

**THE CONCEPT OF THE VERTICAL GARDEN, ITS HISTORY OF FORMATION AND
ITS PLACE IN MODERN ARCHITECTURE**

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Abstract: This article broadly covers the concept of a vertical garden (green wall, "living wall"), its history of origin, and its importance in modern architecture. It also covers the ecological, aesthetic, and social benefits of vertical gardens, their importance in improving air quality, increasing energy efficiency, and improving the health of the urban environment. The research results indicate the need for effective use of vertical gardens in the design of multi-story residential buildings and public facilities.

Keywords: Vertical garden, green walls, ecological architecture, sustainable development, facade design, modern architecture, sustainable development,

Introduction: Vertical gardens have become an important aspect of modern architectural design, seamlessly connecting nature with urban spaces. These living walls not only enhance the aesthetic appeal of buildings, but also provide numerous environmental and health benefits. By integrating green spaces into the structure of buildings, vertical gardens bring us closer to nature while solving the problems of urbanization. Vertical gardens have a rich history that dates back to ancient civilizations.

The most famous example of a green wall is the Hanging Gardens of Babylon, one of the Seven Wonders of the Ancient World. It is believed that they were built in the 6th century BC. Later, many civilizations from Scandinavia to Japan used plants to cover buildings. In the Middle Ages, the use of evergreen plants on the walls of palaces, castles, and monasteries was widespread (Figure 1). Vertical gardens (green walls) are one of the important elements of modern architecture. They partially solve the problem of the lack of green spaces in cities, improve human health and environmental quality, and are developing as an important component of the architecture of the future.

VERTIKAL BOG'LARNING SHAKILLANISH TARIXI

Davr	Vaqt	Asosiy xususiyatlari	Misolalar / Namunalari	Ahamiyati
1 Qadimgi davr	Mil. avv. VI asr	Bobiling osma bog'lari terasalarida daraxt va o'simliklar yetishtirilgan. Sug'orish tizimlari orqali ko'p qavatli yashil inshoot yaratilgan.	 Bobiling osma bog'lari	Vertikal ko'kalamzorlashtirishning ilk namunasi bo'lib, keyingi davrlar uchun ilhom manbai bo'lgan.
2 Antik va o'rta asrlar	Mil. avv. I asr – XV asr	Saroylar, qal'alar, monastir va uylar devorlarida pechak, tok, atirgul va boshqa chirmashuvchi o'simliklar keng qo'llanilgan.	 O'rta asr qal'a devorlari	Binolarni bezash, soyalanishini ta'minlash va issiqlikdan himoya qilish vazifasini bajargan.
3 Uyg'onish davri	XV–XVII asrlar	Bog'-park san'atining rivojlanishi bilan terrasali bog'lar va yashil inshootlar yaratilgan. Arxitektura va landschaft uyg'unlashgan.	 Italiya terrasali bog'lari	Landschaft dizayni va arxitektura uyg'unligi vertikal bog'lar rivojlanishiga zamin yaratdi.
4 Sanoatlashuv davri	XVIII–XIX asrlar	Shaharlarda yashil hududlar qisqarishi natijasida binolar fasadlarini ko'kalamzorlashtirishga qiziqish ortdi. Daraxt va tok o'simliklari ishlatilgan.	 XIX asr sanoat shaharlari	Shahar ekologiyasini yaxshilash uchun vertikal ko'kalamzorlashtirish g'oyasi shakllandi.
5 XX asr boshlari	1900–1950-yillar	Chirmashuvchi o'simliklar yordamida yashil devorlar yaratish amaliyoti kengaydi. Turli tayanch konstruksiyalar ishlab chiqila boshlandi.	 Yashil qoplangan fasadlar	Vertikal bog'larning zamonaviy shakliga o'tish bosqichi bo'lib, amaliy tajriba ortdi.
6 XX asr oxiri	1980–2000-yillar	Fransuz botanigi Patrick Blanc tomonidan zamonaviy vertikal bog' texnologiyasi ishlab chiqildi. Hidroponika va modulli tizimlar joriy etildi.	 Patrick Blanc va yashil devor	Ilmiy asoslangan vertikal bog' tizimi yaratildi va dunyo bo'ylab yayildi.
7 XXI asr	2000-yildan hozirgacha	Vertikal bog'lar turar joy, ofis, savdo markazlari va jamoat binolarida keng qo'llanilmoqda. Avtomatlashtirilgan sug'orish va aqlli tizimlar rivojlandi.	 Zamonaviy vertikal bog'lar	Barqaror arxitektura, energiya samaradorligi va ekologik barqarorlikka katta hissa qo'shmoqda.

Figure 1. The history of the formation of vertical gardens

Analysis and results: Advantages of vertical gardens in architecture: Improving air quality and reducing air pollution

Vertical gardens are one of the important elements that ensure environmental sustainability in modern architecture. They not only improve the aesthetic appearance of buildings, but also have a positive effect on the environment and human health. They are especially important in improving air quality and reducing pollution. Plants absorb carbon dioxide (CO₂) from the atmosphere during photosynthesis and release oxygen. Vertical gardens, due to their large green surface, help increase the amount of oxygen in cities. At the same time, they absorb a certain part of the harmful gases emitted by cars and industrial enterprises, including nitrogen oxides, sulfur dioxide and carbon compounds. Vertical gardens also have the property of trapping dust and fine particles in the air. The leaves of plants trap dust particles, which are washed away during rain or irrigation. As a result, the air around buildings becomes cleaner and a more comfortable environment is created for people's respiratory system. In addition, vertical gardens reduce the "heat island" effect in cities. Concrete and asphalt surfaces absorb sunlight and increase the ambient temperature. Plants naturally cool the air through the process of evaporation.

This improves the microclimate and regulates air circulation. Another advantage of vertical gardens is that they have noise-absorbing properties. Vegetation cover and soil layers reduce noise from the outside environment, creating a comfortable acoustic environment inside buildings. This is especially important for residential and office buildings located on busy streets.

Vertical gardens also support biodiversity. Various plant species create a habitat for birds, butterflies and beneficial insects. As a result, the stability of the urban ecosystem increases.

One of the most important moments in the process of designing green walls is the selection of

these species. That is, it is necessary to choose plants that grow evenly and have beautiful lower leaves, visible from below.

Analyses show that vertical gardens are an innovative solution that meets the ecological and functional requirements of modern architecture. As a result of their use:

1. Improves air quality in urban environments and reduces carbon dioxide levels.
 2. Increases energy efficiency of buildings, reduces cooling and heating costs.
 3. Partially compensates for the decreasing green areas due to urbanization
 4. Improves people's mental health and quality of life.
 5. Increases the aesthetic and investment attractiveness of architectural objects.
 6. Serves to implement the principles of sustainable development.
- Based on the analysis, vertical gardens reduce environmental problems.

Blanc's most famous work in Paris is the administration building of the Quai Branly Museum (architect Jean Nouvel). Its walls are decorated with 15,000 plant specimens of 150 different species. People are very tired of concrete and glass, so vertical gardens are in great demand today (Figure 2).



Figure 2. The administration building of the Quai Branly Museum, Blanc's most famous work in Paris

Conclusion: Vertical gardens are becoming an integral part of modern architecture by purifying the air, increasing oxygen levels, reducing dust and harmful gases, improving the microclimate, and maintaining ecological balance. Therefore, the use of vertical gardens in multi-storey residential buildings is an environmentally and socially effective solution. Vertical gardens are also widely used in architectural practice as a modern and innovative solution, enriching the architectural appearance of buildings. World experience shows that the use of vertical gardens has high environmental, economic, and social efficiency. Therefore, the

widespread introduction of vertical gardens in the design of multi-storey residential and public buildings in the future will be one of the important factors of sustainable development.

Foydalanilgan adabiyotlar:

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