing a strategy. Urban gardens should be designed with sustainability in mind, including features such as rainwater harvesting systems, composting, and growing native plant species. Ecological design reduces the impact on the environment and at the same time is a model of sustainable living for the local community. For example, the urban garden project in Barcelona's La Teixonera district is a model of sustainable design, incorporating elements such as a green roof, a rainwater collection system and native plant species. The project’s focus on sustainability reduced the garden’s environmental impact and provided a model of sustainable living for the local community.

Innovative funding strategies are essential to creating a successful urban garden project. Urban gardens often require significant funding to establish and maintain, and traditional sources of funding such as government grants and private donations may not be sufficient. Therefore, innovative financing strategies such as crowdfunding, corporate sponsorship, and public-private partnerships are needed to ensure the long-term viability of the project. For example, an urban garden project in the Zuidplein area of Rotterdam was financed through a public-private partnership between the city and a local developer, which provided a model for innovative financing strategies [15].

Urban gardens can serve as centers for education and community work. Urban gardens can provide community members with a unique opportunity to learn about sustainable gardening practices, environmental conservation, and healthy living. For example, the City Garden project in Berlin's Kreuzberg district offers workshops and educational programs on sustainable gardening practices, providing a valuable resource for the local community. An important aspect of such projects is their potential to promote social cohesion and community building. Urban gardens can serve as community centers, providing spaces for community members to interact. For example, the urban garden project in the 15th arrondissement of Paris has become a hub of public activity, hosting public events and festivals that promote social cohesion and community building.

A project to create an urban garden can have several options for strategies, each of which is focused on different aspects and needs of the community. One strategy option is to create a community garden where local residents can cultivate their own plots of land to grow vegetables, fruits and flowers. This option promotes the development of social ties, increases environmental awareness and provides local residents with fresh produce. The public garden can also become a venue for educational events, such as gardening workshops or environmental workshops for children and adults.

Creation of an interactive park. Another variant of the strategy is to create an interactive park with elements of a city garden. Such a park can include themed areas with different types of plants, from green grassy areas to fruit trees and berry bushes. An interactive park can have educational stands with information about different types of plants, their benefits for the ecosystem and human health. You can also install benches, playgrounds and paths for walking, which will make the park an attractive place for the whole family to relax.

Biodiversity and nature protection. Another strategy option is to create an urban garden with an emphasis on biodiversity and nature conservation. Rare and endangered species of plants that need protection can be planted in such a garden. An urban garden can include areas for pollinators, such as flower meadows and plantings

of honey plants, which will help to maintain populations of bees and other beneficial insects. It is also possible to provide water bodies and places for nesting birds, which will increase the ecological value of the garden and make it attractive for ornithologists and nature lovers.

Social integration and therapy. A strategy aimed at social integration and therapy can be developed. Such an urban garden can be specially adapted for people with disabilities, including raised beds for those who cannot bend and tactile paths for the visually impaired. Special horticultural therapy programs can also be arranged for people with mental disorders or veterans in need of rehabilitation. This will help create an inclusive environment where everyone can find activities of interest and benefit from communication with nature.

Each of these strategy options has its advantages and can be adapted to the specific needs and conditions of the local community. It is important to ensure the active participation of residents in the planning and implementation of the project so that the city garden becomes a real center of the community.

To create a work schedule for the “Green Oasis” project using a Gantt chart, it is necessary to determine the main stages of the project and the time required for their implementation.

1. Preparatory stage (1 month)
   - Territory analysis and garden concept development (1 week)
   - Involvement of the public and discussion of the project (2 weeks)
   - Obtaining necessary permits and approvals (1 week)
2. Planning and design (1 month)
   - Development of a detailed garden plan (2 weeks)
   - Preparation of the budget estimate (1 week)
   - Attracting financing (1 week)
3. Preparation of the territory (1 month)
   - Land clearing and preparation (2 weeks)
   - Territory marking and bed preparation (2 weeks)

4. Planting (2 months)
   - Purchase of plants and necessary equipment (2 weeks)
   - Planting of trees, bushes and perennial plants (3 weeks)
   - Planting of annual plants and flowers (1 week)
5. Arrangement of infrastructure (1 month)
   - Installation of paths, benches and lighting (2 weeks)
   - Arrangement of places for recreation and playgrounds (2 weeks)
6. Starting and opening the garden (1 week)
   - Organization of the grand opening (1 week)
   - Conducting educational events and workshops (1 week)
7. Support and care (ongoing)
   - Regular care of plants and territory (ongoing)
   - Carrying out seasonal works (depending on the season)

Table 3.1

Work schedule for the “Green Oasis” project (Gantt chart)

Stages of the project	January	February	March	April	May	June	July	August	September	October	November	December
Preparatory stage	X											
Planning and design		X										
Preparation of the territory			X									
Planting plants				X	X							
Arrangement of infrastructure					X							
Opening of the garden						X						
Support and maintenance			X	X	X	X	X	X	X	X	X	X

Thus, the general work schedule for the project to create a urban garden “Green Oasis” covers the whole year, with regular care and support after its opening.

Therefore, developing an urban garden project summary and strategy is critical to success. By providing clear direction, identifying and mitigating risks, fostering collaboration, providing a framework for monitoring and evaluation, securing

funding and resources, and ensuring long-term sustainability, a comprehensive brief and strategy enable the project to achieve its goals and create a sustainable urban oasis. As cities continue to grow and develop, the importance of urban gardens will only increase. Creating a successful urban garden project requires a multifaceted approach that includes community engagement, sustainable design, innovative funding strategies, community education, and social cohesion. Using these strategies, urban gardens can become thriving community centers that provide a range of benefits for local residents.

3.2. Project budget planning

Project budgeting is an important step in managing any project, including environmental initiatives. The essence of budget planning is to determine the financial resources necessary for the implementation of the project, as well as to develop a detailed plan for their use. This includes estimating all costs, from material resources to labor costs, and predicting possible financial risks. Budget planning ensures financial discipline and transparency, helps avoid overspending and allows you to control the implementation of the project at all stages.

A well-planned budget is the basis for attracting funding, as it demonstrates to donors and investors a serious approach to resource management and a clear understanding of the project’s financial needs.

The budget planning procedure begins with defining the main goals and objectives of the project. Next, identify all required resources, including materials, equipment, labor, services, and other costs associated with the project. Each of these elements must be detailed, taking into account the cost, quantity and terms of use.

After that, it is necessary to estimate the cost of each element. This may include obtaining commercial offers from suppliers, analyzing market prices, taking into account internal costs of the organization, etc. Based on these data, a general estimate of the project is drawn up. It is also important to take into account possible

unforeseen costs by including a reserve fund in the budget, which is usually 5-10% of the total amount of the project.

The next step is the distribution of the budget according to the stages of project implementation. This allows you to understand what costs are expected at each of the stages and how financial resources will be used throughout the entire project implementation period. This approach provides flexibility and the ability to adjust costs in case of changing conditions or occurrence of unforeseen circumstances [64].

Cost control and monitoring is an integral part of budget management. This includes regular analysis of financial statements, comparison of actual costs with planned costs and detection of deviations. If necessary, corrective measures should be taken to keep costs within the approved budget. It is also important to ensure transparency and reporting to donors, investors and other stakeholders.

Budget planning also includes fundraising. This can be both internal funding of the organization and external sources such as grants, loans, crowdfunding or investments. To attract external funding, it is important to prepare a detailed and justified budget application, which includes a description of the project, its goals, expected results and a detailed estimate [28].

Developing a budget for the Green Oasis urban garden project is an important part of planning. The estimated costs for the urban garden project are shown below.

1. Capital costs:

a) Land and infrastructure:

- Purchase or lease of land: $10,000
- Development of a plan for the garden and infrastructure: $5,000
- Installation of a fence: $3,000
- Construction of paths and infrastructure objects: $7,000

b) Construction works:

- Construction of buildings for storage of inventory and tools: $8,000
- Construction of buildings for recreation and educational programs: $10,000

2. Operating expenses (monthly):

a) Materials and equipment:

- Purchase of plants, seeds and fertilizers: $2,000

b) Staff

- Salaries and benefits for garden administrators, gardeners and other workers: $5,000

c) Operating expenses:

- Electricity and water supply: $500
- Equipment maintenance and repair costs: $500
- Management and administration costs, including insurance and auditing: $1,000

3. Financing:

- Grants and subsidies from local organizations and government structures: $20,000
- Sponsorship contributions from local businesses and residents: $15,000
- Crowdfunding and other forms of mass financing: $5,000

4. Calculation of the total cost of the project:

Capital costs:

- Land and infrastructure: $25,000
- Construction works: $18,000

Operating expenses (per year):

- Materials and equipment: $24,000
- Staff: $60,000
- Operating expenses: $12,000

The total cost of the project is $154,500.

This budget will enable the city garden project to be implemented effectively, providing the necessary capital expenditures, operating expenses, and contingency funds.

A variety of sources can be used to finance the project of creating an urban garden. One of the options is grants and subsidies. Many local organizations, foundations and scholarship programs provide grants for sustainable development and green building projects. In addition, various governmental and international

organizations also provide grants for projects that contribute to environmental conservation and community development. Sponsorship contributions are another option. Often, local businesses are interested in supporting initiatives that help preserve the environment and improve the quality of life in the city. It is also possible to involve local residents through crowdfunding campaigns or personal contributions, which can be an important source of funding. Corporate partnerships can also be helpful. Many companies have corporate social responsibility (CSR) programs aimed at supporting projects in the field of environmental protection and community development [43].

Fundraising is the process of attracting financial, material or other resources for the implementation of green construction and sustainable development projects. This tool is used to raise funds for various initiatives aimed at preserving the environment, improving the quality of life and developing sustainable infrastructure. Fundraising can be done through various channels, including charity events, crowdfunding platforms, sponsorships from companies and organizations, and grant programs. Organizers typically use a variety of strategies and methods to gain attention and mobilize resources, including holding outreach events, creating informational materials, publishing social media campaigns, and organizing fundraisers. Fundraising is an important tool for ensuring the financial sustainability and successful implementation of green building and sustainable development projects, helping to attract the necessary resources and support from the community, business and government.

Involving local residents and businesses through fundraising allows you to raise funds and raise awareness of the project in the community itself. Crowdfunding and other forms of fundraising allow you to attract a large number of small contributions from individuals, which can significantly increase the total amount of funds raised. Fundraising makes it possible to collect funds at different stages of the project and to adapt the fundraising strategy according to the needs of the project. Crowdfunding provides transparent financial management and reporting to donors, which strengthens the trust and support of the community. The use of these sources of

funding will contribute to the successful implementation of the urban garden project by providing the necessary resources for capital expenditures, operational costs and program implementation.

Therefore, project budget planning is a complex process that requires careful analysis, planning and constant monitoring. It ensures the financial stability of the project, allows efficient use of resources and achievement of the set goals within the approved budget. Various sources can be used to finance the project of creating an urban garden: grants and subsidies, grants for projects from governmental and international organizations, sponsorship contributions, crowdfunding campaigns or personal contributions, corporate partnerships, corporate social responsibility (CSR) programs aimed at supporting projects in in the field of environmental protection and community development.

3.3. Evaluation of project effectiveness and scaling

Evaluation of project performance is a process that includes the collection, analysis and evaluation of data for the purpose of determining the achievement of set goals, determining effectiveness and verifying the compliance of the project with requirements and expectations. This process requires clearly defining the purpose and goals of the project, selecting key performance indicators, collecting and analyzing data on project progress, assessing compliance with requirements and expectations, and developing recommendations for further action. Performance evaluation helps to ensure optimal use of resources, achievement of goals and satisfaction of stakeholders' expectations, which makes it an important part of project management [31].

An urban garden project can have a variety of economic benefits for the local community and business environment.

Increasing local business. City gardens can become popular tourist attractions that attract tourists and increase demand for hospitality services (hotels, restaurants, cafes). Green areas promote the development of local businesses that sell

horticultural products, such as organic produce, seeds, fertilizers and other horticultural equipment.

Saving energy and reducing costs. Green spaces can help lower the city's temperature, reducing the need for air conditioning in the summer, leading to lower energy costs. Gardens can reduce waste disposal costs by composting organic waste and using it as fertilizer.

Increase in real estate value. Having more green areas in a city can increase the livability of an area, which can lead to higher property values. Studies show that the presence of green areas has a positive effect on the market value of housing.

Health and well-being of residents. Green areas promote a healthy lifestyle, reducing stress and improving the physical and mental health of residents.

The calculation of the economic benefit from the project of creating an urban garden can be carried out using different approaches that take into account the different directions of the project's impact on the local economy. Saving energy and reducing costs is one of the important aspects that includes the assessment of reducing air conditioning costs, because improving the microclimate thanks to green areas can significantly reduce energy costs. Disposal costs are also reduced, as composting organic waste and using it as fertilizer can reduce waste disposal costs.

Improving the health and well-being of residents also has an economic impact. Reducing stress and improving the health of residents through access to green spaces can lead to reduced health care costs and lost work due to illness.

An increase in local business can be achieved by increasing the income of local enterprises. The development of green areas can increase the demand for gardening products, cafes and other services, which will positively affect the local economy [57].

Methods of calculating the economic benefit:

1. Cost-Benefit Analysis (CBA): A cost-benefit analysis allows you to assess whether the benefits outweigh the costs as a result of the project.

2. Return on Investment (ROI): Calculating return on investment can show what proportion of costs will be returned through increased revenues or reduced costs.

3. Cost-Effectiveness: Estimating the cost relative to the results achieved, such as reduced energy costs or increased real estate value.

Below are the expected results from the implementation of the project.

Energy savings of $20,000 per year

To calculate the amount saved, the average cost of electricity for conditioning one square meter of residential or commercial space and the number of buildings that will benefit from the creation of an urban garden are taken into account. For example, if the garden covers an area of 100,000 square meters and the annual electricity savings is $0.20 per square meter, the total savings will be $20,000 per year.

Waste disposal savings of $10,000 per year

Assuming that the urban garden composts, for example, 100 tons of organic waste each year and reduces disposal costs by $100 per ton, the total savings would be $10,000 per year.

Increase in real estate value $50,000

If we estimate that creating an urban garden increases property values by an average of 5% for 1,000 homes, each with an average value of $100,000, the total increase in property values is $5,000,000. If we consider only the annual benefit from the appreciation, we can assume that only a portion of this appreciation (eg 1%) is realized in the form of income from the sale or rental of the property, amounting to $50,000 per year.

The overall economic benefit of the project

Adding up all these components, we get a total economic benefit: $20,000 per year in electricity + $10,000 per year in garbage disposal + $50,000 per year in property appreciation, which gives a total of $80,000 per year. This is the cumulative economic benefit that can be expected from an urban garden project.

Project scaling is the process of expanding or reducing the scope and impact of a project in order to adapt it to changing conditions or needs. This may mean an increase in resources, coverage area, number of participants or volume of production, or a decrease in these indicators depending on the needs and goals of the project. Scaling can be a strategic decision to solve a variety of tasks, such as increasing

project impact, ensuring sustainable growth, increasing resource efficiency, or responding to changes in the internal or external environment [27]. Prospective directions for scaling up the “Green Oasis” urban garden project:

- expanding the territory of the garden;
- integration with other city projects;
- expansion of educational initiatives;
- development of cooperation with local enterprises and organizations;
- introduction of new technologies;
- implementation of social programs;
- organization of mass events on the territory of the city garden.

One of the directions can be the expansion of the garden area. This may include increasing the area of the garden, attracting new plots of land, perhaps even in different areas of the city. This approach will allow creating a network of city gardens, which will provide more green areas for city residents.

Another direction is integration with other city projects. For example, it is possible to join forces with projects for the development of bicycle paths, parks, playgrounds and other infrastructure initiatives. This will contribute to the creation of a comprehensive ecological and recreational network that will improve the quality of life of residents.

Educational programs are an important direction. Expanding educational initiatives such as master classes, workshops, school programs and public lectures will help raise environmental awareness and involve more people in gardening projects. It could also include the creation of training centers or laboratories based on the urban garden.

To develop cooperation with local enterprises and organizations, businesses can be involved in financing new garden plots or supporting existing ones through corporate social responsibility programs. Joint projects with local schools, universities and non-governmental organizations can promote the development of innovative solutions and attract additional resources.

The use of advanced horticultural techniques, such as vertical gardening, aquaponics, automated irrigation systems and plant health monitoring, has great potential in increasing the efficiency and sustainability of urban gardens. Vertical landscaping, for example, allows you to make the most of the limited urban area by creating areas of green space on buildings and walls. Aquaponics combines growing plants and breeding fish in a closed cycle, which allows to optimize the use of resources and ensure sustainable food production in an urban environment. Automated systems of watering and monitoring the condition of plants allow you to optimize the management of the garden, ensuring the optimal level of moisture and nutrition of plants, as well as a quick response to any deviations or problems. This helps to increase productivity and reduce losses from stress or disease. The use of advanced technologies opens up new opportunities for research and innovation in the field of urban horticulture. New methods and technologies can be tested and optimized within the urban garden, creating a basis for the development of more efficient and sustainable agricultural production systems in urban settings [32].

The development of social programs is an important direction of the project. For example, creating therapeutic gardening programs for people with disabilities, veterans, the elderly, or children with special needs. This will help create an inclusive environment where everyone can find their place and benefit from participating in the project.

The organization of festivals, fairs and other mass events on the territory of the city garden will attract attention to the project, attract new participants and provide additional sources of funding through ticket sales, sponsorship contributions and other forms of support.

Therefore, the effectiveness of the Green Oasis urban garden project depends on the ability to adapt to the changing conditions and demands of the community, as well as on the involvement of various stakeholders in the project. Scaling the project opens up new opportunities for improving the ecological condition of the city, improving the quality of life of residents and promoting sustainable development. Expansion of the garden area, integration with other city initiatives, implementation

of the latest technologies and development of educational and social programs ensure not only the long-term sustainability of the project, but also its positive impact on the community and the environment. Success in project scaling depends on effective resource management, a clear strategy and active participation of local residents, which together form the basis for sustainable development and prosperity of the urban garden.

CONCLUSIONS

1. Ecological projects play an important role in maintaining ecological, economic and social sustainability, ensuring nature conservation, stimulating economic development and improving people's quality of life. Environmental projects are critical to sustainable development because they contribute to the conservation of natural resources, the maintenance of ecosystem services, the improvement of people's quality of life, economic growth and technological development. They are an important tool for overcoming global environmental challenges and ensuring a healthy and balanced future for future generations.

2. Modern trends in the management and implementation of environmental projects are characterized by the integration of advanced technologies, active public participation, increased environmental responsibility of business, development of the circular economy, and strengthening of international cooperation. Such a comprehensive approach makes it possible to more efficiently solve environmental problems and ensure sustainable development of society.

3. Project management in the environmental field requires an integrated approach that takes into account the complexity of environmental problems and the need for interdisciplinary cooperation. Methodological aspects of project management in the environmental field include a comprehensive approach to planning and implementation, taking into account the specifics of environmental tasks and the need to involve a wide range of stakeholders. Important elements are clear definition of goals, detailed planning, constant monitoring and evaluation, effective communication and involvement of stakeholders, as well as the use of modern technologies. Complex management of the project of creating an urban garden includes various management methods aimed at achieving the set goals of the project, ensuring the quality of work, managing risks and resources, as well as effective communication and cooperation with stakeholders. The implementation of such methodological approaches allows to ensure the successful implementation of

environmental projects and contributes to the achievement of sustainable development.

4. When developing an idea for any project, it is important to understand what main problem it can solve. All further work on the project, its goals, tasks and expected results depend on the definition of the main problem. One of the effective methods of problem analysis is the use of a “problem tree”. The project of creating an urban garden is important for the sustainable development of cities, improving the quality of life of residents and preserving the environment. It contributes to the ecological, social and economic sustainability of cities and ensures proper use of free urban space. This project is intended for all city residents who seek to improve their lives through the creation of natural and green areas in the urban environment. The project offers opportunities for social integration, physical activity and educational initiatives, contributing to the healthy and ecologically sustainable development of the city.

5. The main goal of the urban garden project is to improve the environment, reduce the carbon footprint, increase environmental awareness and sustainable use of urban land for growing food. Goals and sub-goals specify the general goal of the project and allow defining specific tasks to achieve the ultimate goal of improving the quality of life of city residents through green areas and fresh products. SWOT analysis allows you to assess the potential of the project, as well as identify potential problems and opportunities for further development. A SWOT analysis of the urban garden project demonstrates both positive aspects and challenges that the initiative may face. Taking these factors into account will allow you to better prepare for the implementation of the project and increase the chances of its successful implementation.

6. Project risk management is important for the successful implementation of projects in any industry. It ensures an increase in the probability of achieving project goals, efficient use of resources, cost reduction and avoidance of delays. Using a variety of risk management methods and tools allows project teams to anticipate potential problems and take steps to prevent or mitigate them. Taking risks into

account and developing strategies for their management are necessary for the successful implementation of environmental projects. Effective risk management helps reduce negative impacts, optimize resources and ensure achievement of set goals.

7. Developing an Urban Garden Project Summary and Strategy is critical to success. By providing clear direction, identifying and mitigating risks, fostering collaboration, providing a framework for monitoring and evaluation, securing funding and resources, and ensuring long-term sustainability, a comprehensive brief and strategy enable the project to achieve its goals and create a sustainable urban oasis. As cities continue to grow and develop, the importance of urban gardens will only increase. Creating a successful urban garden project requires a multifaceted approach that includes community engagement, sustainable design, innovative funding strategies, community education, and social cohesion. Using these strategies, urban gardens can become thriving community centers that provide a range of benefits for local residents.

8. Project budget planning is a complex process that requires careful analysis, planning and constant monitoring. It ensures the financial stability of the project, allows efficient use of resources and achievement of the set goals within the approved budget. Various sources can be used to finance the project of creating an urban garden: grants and subsidies, grants for projects from governmental and international organizations, sponsorship contributions, crowdfunding campaigns or personal contributions, corporate partnerships, corporate social responsibility (CSR) programs aimed at supporting projects in in the field of environmental protection and community development.

9. The effectiveness of the project to create a urban garden “Green Oasis” depends on the ability to adapt to the changing conditions and demands of the community, as well as on the involvement of various stakeholders in the project. Scaling the project opens up new opportunities for improving the ecological condition of the city, improving the quality of life of residents and promoting sustainable development. Expansion of the garden area, integration with other city

initiatives, implementation of the latest technologies and development of educational and social programs ensure not only the long-term sustainability of the project, but also its positive impact on the community and the environment. Success in project scaling depends on effective resource management, a clear strategy and active participation of local residents, which together form the basis for sustainable development and prosperity of the urban garden.

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